SECTION A – HUMAN NECESSITIES

AGRICULTURE

A01 AGRICULTURE; FORESTRY; ANIMAL HUSBANDRY; HUNTING; TRAPPING; FISHING

A01B SOIL WORKING IN AGRICULTURE OR FORESTRY; PARTS, DETAILS, OR ACCESSORIES OF AGRICULTURAL MACHINES OR IMPLEMENTS, IN GENERAL (making or covering furrows or holes for sowing, planting or manuring A01C 5/00; machines for harvesting root crops A01D; mowers convertible to soil working apparatus or capable of soil working A01D 42/04; mowers combined with soil working implements A01D 43/12; soil working for engineering purposes E01, E02, E21)

Subclass index

1/00 Hand tools (edge trimmers for lawns A01G 3/06)
1/02 . Spades; Shovels
1/04 . . with teeth
1/06 . Hoes; Hand cultivators
1/08 . . with a single blade
1/10 . . with two or more blades
1/12 . . with blades provided with teeth
1/14 . . with teeth only
1/16 . Tools for uprooting weeds
1/18 . . Tong-like tools
1/20 . Combinations of different kinds of hand tools
1/22 . Attaching the blades or the like to handles (handles for tools, or their attachment, in general B25G); Interchangeable or adjustable blades
1/24 . for treating meadows or lawns **[2]**

Ploughs

3/00 Ploughs with fixed plough-shares
3/02 . Man-driven ploughs
3/04 . Animal-drawn ploughs
3/06 . . without alternating possibility, i.e. incapable of making an adjacent furrow on return journey
3/08 . . . Swing ploughs
3/10 . . . Trussed-beam ploughs; Single-wheel ploughs
3/12 . . . Two-wheel beam ploughs
3/14 . . . Frame ploughs
3/16 . . Alternating ploughs, i.e. capable of making an adjacent furrow on return journey
3/18 . . . Turn-wrest ploughs
3/20 . . . Balance ploughs
3/22 . . . with parallel plough units used alternately
3/24 . Tractor-drawn ploughs (A01B 3/04 takes precedence)
3/26 . . without alternating possibility
3/28 . . Alternating ploughs
3/30 . . . Turn-wrest ploughs
3/32 . . . Balance ploughs
3/34 . . . with parallel plough units used alternately
3/36 . Ploughs mounted on tractors
3/38 . . without alternating possibility
3/40 . . Alternating ploughs
3/42 . . . Turn-wrest ploughs
3/421 . . . . with a headstock frame made in one piece **[2]**
3/426 . . . . with a headstock frame made of two or more parts **[2]**
3/44 . . . with parallel plough units used alternately
3/46 . Ploughs supported partly by tractor and partly by their own wheels
3/50 . Self-propelled ploughs
3/52 . . with three or more wheels, or endless tracks
3/54 . . . without alternating possibility
3/56 . . . Alternating ploughs
3/58 . . with two wheels
3/60 . . . Alternating ploughs
3/62 . . . . Balance ploughs
3/64 . Cable ploughs; Indicating or signalling devices for cable plough systems
3/66 . . with motor-driven winding apparatus mounted on the plough
3/68 . . Cable systems with one or two engines
3/70 . . . Systems with one engine for working uphill

3/72 . . Means for anchoring the cables
3/74 . Use of electric power for propelling ploughs (electric current collectors B60L 5/00)

5/00 Ploughs with rolling non-driven tools, e.g. discs (with rotary driven tools A01B 9/00)
5/02 . drawn by animals
5/04 . drawn by tractors
5/06 . . without alternating possibility
5/08 . . Alternating ploughs
5/10 . mounted or partly-mounted on tractors
5/12 . . without alternating possibility
5/14 . . Alternating ploughs
5/16 . Self-propelled disc or like ploughs

7/00 Disc-like soil-working implements usable either as ploughs or as harrows, or the like

9/00 Ploughs with rotary driven tools (tilling implements with rotary driven tools A01B 33/00)

11/00 Ploughs with oscillating, digging or piercing tools

13/00 Ploughs or like machines for special purposes (for drainage E02B 11/02)
13/02 . for making or working ridges, e.g. with symmetrically arranged mouldboards
13/04 . for working in vineyards, orchards, or the like
13/06 . . Arrangements for preventing damage to the vines, or the like
13/08 . for working subsoil
13/10 . . Special implements for lifting subsoil layers
13/12 . . . Means for distributing the layers on the surface
13/14 . for working soil in two or more layers
13/16 . Machines for combating erosion, e.g. basin-diggers, furrow-dammers

15/00 Elements, tools, or details of ploughs
15/02 . Plough blades; Fixing the blades
15/04 . . Shares
15/06 . . . Interchangeable or adjustable shares
15/08 . . Mouldboards
15/10 . . . Interchangeable or adjustable mouldboards
15/12 . Beams; Handles (handles for tools or their attachment in general B25G)
15/14 . Frames (means or arrangements to facilitate transportation A01B 73/00) **[4]**
15/16 . Discs (bearings therefor A01B 71/04); Scrapers for cleaning discs; Sharpening attachments (sharpening in general B24)
15/18 . Coulters
15/20 . Special adjusting means for tools of ploughs drawn by, or mounted on tractors working on hillsides or slopes

17/00 Ploughs with special additional arrangements, e.g. means for putting manure under the soil, clod-crushers (A01B 49/00 takes precedence; ploughs for working subsoil A01B 13/08) **[2]**

Harrows

19/00 Harrows with non-rotating tools
19/02 . with tools rigidly or elastically attached to a tool-frame
19/04 . . with two or more tool-frames
19/06 . . with tools or tool-frames moved to-and-fro mechanically
19/08 . with link network supporting tooth-like tools
19/10 . Lifting or cleaning apparatus

21/00 Harrows with rotary non-driven tools (tilling implements with rotary driven tools A01B 33/00)
21/02 . with tooth-like tools
21/04 . . on horizontally-arranged axles
21/06 . . on vertically-arranged axles
21/08 . with disc-like tools

23/00 Elements, tools, or details of harrows
23/02 . Teeth; Fixing the teeth
23/04 . Frames (means or arrangements to facilitate transportation A01B 73/00); Drawing-arrangements **[4]**
23/06 . Discs (A01B 15/16 takes precedence; bearings therefor A01B 71/04); Scrapers for cleaning discs; Sharpening attachments (sharpening in general B24) **[2]**

25/00 Harrows with special additional arrangements, e.g. means for distributing fertilisers; **Harrows for special purposes** (A01B 39/00 takes precedence)

Other machines for working soil

27/00 Clod-crushers

29/00 Rollers
29/02 . with smooth surface
29/04 . with non-smooth surface formed of rotatably-mounted rings or discs or with projections or ribs on the roller body; Land packers
29/06 . with special additional arrangements

31/00 Drags

33/00 Tilling implements with rotary driven tools
33/02 . with tools on horizontal shaft transverse to direction of travel
33/04 . with tools on horizontal shaft parallel to direction of travel
33/06 . with tools on vertical or steeply-inclined shaft
33/08 . Tools; Details, e.g. adaptations of transmissions or gearings
33/10 . . Structural or functional features of the tools
33/12 . . Arrangement of the tools; Screening of the tools
33/14 . . Attaching the tools to the rotating shaft, e.g. resiliently-attached tools
33/16 . with special additional arrangements (A01B 49/00 takes precedence; for sowing or fertilising A01B 49/06) **[2]**

35/00 Other machines for working soil (A01B 37/00, A01B 39/00, A01B 77/00 take precedence)
35/02 . with non-rotating tools
35/04 . . drawn by animal or tractor
35/06 . . . with spring tools
35/08 . . . with rigid tools
35/10 . . mounted on tractors
35/12 . . . with spring tools
35/14 . . . with rigid tools
35/16 . with rotating or circulating non-propelled tools
35/18 . with both rotating and non-rotating tools
35/20 . Tools; Details
35/22 . . Non-rotating tools; Mounting non-rotating tools
35/24 . . . Spring tools
35/26 . . . Rigid tools

35/28 . . Rotating tools; Mounting rotating tools
35/30 . . Undercarriages (A01B 23/04 takes precedence) **[2]**
35/32 . with special additional arrangements

37/00 Devices for loosening soil compacted by wheels or the like

39/00 Other machines specially adapted for working soil on which crops are growing
39/02 . with non-rotating tools
39/04 . . drawn by animal or tractor
39/06 . . Self-propelled machines
39/08 . with rotating tools
39/10 . with oscillating tools
39/12 . for special purposes
39/14 . . for working ridges
39/16 . . for working in vineyards, orchards, or the like
39/18 . . for weeding
39/19 . . . Rod weeders, i.e. weeder with rotary rods propelled beneath the soil surface
39/20 . Tools; Details
39/22 . . Tools; Mounting tools
39/24 . . Undercarriages (A01B 23/04 takes precedence) **[2]**
39/26 . . Arrangements for protecting plants
39/28 . with special additional arrangements (A01B 49/00 takes precedence) **[2]**

41/00 Thinning machines
41/02 . with oscillating tools
41/04 . with rotating tools
41/06 . with electric, e.g. photo-electric control of thinning operations

43/00 Gatherers for removing stones, undesirable roots or the like from the soil, e.g. tractor-drawn rakes [4]

45/00 Machines for treating meadows or lawns
45/02 . for aerating
45/04 . for cutting sods or turf

47/00 Soil-working with electric potential applied between tools and soil

49/00 Combined machines (auxiliary devices attached to machines of a different kind, e.g. harrows attached to ploughs, see the relevant groups for the machines)
49/02 . with two or more soil-working tools of different kind
49/04 . Combinations of soil-working tools with non-soil-working tools, e.g. planting tools
49/06 . . for sowing or fertilising

Parts, details or accessories of agricultural machines or implements, in general [3]

51/00 Undercarriages specially adapted for mounting-on various kinds of agricultural tools or apparatus (general vehicle aspects, see the relevant subclass of class B60 or B62)
51/02 . propelled by a motor
51/04 . drawn by animal or tractor

59/00 Devices specially adapted for connection between animals or tractors and agricultural machines or implements (A01B 63/00 takes precedence; vehicle connections in general B60D; draught assemblies for animal drawn vehicles, in general B62C 5/00) **[3]**
59/02 . for animal-drawn machines
59/04 . for machines pulled or pushed by a tractor
59/041 . . preventing or limiting side-play of implements (preventing overstrain A01B 61/00) **[2]**
59/042 . . having pulling means arranged on the rear part of the tractor
59/043 . . . supported at three points, e.g. by quick-release couplings (A01B 59/06 takes precedence)
59/044 . . having pulling means arranged on the middle part of the tractor
59/046 . . having pulling or pushing means arranged on the side of the tractor
59/048 . . having pulling or pushing means arranged on the front part of the tractor
59/06 . for machines mounted on tractors

61/00 Devices for, or parts of, agricultural machines or implements for preventing overstrain (preventing overstrain in vehicle connections, in general B60D; preventing overstrain in couplings per se F16D) **[3]**
61/02 . of the coupling devices between tractor and machine
61/04 . of the connection between tools and carrier beam or frame

63/00 Lifting or adjusting devices or arrangements for agricultural machines or implements (lifting mechanisms for the cutter-bar of a mower A01D 34/24; adjusting devices for the cutter-bar of a mower A01D 34/28; constructional features of lifting devices per se B66F) **[3]**
63/02 . for implements mounted on tractors
63/04 . . Hand devices; Hand devices with mechanical accumulators, e.g. springs
63/06 . . operated mechanically by tractor motor
63/08 . . operated by the movement of the tractor
63/10 . . operated by hydraulic or pneumatic means
63/102 . . . characterised by the location of the mounting on the tractor, e.g. on the rear part
63/104 . . . . on the middle part, i.e. between front and rear wheels
63/106 . . . . on the side
63/108 . . . . on the front part
63/11 . . . for controlling weight transfer between implements and tractor wheels **[2]**
63/111 . . . regulating working depth of implements
63/112 . . . . to control draught load, i.e. tractive force **[2]**
63/114 . . . . to achieve a constant working depth **[2]**
63/118 . . . Mounting implements on power-lift linkages (A01B 59/043 takes precedence; preventing or limiting side-play of implements A01B 59/041; preventing overstrain A01B 61/00) **[2]**
63/12 . . operated by an electric motor
63/14 . for implements drawn by animals or tractors
63/16 . . with wheels adjustable relatively to the frame
63/18 . . . with clutch between Z-type axle and wheel
63/20 . . . with gear and rack
63/22 . . . operated by hydraulic or pneumatic means
63/24 . . Tools or tool-holders adjustable relatively to the frame
63/26 . . . by man-power
63/28 . . . operated by the machine or implement
63/30 . . . operated by motor power through a mechanical transmission
63/32 . . . operated by hydraulic or pneumatic means

67/00 Devices for controlling the tractor motor by resistance of tools (preventing overstrain A01B 61/00)

69/00 **Steering of agricultural machines or implements**; **Guiding agricultural machines or implements on a desired track [3]**

69/02 . Ridge-marking or like devices; Checkrow wires; Accessories therefor

69/04 . Special adaptations of automatic tractor steering, e.g. electric system for contour ploughing

69/06 . Lateral steering of machines by an additional operator

69/08 . Lateral steering of machines derived from the lateral movement of tractor

71/00 **Construction or arrangement of setting or adjusting mechanisms, of implement or tool drive or of power take-off**; **Means for protecting parts against dust, or the like**; **Adapting machine elements to or for agricultural purposes**

71/02 . Setting or adjusting mechanisms

71/04 . Bearings of rotating parts, e.g. for soil-working discs (bearings in general F16C)

71/06 . Special adaptations of coupling means between power take-off and transmission shaft to the implement or machine (couplings for transmitting rotation F16D)

71/08 . Means for protecting against dust or the like, or for cleaning agricultural implements (A01B 15/16, A01B 19/10, A01B 23/06 take precedence; screening of rotary driven tilling tools A01B 33/12; screening of rotary parts in general F16P 1/00) **[2]**

73/00 **Means or arrangements to facilitate transportation of agricultural machines or implements, e.g. folding frames to reduce overall width** (arrangements of lifting devices for soil working implements A01B 63/00; vehicles adapted for load transportation or to transport, to carry or to comprise special loads or objects B60P; motor vehicles, trailers B62D) **[4]**

73/02 . Folding frames **[4]**

73/04 . . foldable about a horizontal axis **[4]**

73/06 . . foldable about a vertical axis **[4]**

75/00 **Carriers for supporting persons when working in the field, e.g. while thinning beet**

76/00 **Parts, details or accessories of agricultural machines or implements, not provided for in groups A01B 51/00 to A01B 75/00 [8]**

77/00 **Machines for lifting and treating soil** (biocides, pest repellants or attractants, plant growth regulators A01N 25/00 to A01N 65/00; fertilisers C05; soil-conditioning or soil-stabilising materials C09K 17/00)

79/00 **Methods for working soil** (essentially requiring the use of particular machines, see the relevant groups for the machines)

79/02 . combined with other agricultural processing, e.g. fertilising, planting

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A01C **PLANTING**; **SOWING**; **FERTILISING** (combined with general working of soil A01B 49/04; parts, details or accessories of agricultural machines or implements, in general A01B 51/00 to A01B 75/00)

Subclass index

1/00 **Apparatus, or methods of use thereof, for testing or treating seed, roots, or the like, prior to sowing or planting** (chemicals therefor A01N 25/00 to A01N 65/00)

1/02 . Germinating apparatus; Determining germination capacity of seeds or the like (germinating in preparation of malt C12C 1/027)

1/04 . Arranging seed on carriers, e.g. on tapes, on cords

1/06 . Coating or dressing seed

1/08 . Immunising seed

3/00 **Treating manure**; **Manuring** (dung forks A01D 9/00; organic fertilisers from waste or refuse C05F)

3/02 . Storage places for manure, e.g. cisterns for liquid manure; Installations for fermenting manure (sewerage structures E03F 5/00; silos, bunkers E04H 7/22)

3/04 . Manure loaders (loaders in general B65G)

3/06 . Manure distributors, e.g. dung distributors

3/08 . . for manure already laying on the soil **[2]**

5/00 **Making or covering furrows or holes for sowing, planting, or manuring** (ploughs for making ridges A01B 13/02)

5/02 . Hand tools for making holes for sowing, planting or manuring (transplanting devices for trees A01G 23/02)

5/04 . Machines for making or covering holes for sowing or planting

5/06 . Machines for making or covering drills or furrows for sowing or planting

5/08 . Machines for both manuring and sowing or both manuring and planting

7/00 **Sowing** (arrangements for driving working parts A01C 19/00)

7/02 . Hand sowing implements

7/04 . Single-grain seeders with or without suction devices

7/06 . Seeders combined with fertilising apparatus (combinations with soil working tools A01B 49/04)

7/08 . Broadcast seeders; Seeders depositing seeds in rows

7/10 . . Devices for adjusting the seed-box

7/12 . . Seeders with feeding-wheels

7/14 . . . Seeders with spoon or bucket wheels
7/16 . . Seeders with other distributing devices, e.g. brushes, discs, screws, slides (with endless chains A01C 15/18)
7/18 . Machines for depositing quantities of seed at intervals
7/20 . Parts of seeders for conducting and depositing seed

9/00 Potato planters (combinations with soil-working A01B 49/04)
9/02 . with conveyer belts
9/04 . with bucket wheels
9/06 . with piercing or grasping devices
9/08 . with other distributing devices, e.g. flaps, screws, horizontal turning plates

11/00 Transplanting machines (carriers for supporting persons A01B 75/00; transplanting devices for trees A01G 23/02)
11/02 . for seedlings
11/04 . for deeper setting or shifting of plants

13/00 Machines or apparatus for consolidating soil around plants

14/00 Methods or apparatus for planting not provided for in other groups of this subclass [8]

15/00 Fertiliser distributors (A01C 7/06 takes precedence; with centrifugal wheels A01C 17/00; arrangements for driving working parts A01C 19/00; sand, gravel or salt spreaders for roads E01C 19/20) **[2]**
15/02 . for hand use
15/04 . using blowers
15/06 . with distributing slots
15/08 . . with pushers or stirrers in the slots
15/10 . . . with reciprocating pushers
15/12 . with movable parts of the receptacle
15/14 . with means for lifting out the fertiliser
15/16 . with means for pushing out the fertiliser, e.g. by a roller
15/18 . with endless chains

17/00 Fertilisers or seeders with centrifugal wheels (mechanical throwing machines for articles or solid bulk materials, in general B65G 31/00; sand, gravel, or salt spreaders E01C 19/20) **[3]**

19/00 Arrangements for driving working parts of fertilisers or seeders [4]
19/02 . by a motor **[4]**
19/04 . by a ground-engaging wheel **[4]**

21/00 Methods of fertilising (fertilisers C05; soil-conditioning or soil-stabilising materials C09K 17/00)

23/00 Distributing devices specially adapted for liquid manure or other fertilising liquid, including ammonia, e.g. transport tanks, sprinkling wagons (watering fields in general A01G 25/00; spraying or applying liquids or other fluent materials in general B05)
23/02 . Special arrangements for delivering the liquid directly into the soil
23/04 . Distributing under pressure; Distributing mud; Adaptation of watering systems for fertilising-liquids

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A01D HARVESTING; MOWING

Note

This subclass covers the shredding or pulverising of stubble, e.g. for the purpose of producing mulch, but does not cover other mechanical destruction of unwanted vegetation, which is covered by group A01M 21/02. **[7]**

Subclass index

Hand implements

1/00 **Hand-cutting implements for harvesting** (devices for picking apples or like fruits A01D 46/24; hedge trimming means A01G 3/04)
1/02 . Scythes
1/04 . Sickles
1/06 . Knives
1/08 . Attaching means for blades
1/10 . . with fastening by means of eccentric levers
1/12 . . with blades adjustable in several ways
1/14 . Handles; Accessories, e.g. scythe baskets, safety devices

3/00 **Non-abrasive sharpening devices for scythes, sickles, or the like**
3/02 . with percussive tools
3/04 . with pressing jaws
3/06 . with pressing rollers or pressing discs
3/08 . Details, e.g. scythe anvils, scythe guides

5/00 **Containers for whetstones for use during harvesting**

7/00 **Rakes** (mowers convertible to rakes or capable of raking A01D 42/02; mowers combined with rakes A01D 43/02)
7/02 . with tines rigidly connected to the rake-bar
7/04 . with adjustable rake-bar
7/06 . with tines specially shaped or attached
7/08 . with exchangeable tines
7/10 . combined with strippers, grippers, or the like

9/00 **Forks**
9/02 . with tines rigidly connected to the handle
9/04 . with exchangeable tines
9/06 . combined with strippers, grippers, or the like

11/00 **Other hand implements** (devices for picking apples or like fruits A01D 46/24)
11/02 . for lifting or cropping beet, potatoes, or other root crops
11/04 . for handling root crops, e.g. shovels, fork-like shovels
11/06 . Combined implements, e.g. fork and rake

Machines for harvesting root crops

13/00 **Diggers, e.g. potato ploughs**

15/00 **Digging machines with sieve graters but without conveying mechanisms**
15/02 . with rigid grates
15/04 . with moving or vibrating grates

17/00 **Digging machines with sieving and conveying mechanisms**
17/02 . with conveyers arranged above the sieving device
17/04 . with conveyers arranged below the sieving device
17/06 . with rollers or disc screens
17/08 . with shaker type screens
17/10 . with smooth conveyer belts, lath bands, or rake bands
17/12 . with bucket conveyers
17/14 . with cylindrical screens
17/16 . . with a conveyer spiral
17/18 . . without a conveyer spiral
17/20 . . with several co-operating screens
17/22 . . with several co-operating sifter bands

19/00 **Digging machines with centrifugal wheels, drums, or spinners**
19/02 . with working tools rotating around a horizontal axis arranged transverse to the direction of travel
19/04 . with working tools rotating around a horizontal axis arranged parallel to the direction of travel
19/06 . . with scoop wheels or drums
19/08 . . with scoop tine chains
19/10 . . with receiving screens; Implements for depositing the root crops
19/12 . with working tools arranged on an approximately vertical axis
19/14 . . with one screening wheel
19/16 . . with several screening wheels
19/18 . . with screen tine chains

21/00 **Digging machines with potato-picking implements**
21/02 . with picking tools moved up-and-down
21/04 . with rotating picking tools

23/00 **Topping machines**
23/02 . cutting the tops before being lifted
23/04 . cutting the tops after being lifted
23/06 . with collecting and depositing devices for the tops; Devices for protecting the tops against damage

25/00 **Lifters for beet or like crops**
25/02 . Machines with rigid tools
25/04 . Machines with moving or rotating tools

27/00 **Machines with both topping and lifting mechanisms**
27/02 . with rigid tools
27/04 . with moving or rotating tools

29/00 **Harvesters for peanuts**

31/00 **Other digging harvesters**
31/02 . combined with other agricultural machines, e.g. drilling, planting, hay-harvesting machines

33/00 **Accessories for digging harvesters**
33/02 . Foliage-separating mechanisms
33/04 . Stone-separating mechanisms
33/06 . Haulm-cutting mechanisms
33/08 . Special sorting and cleaning mechanisms
33/10 . Crop collecting devices, with or without weighing apparatus
33/12 . Driving mechanisms, with or without motor
33/14 . Lifting or lowering mechanisms for the tools

Harvesters or mowers for grass, cereals or other crops

34/00 **Mowers** (combined with apparatus performing additional operations while mowing A01D 37/00 to A01D 41/00, A01D 43/00; convertible to apparatus for purposes other than mowing or capable of performing operations other than mowing A01D 42/00); **Mowing apparatus of harvesters [4]**

Note

In this group, it is desirable to add the indexing code of group A01D 101/00, relating to the use of mowers. **[8]**

34/01 . characterised by features relating to the type of cutting apparatus **[7]**
34/02 . . having reciprocating cutters **[4,7]**
34/03 . . . mounted on a vehicle, e.g. a tractor, or drawn by an animal or a vehicle **[4]**

34/04 . . . . with cutters at the front **[4]**
34/06 . . . . with cutters at the side **[4]**
34/07 . . . . with cutters at the back **[4]**
34/08 . . . hand-guided by a walking operator **[4,7]**
34/10 . . . . with motor driven cutters or wheels **[4]**
34/125 . . . with means for discharging mown material (A01D 57/26 to A01D 57/30 take precedence; combined with means for gathering or loading mown material A01D 43/06) **[7]**
34/13 . . . Cutting apparatus **[4]**
34/135 . . . . having oppositely movable cooperating knife-bars **[7]**
34/14 . . . . Knife-bars **[4]**
34/16 . . . . Guides for the knife-bar in the ledger-plate **[4]**
34/17 . . . . Holding-down devices for the knife **[4]**
34/18 . . . . Guard fingers; Ledger-plates **[4]**
34/20 . . . . Ledger-plate bars **[4]**
34/22 . . . . . Shoes therefor **[4]**
34/23 . . . . with additional vertical cutter-bar **[4]**
34/24 . . . Lifting devices for the cutter-bar **[4]**
34/26 . . . . manually actuated **[4]**
34/27 . . . . Devices for disengaging the knife-driving mechanisms during the lifting of the cutter-bar **[4]**
34/28 . . . Adjusting devices for the cutter-bar **[4]**
34/30 . . . Driving mechanisms for the cutters **[4]**
34/32 . . . . Connecting-rods for knife-driving mechanisms **[4]**
34/33 . . . . . Devices for connecting the rod to the knife-bar **[4]**
34/34 . . . . . Devices for connecting the rod to the crank-pin of the driving mechanism **[4]**
34/36 . . . . actuated by advance of the machine **[4]**
34/37 . . . . electric **[4]**
34/38 . . . . fluid **[4]**
34/40 . . . Other details **[4]**
34/404 . . having cutters driven to oscillate in a horizontal plane **[7]**
34/408 . . . and cooperating with counter-cutters **[7]**
34/412 . . having rotating cutters **[7]**
34/416 . . . Flexible line cutters **[7]**
34/42 . . . having cutters rotating about a horizontal axis, e.g. cutting-cylinders **[4,7]**
34/43 . . . . mounted on a vehicle, e.g. a tractor, or drawn by an animal or a vehicle **[4]**
34/44 . . . . . with two or more cutters **[4]**
34/46 . . . . hand-guided by a walking operator **[4,7]**
34/47 . . . . . with motor driven cutters or wheels **[4]**
34/49 . . . . with means for discharging mown material (A01D 57/26 to A01D 57/30 take precedence; combined with means for gathering or loading mown material A01D 43/06) **[7]**
34/52 . . . . Cutting apparatus **[4]**
34/53 . . . . . Helically shaped cutting members **[4]**
34/535 . . . . . with cutting members pivotally attached to the rotating axle, e.g. flails **[7]**
34/54 . . . . Cutting-height adjustment **[4]**
34/56 . . . . Driving mechanisms for the cutters **[4]**
34/57 . . . . . actuated by advance of the machine **[4]**
34/58 . . . . . electric **[4]**
34/60 . . . . . fluid **[4]**
34/62 . . . . Other details **[4]**
34/63 . . . having cutters rotating about a vertical axis **[4,7]**
34/64 . . . . mounted on a vehicle, e.g. a tractor, or drawn by an animal or a vehicle (A01D 34/695 takes precedence) **[4,7]**
34/66 . . . . . with two or more cutters **[4]**
34/67 . . . . hand-guided by a walking operator **[4,7]**
34/68 . . . . . with motor driven cutters or wheels **[4]**
34/685 . . . . . with two or more cutters **[7]**
34/69 . . . . . with motor driven wheels **[7]**
34/695 . . . . supported by an air cushion **[7]**
34/71 . . . . with means for discharging mown material (A01D 57/26 to A01D 57/30 take precedence; combined with means for gathering or loading mown material A01D 43/06) **[7]**
34/73 . . . . Cutting apparatus **[4]**
34/74 . . . . Cutting-height adjustment **[4]**
34/76 . . . . Driving mechanisms for the cutters **[4]**
34/77 . . . . . actuated by advance of the machine **[4]**
34/78 . . . . . electric **[4]**
34/80 . . . . . fluid **[4]**
34/81 . . . . Casings; Housings (A01D 34/71 takes precedence) **[7]**
34/82 . . . . Other details **[4]**
34/83 . . having cutting members on endless belts or sprocket chains **[4]**
34/835 . specially adapted for particular purposes **[7]**
34/84 . . for edges of lawns or fields, e.g. for mowing close to trees or walls (edge trimmers A01G 3/00) **[4]**
34/86 . . for use on sloping ground, e.g. on embankments (undercarriages or frames specially adapted for harvesters or mowers A01D 67/00; control mechanisms for harvesters or mowers when moving on slopes A01D 75/28) **[4,7]**
34/90 . . for carrying by the operator **[7]**

37/00 **Reaper-binders** (equipment thereon for binding harvested or mown produce, e.g. knotters, A01D 59/00)
37/02 . with receiving platform and binding apparatus but without elevating canvases
37/04 . conveying the stalks in vertical position
37/06 . binding with stalks or straw bands

39/00 **Independent binders, e.g. for hay**; **Binders attachable to mowers** (equipment thereon for binding harvested or mown produce, e.g. knotters, A01D 59/00; stationary apparatus or hand tools for forming or binding straw or hay into bundles A01F 1/00)

41/00 **Combines, i.e. harvesters or mowers combined with threshing devices**
41/02 . Self-propelled combines
41/04 . Tractor-driven combines
41/06 . Combines with headers
41/08 . Combines which thresh before the stalk is cut
41/10 . Field threshers with windrow pick-up apparatus
41/12 . Details of combines
41/127 . . Control or measuring arrangements specially adapted for combines **[7]**
41/133 . . Drying devices **[7]**
41/14 . . Mowing tables **[2]**
41/16 . . . Devices for coupling mowing tables to conveyers **[7]**

42/00 **Mowers convertible to apparatus for purposes other than mowing**; **Mowers capable of performing operations other than mowing** (mowers combined with apparatus performing additional operations while mowing A01D 43/00) **[7]**

42/02 . Raking **[7]**
42/04 . Soil working **[7]**
42/06 . Sweeping or cleaning lawns or other surfaces **[7]**
42/08 . . Sweeping snow **[7]**

43/00 **Mowers combined with apparatus performing additional operations while mowing** (A01D 37/00, A01D 39/00, A01D 41/00 take precedence) **[3]**

43/02 . with rakes
43/04 . with haymakers, e.g. tedders
43/06 . with means for collecting, gathering or loading mown material **[1,7]**
43/063 . . in or into a container carried by the mower; Containers therefor (A01D 43/077 takes precedence) **[7]**
43/07 . . in or into a trailer (A01D 43/077 takes precedence) **[7]**
43/073 . . . with controllable discharge spout **[7]**
43/077 . . with auxiliary means, e.g. fans, for transporting the mown crop **[7]**
43/08 . with means for cutting up the mown crop
43/10 . with means for crushing or bruising the mown crop
43/12 . with soil-working implements, e.g. ploughs
43/14 . with dispensing apparatus, e.g. for fertilisers, herbicides or preservatives **[7]**
43/16 . with lawn edgers **[7]**

44/00 **Harvesting of underwater plants, e.g. harvesting of seaweed [2]**

44/02 . of laver **[2]**

45/00 **Harvesting of standing crops** (A01D 44/00 takes precedence; threshing machines adapted for special crops, threshing devices for combines adapted for special crops A01F 11/00) **[2]**

45/02 . of maize
45/04 . of rice
45/06 . of flax
45/10 . of sugar cane
45/16 . of tobacco
45/22 . of beans
45/24 . of peas
45/26 . of cabbage or lettuce **[2]**
45/28 . of spinach
45/30 . of grass-seeds or like seeds

46/00 **Picking of fruits, vegetables, hops, or the like**; **Devices for shaking trees or shrubs [2,3]**

Note

Group A01D 46/30 takes precedence over groups A01D 46/02 to A01D 46/28 **[7]**

46/02 . of hops **[2]**
46/04 . of tea **[2]**
46/06 . of coffee **[2]**
46/08 . of cotton **[2]**
46/10 . . pneumatically **[2]**
46/12 . . using boll-from-plant strippers **[2]**
46/14 . . using lint-from-plant pickers **[2]**
46/16 . . . using rotary or oscillating spindles **[2]**
46/18 . . . . mounted on rotary carrier **[2]**
46/20 . Platforms with lifting and lowering devices **[2]**
46/22 . Baskets or bags attachable to the picker **[2]**
46/24 . Devices for picking apples or like fruit (A01D 46/26 takes precedence) **[2,7]**
46/247 . . Manually operated fruit-picking tools (A01D 46/253 takes precedence) **[7]**
46/253 . . Portable motorised fruit pickers **[7]**
46/26 . Devices for shaking trees or shrubs; Fruit catching devices to be used therewith (A01D 46/28 takes precedence) **[3,7]**
46/28 . Vintaging machines, i.e. grape harvesting machines **[3]**
46/30 . Robotic devices for individually picking crops **[7]**

47/00 **Headers**

51/00 **Apparatus for gathering together crops spread on the soil, e.g. apples, beets, nuts, potatoes**

Components of harvesters or mowers for grass or cereals **[7]**

57/00 **Delivering mechanisms for harvesters or mowers**

57/01 . Devices for leading crops to the mowing apparatus **[7]**
57/02 . . using reels
57/03 . . . with supplementary controlled movement of the crop-engaging members, e.g. of the tines **[3]**
57/04 . . . Arrangements for changing the position of the reels
57/05 . . . Detachable reels for converting a mower into a harvester **[7]**
57/06 . . using endless conveyers
57/08 . . using swinging rakes
57/10 . . using fans
57/12 . Rotating rakes
57/14 . Single-platform rakes
57/16 . Tilting tables
57/18 . Bunching devices, e.g. with tipping bars
57/20 . with conveyer belts
57/22 . for standing stalks
57/24 . Grass-boards
57/26 . Plates arranged behind the cutter-bar for guiding the cut grass or straw
57/28 . Windrower attachments with tines
57/30 . Rotating attachments for forming windrows

59/00 **Equipment for binding harvested or mown produce** (specially adapted for baling presses A01F 15/14)

59/02 . Packers
59/04 . Knotters
59/06 . Needles
59/08 . Discharge arms
59/10 . Devices for separating cohering sheaves
59/12 . Containers for the twine
59/14 . Sheaf counters

61/00 **Elevators or conveyers for binders or combines**

61/02 . Endless belts
61/04 . Chains

63/00 **Outside dividers**

63/02 . Rotating dividers
63/04 . Non-rotating dividers

65/00 **Grain-crop lifters**

65/02 . Lifting fingers

65/04 . with revolving staffs
65/06 . Lifting devices arranged on the inner side of the cutter-bar
65/08 . Guard attachments for the wheels

67/00 Undercarriages or frames specially adapted for harvesters or mowers (coupling arrangements between animal or tractor and harvester or mower A01B 59/00); **Mechanisms for adjusting the frame** (adjusting devices for the cutter-bar A01D 34/28); **Platforms [3]**
67/02 . Protection against weather
67/04 . Seats

69/00 Driving mechanisms or parts thereof for harvesters or mowers (driving mechanisms for the cutters of mowers or harvesters A01D 34/00)
69/02 . electric
69/03 . fluid **[4]**
69/06 . Gearings
69/08 . Clutches
69/10 . Brakes
69/12 . Lubrication

75/00 Accessories for harvesters or mowers
75/02 . Implements for collecting grain crop
75/04 . Sheaf carriers
75/06 . Sheaf shockers or stookers
75/08 . Sharpening apparatus fixed to the harvester or mower
75/10 . Devices for reconditioning the knife-bar, e.g. removing the knife from its backing
75/12 . Instruments for removing the knife-bar from the cutter
75/16 . Implements for laying-out bands for sheaves
75/18 . Safety devices for parts of the machines
75/20 . Devices for protecting men or animals
75/24 . Special devices for harvesters or mowers drawn by animals
75/26 . Front trucks; Axle-pivot steering of front trucks
75/28 . Control mechanisms for harvesters or mowers when moving on slopes; Devices preventing lateral pull
75/30 . Arrangements for trailing two or more harvesters or mowers

Haymakers; **Crop conditioners** **[3]**

Note

In groups A01D 76/00 to A01D 87/00, the following terms are used with the meanings indicated:
– "hay" includes all mown forage crop in a dry or partially dry state;
– "haymakers" covers all apparatus working on mown forage crop lying on the ground with the intention to make hay, with the exception of "rakes" which are covered by group A01D 7/00. **[3]**

76/00 Haymakers with tines that are stationary with respect to the machine during operation but that may be liftable for dumping (haymakers combined with mowers A01D 43/04) **[3]**

78/00 Haymakers with tines moving with respect to the machine (haymakers combined with mowers A01D 43/04) **[3]**
78/02 . with tine-carrying bars or equivalent members which interconnect heads rotating about horizontal axes, e.g. of rotary-drum type **[3]**
78/04 . . the tine-carrying members moving obliquely or at right angles to the direction of travel of the machine **[3]**
78/06 . with tine-carrying endless chains or belts **[3]**
78/08 . with tine-carrying rotary heads or wheels **[3]**
78/10 . . the tines rotating about a substantially vertical axis **[3]**
78/12 . . . the tines having an additional movement superimposed upon their rotary movement **[3]**
78/14 . . the tines rotating about a substantially horizontal axis **[3]**
78/16 . . . with positive drive of the heads or wheels **[3]**
78/18 . of the reciprocating tine type **[3]**
78/20 . . the tines reciprocating in a direction parallel to the direction of travel of the machine **[3]**

80/00 Parts or details of haymakers (parts or details specific for one type of machine, see the relevant groups for these machines) **[3]**
80/02 . Tines; Attachment of tines **[3]**

82/00 Crop conditioners, i.e. machines for crushing or bruising stalks (mowers combined with means for crushing or bruising the mown crop A01D 43/10) **[3]**
82/02 . Rollers for crop conditioners **[6]**

84/00 Haymakers not provided for in a single one of groups A01D 76/00 to A01D 82/00 (haymakers combined with mowers A01D 43/04)
84/02 . with flexible tools **[6]**

85/00 Arrangements for making or setting stacks

87/00 Loaders for hay or like field crops (combined with mowers A01D 43/06)
87/02 . with conveyer belts
87/04 . . with rakes feeding the crop to the conveyer
87/06 . with oscillating or reciprocating rake-bars
87/08 . with sweep rakes
87/10 . with blowers
87/12 . Loaders for sheaves, stacks, or bales

89/00 Pick-ups for loaders, chaff-cutters, balers, field-threshers, or the like

90/00 Vehicles for carrying harvested crops with means for selfloading or unloading (combined with mowers A01D 43/06) **[2]**
90/02 . Loading means **[2]**
90/04 . . with additional cutting means **[2]**
90/06 . . . with chaff-cutters used as loading and cutting means (A01D 43/08 takes precedence) **[2]**
90/08 . . with bale-forming means additionally used for loading; with means for picking-up bales and transporting them into the vehicle **[2]**
90/10 . Unloading means **[2]**
90/12 . with additional devices or implements (arrangements of coupling devices, A01B 59/00) **[2]**
90/14 . Adaptations of gearing for driving, loading or unloading means **[2]**
90/16 . self-propelled **[2]**

91/00 Methods for harvesting agricultural products (essentially requiring the use of particular machines, see the relevant groups for the machines)
91/02 . Products growing in the soil
91/04 . Products growing above the soil (fruit, hops A01D 46/00)

93/00 Harvesting apparatus not provided for in other groups of this subclass [2009.01]

Indexing scheme associated with group A01D 34/00, relating to the use of mowers. [6]

101/00 Lawn-mowers [6]

A01F THRESHING (combines A01D 41/00); **BALING OF STRAW, HAY OR THE LIKE**; **STATIONARY APPARATUS OR HAND TOOLS FOR FORMING OR BINDING STRAW, HAY OR THE LIKE INTO BUNDLES**; **CUTTING OF STRAW, HAY OR THE LIKE**; **STORING AGRICULTURAL OR HORTICULTURAL PRODUCE** (arrangements for making or setting stacks in connection with harvesting A01D 85/00)

Subclass index

1/00 Stationary apparatus or hand tools for forming or binding straw, hay or the like into bundles (baling apparatus or presses A01F 13/00, A01F 15/00; mobile binders for use in the field A01D 37/00, A01D 39/00) **[3]**

1/02 . Hand-operated tools

1/04 . Fastening or tying devices

1/06 . Ties for bundles

3/00 Hand-operated implements for cutting-up straw, hay or the like (mechanically-driven straw cutters A01F 29/00)

Threshing

5/00 Hand-operated implements for threshing

7/00 Threshing apparatus

7/02 . with rotating tools (threshing cylinders or concaves A01F 12/18)

7/04 . . with axles transverse to the feeding direction

7/06 . . with axles in line with the feeding direction

7/70 . with flails **[2010.01]**

11/00 Threshing apparatus specially adapted for maize; **Threshing apparatus specially adapted for particular crops other than cereals**

11/02 . for flax

11/04 . for clover or like seeds, e.g. lucern

11/06 . for maize, e.g. removing kernels from cobs

11/08 . for palm fruit, e.g. releasing the fruit from the stalk

12/00 Parts or details of threshing apparatus (devices, other than safety devices for feeders, for protecting human beings A01D 75/20, A01F 21/00)

12/10 . Feeders

12/12 . . without band-cutters

12/14 . . with band-cutters

12/16 . . Safety devices

12/18 . Threshing devices

12/20 . . Threshing cylinders with ribs

12/22 . . Threshing cylinders with teeth

12/24 . . One-part threshing concaves

12/26 . . Multi-part threshing concaves

12/28 . . Devices for adjusting the concaves

12/30 . Straw separators

12/32 . . with shaker screens or sieves

12/34 . . . Sieve elements; Linings for shakers

12/36 . . . . Sieve elements specially adapted for handling short straw

12/38 . . with juxtaposed and independently-moved shaker bars or the like

12/385 . . with endless straw-conveying surface **[5]**

12/39 . . with straw carriers in the form of rotors or drums **[5]**

12/395 . . Conical or cylindrical straw separators with internal working surface **[5]**

12/40 . Arrangements of straw crushers or cutters

12/42 . Apparatus for removing awns from the grain

12/44 . Grain cleaners; Grain separators

12/46 . Mechanical grain conveyers

12/48 . Air conduits or blowers for grain

12/50 . Sack-filling devices; Counting or weighing devices

12/52 . Arrangements for returning unthreshed grain to the threshing device

12/54 . Arrangements for collecting or removing dust

12/56 . Driving mechanisms for the threshing parts

12/58 . Control devices; Brakes; Bearings

12/60 . Grain tanks

Baling of straw, hay or the like

13/00 Hand-operated baling apparatus

15/00 Baling presses for straw, hay or the like [3]

15/02 . with press-boxes

15/04 . Plunger presses

15/06 . . with double-action plunger

15/07 . Rotobalers, i.e. machines for forming cylindrical bales by winding and pressing **[5]**

15/08 . Details

15/10 . . Feeding devices for the crop material **[3]**

15/12 . . Feeding devices for the ties

15/14 . . Tying devices specially adapted for baling presses

15/16 . . Division blocks

15/18 . . Endless belts, rolls, or the like

Accessories for threshing machines or baling presses

17/00 **Straw conveyers for threshing machines or baling presses**
17/02 . Mechanical conveyers
17/04 . Pneumatic conveyers

19/00 **Devices for securing threshing machines or baling presses to the ground, e.g. for compensating for unevenness of the ground**

21/00 **Devices for protecting human beings for threshing machines or baling presses** (in combines A01D 75/20; for feeders for threshing apparatus A01F 12/16)

25/00 **Storing agricultural or horticultural produce**; **Hanging-up harvested fruit** (maturing fruit A23N 15/06; arrangements in barns for preparatory treatment of tobacco A24B 1/02; packing or storing hops C12C 3/04) **[3]**
25/02 . Clamps; Pits
25/04 . Stacks, ricks, or the like
25/08 . . Ventilating means
25/10 . . Shelters
25/12 . Racks for drying purposes
25/13 . Coverings (A01F 25/14 takes precedence) **[3]**
25/14 . Containers specially adapted for storing **[3]**
25/16 . Arrangements in forage silos
25/18 . . Loading or distributing arrangements **[2]**
25/20 . . Unloading arrangements **[2]**
25/22 . . Ventilating arrangements **[2]**

29/00 **Cutting apparatus specially adapted for cutting hay, straw or the like** (mowers combined with means for cutting up the mown crop A01D 43/08) **[3]**
29/01 . specially adapted for being mounted on or drawn by a tractor, e.g. field choppers **[7]**
29/02 . having rotating knives with their cutting edges in a plane perpendicular to their rotational axis **[3]**
29/04 . . with feeding direction transverse to axis **[3]**
29/06 . having rotating knives with their cutting edges on a cylinder surface, e.g. of the helical-type **[3]**
29/08 . having reciprocating knives **[3]**
29/09 . Details **[2010.01]**
29/10 . . Feeding devices **[3]**
29/12 . . Discharge means (loaders for hay or like field crop having blowers A01D 87/10) **[3]**
29/14 . . Drives **[3]**
29/16 . . Safety devices, e.g. emergency brake arrangements **[3]**
29/18 . . . for protecting human beings **[3]**
29/22 . . Arrangement of knife sharpening devices **[3]**

A01G **HORTICULTURE**; **CULTIVATION OF VEGETABLES, FLOWERS, RICE, FRUIT, VINES, HOPS, OR SEAWEED**; **FORESTRY**; **WATERING** (picking of fruits, vegetables, hops, or the like A01D 46/00; plant reproduction by tissue culture techniques A01H 4/00; devices for topping or skinning onions or flower bulbs A23N 15/08; propagating unicellular algae C12N 1/12; plant cell culture C12N 5/00)

Subclass index

1/00 **Horticulture**; **Cultivation of vegetables** (labels or name-plates G09F 3/00, G09F 7/00)
1/02 . Cultivation of asparagus
1/04 . Cultivation of mushrooms (composts or fertilisers for cultivating mushrooms C05)
1/06 . Grafting (grafting-wax A01N 3/04)
1/08 . Edging for beds, lawns, or the like, e.g. using tiles
1/12 . Tools for cultivating turf; Sweeping apparatus for lawns; Gardens rollers (machines for treating meadows or lawns A01B 45/00; lawn-mowers A01D 34/00)

3/00 **Cutting implements specially adapted for horticultural purposes**; **Delimbing standing trees** (felling trees A01G 23/08; mowers having rotating flexible line cutters A01D 34/416; special adaptation of mowers for carrying by the operator A01D 34/90; hand-held cutting tools suitable for other use B26B) **[5]**
3/02 . Secateurs; Flower or fruit shears
3/025 . . having elongated or extended handles **[6]**
3/033 . . having motor-driven blades **[6]**
3/037 . . . the driving means being an electric motor **[6]**
3/04 . Apparatus for trimming hedges, e.g. hedge shears **[6]**
3/047 . . portable **[6]**
3/053 . . . motor-driven **[6]**
3/06 . Hand-held edge trimmers or shears for lawns (mowers combined with lawn edgers A01D 43/16)
3/08 . Other tools for pruning, branching or delimbing standing trees **[2,5]**

5/00 **Floral handling**
5/02 . Apparatus for binding bouquets or wreaths
5/04 . Mountings for wreaths, or the like; Racks or holders for flowers
5/06 . Devices for preserving flowers (chemical substances A01N 3/02; flower vases A47G 7/06)

7/00 **Botany in general** (cultivation without soil A01G 31/00)
7/02 . Treatment of plants with carbon dioxide (greenhouses therefor A01G 9/18)

7/04 . Electric or magnetic treatment of plants for promoting growth

7/06 . Treatment of growing trees or plants, e.g. for preventing decay of wood, for tingeing flowers or wood, for prolonging the life of plants

9/00 Cultivation of flowers, vegetables or rice in receptacles, forcing-frames or greenhouses (cultivation without soil A01G 31/00)

9/02 . Receptacles, e.g. flower-pots or boxes (hanging flower baskets, holders or containers for flower-pots A47G 7/00); Glasses for cultivating flowers

9/04 . Flower-pot saucers

9/06 . Devices for cleaning flower-pots

9/08 . Devices for filling-up flower-pots; Devices for setting plants in pots

9/10 . Pots for seedlings; Soil-blocks for seedlings; Means for forming soil-blocks

9/12 . Supports for plants; Trellis for strawberries or the like (stays for trees, props for vines A01G 17/14)

9/14 . Greenhouses (cloches A01G 13/04)

9/16 . . Dismountable or portable greenhouses

9/18 . Greenhouses for treating plants with carbon dioxide or the like

9/20 . Forcing-frames; Lights

9/22 . Shades or blinds for greenhouses, or the like

9/24 . Devices for heating, ventilating, regulating temperature, or watering, in greenhouses, forcing-frames, or the like

9/26 . . Electric devices

11/00 Sterilising soil by steam (soil-conditioning or soil-stabilising materials C09K 17/00)

13/00 Protecting plants (apparatus for the destruction of vermin or noxious animals A01M; use of chemical materials therefor, composition of protective materials, e.g. grafting wax, A01N)

13/02 . Protective coverings for plants; Devices for laying-out coverings

13/04 . . Cloches

13/06 . Devices for generating heat, smoke, or fog in gardens, orchards, or forests, e.g. to prevent damage by frost (chemical aspects of generating smoke or mist C06D 3/00; heating devices in general, see the appropriate classes, e.g. F24)

13/08 . Mechanical apparatus for circulating the air

13/10 . Devices for affording protection against animals, birds, or other pests (A01M 29/00 takes precedence; traps A01M 23/00; pesticides A01N) **[2]**

15/00 Devices or methods for influencing weather conditions (dispersing fog in general E01H 13/00)

16/00 Cultivation of rice (A01G 9/00 takes precedence) **[3]**

17/00 Cultivation of hops, vines, fruit trees, or like trees

17/02 . Cultivation of hops or vines

17/04 . Supports for hops, vines, or trees

17/06 . . Trellis-work

17/08 . . . Tools for attaching hops, vines, or boughs to trellis-work; Tying devices

17/10 . . Holders for boughs or branches

17/12 . . Tree-bands

17/14 . . Props; Stays

17/16 . . . Devices for driving-in or pulling-out props

17/18 . Means for filling-up wounds in trees

23/00 Forestry

23/02 . Transplanting, uprooting, felling or delimbing trees (delimbing standing trees A01G 3/00) **[5]**

Note

Tree feeding devices are covered by group B27B 25/00. **[5]**

23/04 . . Transplanting trees; Devices for grasping the root ball, e.g. stump forceps; Wrappings or packages for transporting trees

23/06 . . Uprooting or pulling up trees; Extracting or eliminating stumps **[5]**

23/08 . . Felling trees (axes B26B 23/00; saws, sawing machines B27B)

23/081 . . . Feller-bunchers, i.e. with bunching by felling head (A01G 23/083 takes precedence) **[5]**

23/083 . . . Feller-delimbers **[5]**

23/085 . . . . having the shearing head mounted on a first boom and the delimbing head mounted on a second boom **[5]**

23/087 . . . Shearing apparatus or the like specially adapted for felling trees (A01G 23/081, A01G 23/083, A01G 23/093 take precedence) **[5]**

23/089 . . . . having two or more shears **[5]**

23/09 . . . . of the percussion type **[5]**

23/091 . . . Sawing apparatus specially adapted for felling trees (A01G 23/081, A01G 23/083, A01G 23/093 take precedence) **[5]**

23/093 . . . Combinations of shearing, sawing or milling apparatus specially adapted for felling trees **[5]**

23/095 . . Delimbers (A01G 23/083 takes precedence; manufacture of wood shavings, chips, powder, or the like B27L 11/00) **[5]**

23/097 . . . having a fixed delimbing head **[5]**

23/099 . . Auxiliary devices, e.g. felling wedges **[5]**

23/10 . Tapping of tree-juices, e.g. caoutchouc, gum

23/12 . . Knives or axes for tapping

23/14 . . Tapping-spouts; Receptacles for juices

25/00 Watering gardens, fields, sports grounds, or the like (special apparatus or adaptations for fertilising-liquids A01C 23/00; nozzles or outlets, spraying apparatus B05B; gravity flow, open channel irrigation ditch systems E02B 13/00)

25/02 . Watering arrangements located above the soil which make use of perforated pipe-lines or pipe-lines with dispensing fittings, e.g. for drip irrigation (perforated pipes per se B05B 1/20) **[4]**

25/06 . Watering arrangements making use of perforated pipe-lines located in the soil (perforated pipes per se B05B 1/20; similar arrangements for drainage E02B 11/00)

25/09 . Watering arrangements making use of movable installations on wheels or the like **[2]**

25/14 . Hand watering devices, e.g. watering cans

25/16 . Control of watering (controlling spraying devices B05B) **[2]**

27/00 Self-acting watering devices, e.g. for flower-pots

27/02 . having a water reservoir, the main part thereof being located wholly around or directly beside the growth substrate (A01G 27/06 takes precedence) **[6]**

27/04 . using wicks or the like **[6]**

27/06 . . having a water reservoir, the main part thereof being located wholly around or directly beside the growth substrate **[6]**

29/00 **Root feeders**; **Injecting fertilisers into the roots**

31/00 **Hydroponics**; **Cultivation without soil** (A01G 33/00 takes precedence) **[2]**

31/02 . Special apparatus therefor (apparatus for cultivation in receptacles or greenhouses in general A01G 9/00; self-acting watering devices A01G 27/00)

31/04 . . Hydroponic culture on conveyers **[6]**

31/06 . . Hydroponic culture on racks or in stacked containers **[6]**

33/00 **Cultivation of seaweed [2]**

33/02 . of laver **[2]**

A01H NEW PLANTS OR PROCESSES FOR OBTAINING THEM; PLANT REPRODUCTION BY TISSUE CULTURE TECHNIQUES [5]

Subclass index

Processes

1/00 **Processes for modifying genotypes** (A01H 4/00 takes precedence) **[5]**

1/02 . Methods or apparatus for hybridisation; Artificial pollination

1/04 . Processes of selection

1/06 . Processes for producing mutations, e.g. treatment with chemicals or with radiation (specific mutations prepared by genetic engineering on plant cell or plant tissues C12N 15/00) **[5]**

1/08 . . Methods or apparatus for producing changes in chromosome number

3/00 **Processes for modifying phenotypes** (A01H 4/00 takes precedence) **[5]**

3/02 . by controlling duration, wavelength, intensity, or periodicity of illumination

3/04 . by treatment with chemicals

4/00 **Plant reproduction by tissue culture techniques [5]**

Products

5/00 **Flowering plants, i.e. angiosperms**

5/02 . Flowers

5/04 . Stems

5/06 . Roots

5/08 . Fruits

5/10 . Seeds

5/12 . Leaves

7/00 **Gymnosperms, e.g. conifers**

9/00 **Pteridophytes, e.g. ferns, club-mosses, horse-tails**

11/00 **Bryophytes, e.g. mosses, liverworts**

13/00 **Algae** (unicellular algae C12N 1/12)

15/00 **Fungi**; **Lichens** (fungal micro-organisms C12N 1/14)

17/00 **Symbiotic or parasitic combinations including one or more new plants, e.g. mycorrhiza** (lichens A01H 15/00)

A01J MANUFACTURE OF DAIRY PRODUCTS (preservation, pasteurisation, sterilisation of milk products A23; for chemical matters, see subclass A23C)

Subclass index

Milking

1/00 **Devices or accessories for milking by hand** (milking stools A47C 9/04)

3/00 **Milking with catheters**

5/00 **Milking machines or devices** (A01J 1/00, A01J 3/00 take precedence; milking stations A01K 1/12)

5/003 . Movable milking machines **[6]**

5/007 . Monitoring milking processes; Control or regulation of milking machines **[6]**

5/01 . . Milkmeters; Milk flow sensing devices **[6]**

5/013 . On-site detection of mastitis in milk **[6]**

5/017 . Automatic attaching or detaching of clusters **[6]**

5/02 . with mechanical manipulation of teats

5/04 . with pneumatic manipulation of teats

5/06 . . Teat-cups with one chamber

5/08 . . Teat-cups with two chambers

5/10 . . Pulsators arranged otherwise than on teat-cups

5/12 . . . with membranes

5/14 . . . electromagnetically controlled

5/16 . . Teat-cups with pulsating devices

7/00 **Accessories for milking machines or devices** (milking stations A01K 1/12) **[5,6]**
7/02 . for cleaning or sanitising milking machines or devices (cleaning the internal surfaces of pipes or tubes of milking machines B08B 9/027) **[6]**
7/04 . for treatment of udders or teats, e.g. for cleaning **[6]**

9/00 **Milk receptacles** (containers in general B65D; devices for tilting and emptying of containers B65G 65/23)
9/02 . with straining or filtering devices
9/04 . with cooling arrangements
9/06 . with self-closing valve
9/08 . Holding or supporting devices for milking receptacles
9/10 . Milking pails connected with milking stools

Treatment of milk or cream

11/00 **Apparatus for treating milk** (preserving or sterilising A23C)
11/02 . Appliances for preventing or destroying foam (preventing boiling-over of milk in kitchen cooking vessels A47J 27/56; preventing foaming in boiling apparatus B01B 1/02)
11/04 . Appliances for aerating or de-aerating milk (milk centrifuges B04B)
11/06 . Strainers or filters for milk (filtering materials B01D)
11/08 . . Holders for strainers or cloth filters
11/10 . Separating milk from cream (milk centrifuges B04B)
11/12 . . Appliances for removing cream
11/14 . . . by raising the level of the milk
11/16 . Homogenising milk (homogenising in general B01F)

13/00 **Tanks for treating cream**

15/00 **Manufacturing butter**
15/02 . Stationary churns with beating equipment
15/04 . Rotating or oscillating churns
15/06 . . with beating equipment which is movable in respect of the churn wall
15/08 . . without beating equipment which is movable in respect of the churn wall
15/10 . Devices for manufacturing butter other than by churns
15/12 . . with arrangements for making butter in a continuous process
15/14 . Churns with arrangements for making butter by blowing-in air
15/16 . Details; Accessories
15/18 . . Devices for de-aerating
15/20 . . Incorporation of revolution counters; Incorporation of alarm devices
15/22 . . Lids or covers for butter churns
15/24 . . Beaters for butter churns
15/25 . . Means for removing butter from churns or the like (pumps therefor F04)
15/26 . Combined appliances for separating, churning and kneading
15/28 . Driving mechanisms

Kneading or forming butter; **Kneading or forming margarine or butter substitutes**

17/00 **Kneading machines for butter, or the like** (mixing or kneading machines for the preparation of dough A21C 1/00)

19/00 **Hand devices for forming slabs of butter, or the like**

21/00 **Machines for forming slabs of butter, or the like**
21/02 . with extruding arrangements and cutting devices, with or without packing devices

23/00 **Devices for dividing bulk butter, or the like**

Cheese-making

25/00 **Cheese-making** (coating the cheese A01J 27/02)
25/02 . Cheese basins
25/04 . . Devices for cleaning cheese basins
25/06 . Devices for dividing curdled milk
25/08 . Devices for removing cheese from basins
25/10 . Devices for removing whey from basins
25/11 . Separating whey from curds; Washing the curds
25/12 . Forming the cheese
25/13 . . Moulds therefor
25/15 . . Presses therefor
25/16 . Devices for treating cheese during ripening

27/00 **After-treatment of cheese**; **Coating the cheese**
27/02 . Coating the cheese, e.g. with paraffin wax (applying liquids or other fluent materials to surfaces in general B05)
27/04 . Milling or recasting cheese

99/00 **Subject matter not provided for in other groups of this subclass [8]**

A01K ANIMAL HUSBANDRY; CARE OF BIRDS, FISHES, INSECTS; FISHING; REARING OR BREEDING ANIMALS, NOT OTHERWISE PROVIDED FOR; NEW BREEDS OF ANIMALS

Note

This subclass covers:
– equipment for the care, culture or rearing of all animals or for obtaining their products, unless provided for elsewhere, e.g. milking A01J, shoeing animals A01L, veterinary devices A61D, devices in connection with harnesses B68B;
– methods of breeding animals or new animal breeds. **[5]**

Subclass index

Animal husbandry in general, especially cattle-raising

1/00 **Housing animals**; **Equipment therefor** (building construction, features of buildings E04; ventilating buildings F24F)

1/01 . Removal of dung or urine (A01K 1/015 takes precedence) **[2]**

1/015 . Floor coverings, e.g. bedding-down sheets **[2]**

1/02 . Pigsties; Dog-kennels; Rabbit-hutches or the like

1/03 . . Housing for domestic or laboratory animals **[2]**

1/035 . . Devices for use in keeping domestic animals, e.g. fittings in housings, dog beds **[2]**

1/04 . Tethering-poles or the like

1/06 . Devices for fastening animals, e.g. halters, toggles, neck-bars, chain fastenings

1/062 . . Neck-bars **[2]**

1/064 . . Chain fastenings **[2]**

1/08 . Arrangements for simultaneously releasing several animals

1/10 . Feed racks (devices for impeding movement of animals A01K 15/04)

1/12 . Milking stations **[2]**

3/00 **Pasturing equipment, e.g. tethering devices**; **Grids for preventing cattle from straying**; **Electrified wire fencing** (construction of fencing in general E04H 17/00; electric circuits for fences H05C)

5/00 **Feeding devices for stock or game** (A01K 1/10 takes precedence; for poultry A01K 39/00) **[2]**

5/01 . Feed troughs; Feed pails **[2]**

5/015 . Licking-stone holders (salt blocks A23K 1/16) **[2]**

5/02 . Automatic devices

7/00 **Watering equipment for stock or game**

7/02 . Automatic devices (construction of valves F16K)

7/04 . . actuated by float **[2]**

7/06 . . actuated by the animal **[2]**

9/00 **Sucking apparatus for young stock**

11/00 **Marking of animals** (of poultry A01K 35/00; lead-sealing pliers B25B)

13/00 **Devices for grooming or caring of animals, e.g. curry-combs** (scissors B26B); **Fetlock rings** (bandages, poultices A61D); **Tail-holders** (as part of the harness B68B 5/04); **Devices for preventing crib-biting**; **Washing devices** (milking machine accessories for treatment of udders or teats A01J 7/04; for medical purposes A61D 11/00); **Protection against weather conditions or insects**

14/00 **Removing the fleece from live sheep or similar animals** (hand-held cutting tools B26B) **[5]**

15/00 **Devices for taming animals, e.g. nose-rings or hobbles**; **Devices for overturning animals in general**; **Training or exercising equipment**; **Covering boxes** (devices for veterinary purposes A61D 3/00)

15/02 . Training or exercising equipment, e.g. mazes or labyrinths for animals (A01K 15/04 takes precedence) **[2]**

15/04 . Devices for impeding movement; Devices for impeding passage through fencing **[2]**

17/00 **Dehorners**; **Horn trainers**

19/00 **Weaning apparatus**

21/00 **Devices for assisting or preventing mating** (covering boxes A01K 15/00)

23/00 **Manure or urine pouches**

25/00 **Muzzles**

27/00 **Leads or collars, e.g. for dogs** (devices specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34)

29/00 **Other apparatus for animal husbandry**

Aviculture; **Testing, cleaning, stamping, or grading eggs**

31/00 **Housing birds**

31/02 . Door appliances; Automatic door-openers (counters for specific applications G07C 9/00)

31/04 . Dropping-boards; Devices for removing excrement

31/06 . Cages

31/07 . . Transportable cages (A01K 31/08 takes precedence) **[2]**

31/08 . . Collapsible cages

31/10 . Doors; Trap-doors

31/12 . Perches
31/14 . Nest-boxes
31/16 . . Laying nests for poultry; Egg collecting **[2]**
31/17 . . . Laying batteries **[2]**
31/18 . Chicken coops or houses; Brooders
31/19 . . Brooders **[2]**
31/20 . . Heating arrangements
31/22 . Poultry runs
31/24 . Dovecots; Pigeonlofts **[2]**

33/00 Nest-eggs

35/00 Marking poultry or other birds

37/00 Constraining birds, e.g. wing clamps

39/00 Feeding or drinking appliances for poultry or other birds [2]
39/01 . Feeding devices (A01K 39/04 takes precedence) **[2]**
39/012 . . filling automatically **[2]**
39/014 . . Feed troughs; Feed throwers **[2]**
39/02 . Drinking appliances (A01K 39/04 takes precedence; construction of valves F16K) **[2]**
39/022 . . with weight-controlled supply **[2]**
39/024 . . with float-controlled supply **[2]**
39/026 . . kept filled to constant level from incorporated storage **[2]**
39/04 . Combined feeding and drinking appliances
39/06 . Cramming appliances

41/00 Incubators for poultry
41/02 . Heating arrangements
41/04 . Controlling humidity in incubators
41/06 . Egg-turning appliances for incubators

43/00 Testing, sorting, or cleaning eggs (investigating or analysing eggs, e.g. by candling, G01N 33/08)
43/04 . Grading eggs
43/06 . . according to size
43/08 . . according to weight (sorting according to weight in general B07C 5/16)
43/10 . . Grading and stamping

45/00 Other aviculture appliances, e.g. devices for determining whether a bird is about to lay

Apiculture

47/00 Beehives
47/02 . Construction or arrangement of frames for honeycombs
47/04 . Artificial honeycombs
47/06 . Other details of beehives, e.g. ventilating devices, entrances to hives, guards, partitions, bee escapes

49/00 Rearing-boxes; **Queen transporting or introducing cages**

51/00 Appliances for treating beehives or parts thereof, e.g. for cleaning or disinfecting

53/00 Feeding or drinking appliances for bees

55/00 Bee-smokers; **Bee-keepers' accessories, e.g. veils** (smoking pipes A24F)

57/00 Appliances for providing, preventing, or catching swarms; **Drone-catching devices**

59/00 Honey collection
59/02 . Devices for uncapping honeycombs
59/04 . Honey strainers
59/06 . Devices for extracting wax

Pisciculture; **Aquaria**; **Terraria**

61/00 Culture of fish, mussels, crayfish, lobsters, sponges, pearls, or the like (harvesting oysters, mussels, sponges or the like A01K 80/00)
61/02 . Feeding devices for fish

63/00 Receptacles for live fish, e.g. aquaria (keepnets or other containers for keeping captured fish A01K 97/20); **Terraria [5]**
63/02 . Receptacles specially adapted for transporting live fish
63/04 . Arrangements for treating water specially adapted to receptacles for live fish (filters in general B01D; water treatment in general C02F) **[3]**
63/06 . Arrangements for heating or lighting in, or attached to, receptacles for live fish (heating or lighting apparatus per se F21, H01, H05B) **[3]**

65/00 Fish stringers

67/00 Rearing or breeding animals, not otherwise provided for; **New breeds of animals** (methods for reproduction or fertilisation A61D 19/00; medicinal preparations containing sperm A61K 35/52; tissue- or animal-cell cultivation apparatus C12M 3/00; cultivation or maintenance of tissue or animal cells C12N 5/00; mutation or genetic engineering C12N 15/00)

Note

In this group the following term is used with the meaning indicated:
– "breeding" means obtaining animals up to and including their birth or hatching. **[5]**

67/02 . Breeding vertebrates (covering boxes A01K 15/00; devices for assisting or preventing mating A01K 21/00)
67/027 . New breeds of vertebrates **[5]**
67/033 . Rearing or breeding invertebrates; New breeds of invertebrates (non-chemical sterilisation of invertebrates A01M) **[5]**
67/04 . . Silkworms **[5]**

Fishing

69/00 Stationary catching devices for fishing
69/02 . Fixed nets without traps
69/04 . Fixed nets with traps
69/06 . Traps
69/08 . . Rigid traps, e.g. lobster pots
69/10 . . Collapsible traps

71/00 Floating fishing nets

73/00 Drawn fishing nets
73/02 . Trawling nets
73/04 . . Devices for spreading or positioning, e.g. control thereof **[2]**
73/045 . . . for lateral sheering, e.g. trawl boards **[2]**
73/05 . . . for vertical sheering **[2]**
73/053 . . . Ground-line rollers **[4]**
73/06 . . Hauling devices for the headlines

73/10 . . Determining the quantity of the catch, e.g. by the pull or drag on the lines
73/12 . Nets held vertically in the water, e.g. seines

74/00 Other catching nets or the like for fishing [2]

75/00 Accessories for fishing nets; **Details of fishing nets, e.g. structure [4]**
75/02 . Illuminating devices for nets
75/04 . Floats (for angling A01K 93/00) **[4]**
75/06 . Sinkers (for angling A01K 95/00) **[4]**

77/00 Landing-nets for fishing; **Landing-spoons for fishing**

79/00 Methods or means of catching fish in bulk not provided for in groups A01K 69/00 to A01K 77/00
79/02 . by electrocution (electric circuits therefor H05C)

80/00 Harvesting oysters, mussels, sponges or the like (fishing nets A01K 73/00, A01K 74/00; dredgers E02F) **[3]**

81/00 Fishing with projectiles (weapons, projectiles other than fish-spears F41, F42)
81/04 . Fish-spears
81/06 . Equipment for hunting fish under water (swimming equipment A63B 31/00 to A63B 35/00)

Angling

83/00 Fish-hooks
83/02 . Expanding fish-hook assembly
83/04 . with special gripping arms
83/06 . Devices for holding bait on hooks

85/00 Artificial bait for fishing
85/01 . with light emission, sound emission, scent dispersal or the like **[2,5]**
85/02 . with means for concealing or protecting hooks, e.g. to prevent entanglement with weeds **[5]**
85/08 . Artificial flies (fly tying devices A01K 97/26) **[5]**
85/10 . with at least one flat rotating body having its axis of rotation substantially non-coincident with the longitudinal axis of the body **[5]**
85/12 . comprising a body rotating around its longitudinal axis, e.g. devons **[5]**
85/14 . with flat, or substantially flat, undulating bodies, e.g. spoons **[5]**
85/16 . with other than flat, or substantially flat, undulating bodies, e.g. plugs **[5]**
85/18 . . in two or more pieces **[5]**

87/00 Fishing rods
87/02 . Connecting devices for parts of the rods
87/04 . Fishing-line guides on rods
87/06 . Devices for fixing reels on rods
87/08 . Handgrips **[5]**

89/00 Fishing reels
89/01 . with pick-up, i.e. with the guiding member rotating and the spool being stationary during normal retrieval of the line (A01K 89/027 takes precedence) **[2,5]**
89/012 . . motor-driven **[2]**
89/015 . with rotary drum (A01K 89/033 takes precedence) **[2,5]**
89/0155 . . Antibacklash devices **[5]**
89/016 . . Fly reels **[5]**
89/0165 . . for trolling **[5]**
89/017 . . motor-driven **[2]**
89/02 . Brake devices for reels
89/027 . . with pick-up **[5]**
89/033 . . with rotary drum **[5]**
89/06 . Reversible reels **[5]**
89/08 . Pole-less fishing apparatus, i.e. hand-held reels **[5]**

91/00 Fishing lines
91/02 . Devices for casting lines
91/03 . Connecting devices (devices for fixing on or removing sinkers from lines A01K 95/02) **[5]**
91/04 . . for connecting lines to hooks or lures **[5]**
91/047 . . for connecting lines to lines **[5]**
91/053 . . Fishing booms, i.e. connecting devices spreading out the leaders, e.g. to avoid tangling thereof **[5]**
91/06 . Apparatus on lines not otherwise provided for, e.g. automatic hookers (floats A01K 93/00) **[2,5]**
91/08 . . Trolling devices **[5]**
91/10 . . for automatic hook setting **[5]**
91/12 . Fly lines **[5]**
91/14 . Leaders **[5]**
91/16 . . for fly fishing **[5]**
91/18 . Trotlines, longlines; Accessories therefor, e.g. baiting devices, lifters, setting reelers **[5]**
91/20 . Line length or depth measuring devices **[5]**

93/00 Floats for angling, with or without signalling devices [4,5]
93/02 . with signalling devices **[5]**

95/00 Sinkers for angling [4]
95/02 . Devices for fixing on or removing sinkers from lines **[5]**

97/00 Accessories for angling (fish stringers A01K 65/00; landing-nets or landing-spoons for fishing A01K 77/00)
97/01 . for ice-fishing **[2]**
97/02 . Devices for laying ground-bait, e.g. chum dispensers
97/04 . Containers for bait; Preparation of bait (feeding-stuffs for particular animals A23K 1/18) **[2]**
97/05 . . Containers for live bait kept in water, e.g. for minnows, shrimps **[5]**
97/06 . Containers or holders for hooks, lines, sinkers, flies or the like **[5]**
97/08 . Containers for rods
97/10 . Supports for rods
97/11 . . with automatic hooking devices **[5]**
97/12 . Signalling devices, e.g. tip-up devices (A01K 91/06 takes precedence) **[2]**
97/14 . Gaffs
97/16 . Devices for drying fishing lines
97/18 . for removing fish-hooks from the fish **[5]**
97/20 . Keepnets or other containers for keeping captured fish (A01K 97/05 takes precedence) **[5]**
97/22 . Platforms or seat-boxes specially adapted for angling, e.g. tackle boxes for use as seats **[5]**
97/24 . Arrangements for disengaging fish-hooks from obstacles **[5]**
97/26 . Fly tying devices **[5]**
97/28 . . Vices specially adapted therefor **[5]**

99/00 Methods or apparatus for fishing not provided for in groups A01K 69/00 to A01K 97/00 [8]

A01L SHOEING OF ANIMALS

Subclass index

1/00 **Shoes for horses or other solipeds fastened with nails** (A01L 3/00 takes precedence)
1/02 . Solid horseshoes consisting of one part
1/04 . Solid horseshoes consisting of multiple parts

3/00 **Horseshoes fastened by means other than nails, with or without additional fastening by nailing**
3/02 . Horseshoes consisting of one part
3/04 . Horseshoes consisting of two or more parts connected by hinged joints
3/06 . Shoe-like appliances enabling draught animals to walk on bogs or the like

5/00 **Horseshoes made of elastic materials**

7/00 **Accessories for shoeing animals**
7/02 . Elastic inserts or soles for horseshoes
7/04 . Solid calks or studs
7/06 . Elastic calks or studs
7/08 . Ice-spurs for horseshoes
7/10 . Horseshoe nails

9/00 **Shoes for other animals, e.g. oxen**

11/00 **Farriers' tools or appliances** (making horseshoes by rolling B21H 7/12, by forging B21K 15/02)

13/00 **Pens for animals while being shod**

15/00 **Apparatus or use of substances for the care of hoofs**

A01M CATCHING, TRAPPING OR SCARING OF ANIMALS (apiculture A01K 47/00 to A01K 59/00; fishing A01K 69/00 to A01K 97/00; pesticides A01N); APPARATUS FOR THE DESTRUCTION OF NOXIOUS ANIMALS OR NOXIOUS PLANTS (equipment fitted in or to aircraft for dropping or releasing powdered, liquid or gaseous matter, e.g. pesticides, herbicides, B64D 1/16)

Note

In this subclass, terms "killing" and "destruction" cover "non-chemical sterilisation" of invertebrates. **[7]**

Subclass index

1/00 **Stationary means for catching or killing insects**
1/02 . with devices attracting the insects
1/04 . . using illumination
1/06 . using a suction effect
1/08 . using combined illumination and suction effects
1/10 . Traps
1/12 . . automatically reset
1/14 . Catching by adhesive surfaces
1/16 . . Fly papers or ribbons
1/18 . . Adhesive bands or coatings for trees
1/20 . Poisoning, narcotising, or burning insects
1/22 . by electric means (electric circuits therefor H05C)
1/24 . Arrangements connected with buildings, doors, windows, or the like

3/00 **Manual implements, other than sprayers or powder distributors, for catching or killing insects, e.g. butterfly nets**
3/02 . Fly-swatters
3/04 . with adhesive surfaces

5/00 **Catching insects in fields, gardens, or forests by movable appliances**
5/02 . Portable appliances
5/04 . Wheeled machines, with means for stripping-off or brushing-off insects
5/06 . . with adhesive surfaces
5/08 . . with fans

7/00 **Special adaptations or arrangements of liquid-spraying apparatus for purposes covered by this subclass** (spraying apparatus in general B05B)

9/00 **Special adaptations or arrangements of powder-spraying apparatus for purposes covered by this subclass** (spraying apparatus in general B05B)

11/00 **Special adaptations or arrangements of combined liquid- and powder-spraying apparatus for purposes covered by this subclass** (spraying apparatus in general B05B)

13/00 **Fumigators**; **Apparatus for distributing gases**

15/00 **Flame-throwers specially adapted for purposes covered by this subclass** (flame-throwers in general F41H 9/02)

17/00 **Apparatus for the destruction of vermin in soil or in foodstuffs**

19/00 **Apparatus for the destruction of noxious animals, other than insects, by hot water, steam, hot air, or electricity** (electric circuits therefor H05C)

21/00 **Apparatus for the destruction of unwanted vegetation, e.g. weeds** (biocides, plant growth regulators A01N 25/00 to A01N 65/00; spraying or atomising apparatus in general B05B; soil-conditioning or soil-stabilising materials C09K 17/00; control of undesirable vegetation on roads or permanent ways of railways E01H 11/00)

21/02 . Apparatus for mechanical destruction

21/04 . Apparatus for destruction by steam, chemicals, burning, or electricity

23/00 **Traps for animals**

23/02 . Collecting-traps

23/04 . . with tipping platforms

23/06 . . . with locking mechanism for the tipping platform

23/08 . . with approaches permitting entry only

23/10 . . with rotating cylinders or turnstiles

23/12 . . with devices for throwing the animal to a collecting chamber

23/14 . . Other traps automatically reset

23/16 . Box traps

23/18 . . with pivoted closure flaps

23/20 . . with dropping doors or slides

23/22 . . with dropping covers

23/24 . Jaw or like spring traps

23/26 . . of the double-jaw or pincer type

23/28 . . . Jaw trap setting-devices

23/30 . . Break-back traps

23/32 . . Racket net traps

23/34 . . with snares

23/36 . . with arrangements for piercing the victim

23/38 . Electric traps

25/00 **Devices for dispensing poison for animals** (A01M 27/00 takes precedence; for insects A01M 1/20) **[3]**

27/00 **Apparatus having projectiles or killing implements projected to kill the animal, e.g. pierce or shoot, and triggered thereby [3]**

29/00 ***Scaring or repelling devices, e.g. bird-scaring apparatus* [1,2011.01]**

29/06 . *using visual means, e.g. scarecrows, moving elements, specific shapes, patterns or the like* **[2011.01]**

29/08 . . *using reflection, colours or films with specific transparency or reflectivity* **[2011.01]**

29/10 . . *using light sources, e.g. lasers or flashing lights* **[2011.01]**

29/12 . *using odoriferous substances, e.g. aromas, pheromones or chemical agents* **[2011.01]**

29/14 . *using thermal effects* **[2011.01]**

29/16 . *using sound waves* **[2011.01]**

29/18 . . *using ultrasonic signals* **[2011.01]**

29/20 . . *with generation of periodically explosive reports* **[2011.01]**

29/22 . *using vibrations (A01M 29/16 takes precedence)* **[2011.01]**

29/24 . *using electric or magnetic effects, e.g. electric shocks, magnetic fields or microwaves* **[2011.01]**

29/26 . . *specially adapted for birds, e.g. electrified rods, cords or strips* **[2011.01]**

29/28 . . *specially adapted for insects* **[2011.01]**

29/30 . *preventing or obstructing access or passage, e.g. by means of barriers, spikes, cords, obstacles or sprinkled water* **[2011.01]**

29/32 . . *specially adapted for birds, e.g. spikes* **[2011.01]**

29/34 . . *specially adapted for insects* **[2011.01]**

31/00 **Hunting appliances**

31/02 . Shooting stands (folding seats A47C)

31/04 . Beater rattles

31/06 . Decoys

99/00 **Subject matter not provided for in other groups of this subclass [8]**

A01N **PRESERVATION OF BODIES OF HUMANS OR ANIMALS OR PLANTS OR PARTS THEREOF** (preservation of food or foodstuff A23); **BIOCIDES, E.G. AS DISINFECTANTS, AS PESTICIDES OR AS HERBICIDES** (preparations for medical, dental or toilet purposes which kill or prevent the growth or proliferation of unwanted organisms A61K); **PEST REPELLANTS OR ATTRACTANTS**; **PLANT GROWTH REGULATORS** (mixtures of pesticides with fertilisers C05G)

(1) This subclass covers: **[3]**
- compositions, physical forms, methods of application of specific materials or the use of single compounds or compositions; **[7]**
- chemosterilants for the sexual sterilisation of invertebrates, e.g. insects (sex sterilants for other purposes A61K). **[7]**

(2) This subclass does not cover materials which affect the growth of a plant solely by supplying nutrients, i.e. plant food, ordinarily required for growth or materials which are used to prevent or cure mineral deficiencies in plants, e.g. addition of iron chelates to cure iron chlorosis, which materials are covered by class C05. **[3]**

(3) In this subclass, the following expression is used with the meaning indicated:
- "plant growth regulators" are those materials which alter the plant through a chemical modification of the plant metabolism, such as auxins. **[3]**

(4) Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P. **[8]**

Subclass index

Preservation of bodies of humans or animals, or plants, or parts thereof

1/00 Preservation of bodies of humans or animals, or parts thereof

1/02 . Preservation of living parts

3/00 Preservation of plants or parts thereof, e.g. inhibiting evaporation, improvement of the appearance of leaves (preservation or chemical ripening of harvested fruit or vegetables A23B 7/00); **Grafting wax**

3/02 . Keeping cut flowers fresh chemically (apparatus therefor A01G 5/06)

3/04 . Grafting wax

Biocides; **Pest repellants or attractants**; **Plant growth regulators [3]**

(1) Attention is drawn to the definitions of groups of chemical elements following the title of section C. **[3]**

(2) In groups A01N 27/00 to A01N 65/00, in the absence of an indication to the contrary, an active ingredient is classified in the last appropriate place. **[3]**

(3) A composition, i.e. a mixture of two or more active ingredients is classified in the last of groups A01N 27/00 to A01N 65/00 that provides for at least one of these active ingredients. **[8]**

(4) Any part of a composition which is not identified by the classification according to Note (3), and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups A01N 27/00 to A01N 65/00. The part can be either a single ingredient or a composition in itself. **[8]**

(5) Any part of a composition which is not identified by the classification according to Note (3) or (4), and which is considered to represent information of interest for search, may also be classified in the last appropriate place in groups A01N 27/00 to A01N 65/00. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. **[8]**

(6) Where a compound is described as existing in tautomeric forms, it is classified as if existing in the form which is classified last in the system. **[3]**

(7) Compounds covered by different main groups according to alternatively specified parts of their formulae are classified in every one of the relevant main groups. **[3]**

(8) Salts formed between two or more organic compounds are classified as the compound providing the essential ion and it is also classified as the compound providing the other ion. **[3]**

(9) Salts or metal chelates of an organic compound are classified as that compound. **[3]**

(10) In this subclass, a foodstuff is not considered as an active ingredient. **[3]**

(11) Different materials applied in sequence, at different times, are considered as a mixture of all materials employed. **[3]**

(12) Synergistic or potentiated compositions are classified as if the synergist or potentiator were an active ingredient. **[3]**

(13) In groups A01N 25/00 to A01N 65/00, the symbol X means nitrogen, oxygen, sulfur or a halogen; Y means nitrogen, oxygen or sulfur. A dotted line between atoms indicates an optional bond, e.g.... indicates one or two single bonds or a double bond. **[3]**

25/00 Biocides, pest repellants or attractants, or plant growth regulators, characterised by their forms, or by their non-active ingredients or by their methods of application (fungicidal, bactericidal, insecticidal, disinfecting or antiseptic paper D21H); **Substances for reducing the noxious effect of the active ingredients to organisms other than pests [3]**

25/02 . containing liquids as carriers, diluents or solvents **[3]**

25/04 . . Dispersions or gels (foams A01N 25/16) **[3]**

25/06 . . . Aerosols **[3]**

25/08 . containing solids as carriers or diluents **[3]**

25/10 . . Macromolecular compounds **[3]**

25/12 . Powders or granules (A01N 25/26 takes precedence) **[3]**

25/14 . . wettable **[3]**

25/16 . Foams **[3]**

25/18 . Vapour or smoke emitting compositions with delayed or sustained release **[3]**

25/20 . Combustible or heat-generating compositions **[3]**

25/22 . containing ingredients stabilising the active ingredients **[3]**

25/24 . containing ingredients to enhance the sticking of the active ingredients **[3]**

25/26 . in coated particulate form **[3]**

25/28 . . Microcapsules **[3]**

25/30 . characterised by the surfactants **[3]**

25/32 . Ingredients for reducing the noxious effect of the active substances to organisms other than pests, e.g. toxicity reducing compositions, self-destructing compositions **[3]**

25/34 . Shaped forms, e.g. sheets, not provided for in any other group of this main group **[3]**

27/00 Biocides, pest repellants or attractants, or plant growth regulators containing hydrocarbons [3]

29/00 Biocides, pest repellants or attractants, or plant growth regulators containing halogenated hydrocarbons [3]

29/02 . Acyclic compounds or compounds containing halogen attached to an aliphatic side chain of a cycloaliphatic ring system **[3]**

29/04 . Halogen directly attached to a carbocyclic ring system **[3]**

29/06 . . Hexachlorocyclohexane **[3]**

29/08 . . Halogen directly attached to a polycyclic ring system **[3]**

29/10 . Halogen attached to an aliphatic side chain of an aromatic ring system **[3]**

29/12 . . 1,1-Di- or 1,1,1-tri-halo-2-aryl-ethane or -ethene or derivatives thereof, e.g. DDT **[3]**

31/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic oxygen or sulfur compounds [3]

31/02 . Acyclic compounds **[3]**

31/04 . Oxygen or sulfur attached to an aliphatic side chain of a carbocyclic ring system **[3]**

31/06 . Oxygen or sulfur directly attached to a cycloaliphatic ring system **[3]**

31/08 . Oxygen or sulfur directly attached to an aromatic ring system **[3]**

31/10 . . Pentachlorophenol **[3]**

31/12 . . Bis-chlorophenols **[3]**

31/14 . . Ethers **[3]**

31/16 . . with two or more oxygen or sulfur atoms directly attached to the same aromatic ring system **[3]**

33/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic nitrogen compounds [3]

33/02 . Amines; Quaternary ammonium compounds **[3]**

33/04 . . Nitrogen directly attached to aliphatic or cycloaliphatic carbon atoms **[3]**

33/06 . . Nitrogen directly attached to an aromatic ring system **[3]**

33/08 . . containing oxygen or sulfur **[3]**

33/10 . . . having at least one oxygen or sulfur atom directly attached to an aromatic ring system **[3]**

33/12 . . Quaternary ammonium compounds **[3]**

33/14 . containing nitrogen-to-halogen bonds **[3]**

33/16 . containing nitrogen-to-oxygen bonds **[3]**

33/18 . . Nitro compounds **[3]**

33/20 . . . containing oxygen or sulfur attached to the carbon skeleton containing the nitro group **[3]**

33/22 . . . . having at least one oxygen or sulfur atom and at least one nitro group directly attached to the same aromatic ring system **[3]**

33/24 . . only one oxygen atom attached to the nitrogen atom **[3]**

33/26 . containing nitrogen-to-nitrogen bonds, e.g. azides, diazo-amino compounds, diazonium compounds, hydrazine derivatives **[3]**

35/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic compounds containing a carbon atom having two bonds to hetero atoms with at the most one bond to halogen, e.g. aldehyde radical [3]

35/02 . containing aliphatically bound aldehyde or keto groups, or thio-analogues thereof; Derivatives thereof, e.g. acetals **[3]**

35/04 . containing aldehyde or keto groups, or thio-analogues thereof, directly attached to an aromatic ring system, e.g. acetophenone; Derivatives thereof, e.g. acetals **[3]**

35/06 . containing keto or thioketo groups as part of a ring, e.g. cyclohexanone, quinone; Derivatives thereof, e.g. ketals **[3]**

35/08 . at least one of the bonds to hetero atoms is to nitrogen **[3]**

35/10 . . containing a carbon-to-nitrogen double bond **[3]**

37/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic compounds containing a carbon atom having three bonds to hetero atoms with at the most two bonds to halogen, e.g. carboxylic acids (containing cyclopropane carboxylic acids or derivatives thereof, e.g. cyclopropane carboxylic acid nitriles, A01N 53/00) **[3]**

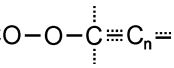
37/02 . Saturated carboxylic acids or thio-analogues thereof; Derivatives thereof **[3]**

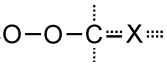
37/04 . . polybasic **[3]**

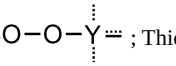
37/06 . Unsaturated carboxylic acids or thio-analogues thereof; Derivatives thereof **[3]**

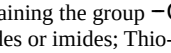
37/08 . containing carboxylic groups or thio-analogues thereof, directly attached by the carbon atom to a cycloaliphatic ring; Derivatives thereof **[3]**

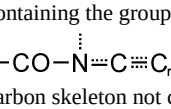
37/10 . Aromatic or araliphatic carboxylic acids, or thio-analogues thereof; Derivatives thereof **[3]**

37/12 . containing the group  , wherein C_n means a carbon skeleton not containing a ring; Thio-analogues thereof **[3]**

37/14 . containing the group  ; Thio-analogues thereof **[3]**

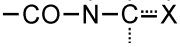
37/16 . containing the group  ; Thio-analogues thereof **[3]**

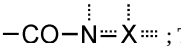
37/18 . containing the group  , e.g. carboxylic acid amides or imides; Thio-analogues thereof **[3]**

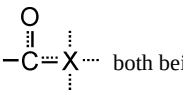
37/20 . . containing the group  , wherein C_n means a carbon skeleton not containing a ring; Thio-analogues thereof **[3]**

37/22 . . the nitrogen atom being directly attached to an aromatic ring system, e.g. anilides **[3]**

37/24 . . . containing at least one oxygen or sulfur atom being directly attached to the same aromatic ring system **[3]**

37/26 . . containing the group  ; Thio-analogues thereof **[3]**

37/28 . . containing the group  ; Thio-analogues thereof **[3]**

37/30 . . containing the groups and  both being directly attached by their carbon atoms to the same carbon skeleton, e.g. $H_2N-NH-CO-C_6H_4-COOCH_3$; Thio-analogues thereof **[3]**

37/32 . . Cyclic imides of polybasic carboxylic acids or thio-analogues thereof **[3]**

37/34 . Nitriles **[3]**

37/36 . containing at least one carboxylic group or a thio-analogue, or a derivative thereof, and a singly bound oxygen or sulfur atom attached to the same carbon skeleton, this oxygen or sulfur atom not being a member of a carboxylic group or of a thio-analogue, or of a derivative thereof, e.g. hydroxy-carboxylic acids **[3]**

37/38 . . having at least one oxygen or sulfur atom attached to an aromatic ring system **[3]**

37/40 . . . having at least one carboxylic group or a thio-analogue, or a derivative thereof, and one oxygen or sulfur atom attached to the same aromatic ring system **[3]**

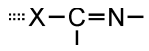
37/42 . containing within the same carbon skeleton a carboxylic group or a thio-analogue, or a derivative thereof, and a carbon atom having only two bonds to hetero atoms with at the most one bond to halogen, e.g. keto-carboxylic acids **[3]**

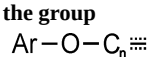
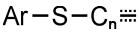
37/44 . containing at least one carboxylic group or a thio-analogue, or a derivative thereof, and a nitrogen atom attached to the same carbon skeleton by a single or double bond, this nitrogen atom not being a member of a derivative or of a thio-analogue of a carboxylic group, e.g. amino-carboxylic acids **[3]**

37/46 . . N-acyl derivatives **[3]**

37/48 . . Nitro-carboxylic acids; Derivatives thereof **[3]**

37/50 . . the nitrogen atom being doubly bound to the carbon skeleton **[3]**

37/52 . containing  groups, e.g. carboxylic acid amidines **[3]**

39/00 Biocides, pest repellants or attractants, or plant growth regulators containing aryloxy- or arylthio-aliphatic or cycloaliphatic compounds, containing the group  **or**  **, e.g. phenoxyethylamine, phenylthio-acetonitrile, phenoxyacetone [3]**

Note

In this group, the symbol  means a carbon skeleton, not containing an aromatic ring system wherein n>=2. **[3]**

39/02 . Aryloxy-carboxylic acids; Derivatives thereof **[3]**

39/04 . . Aryloxy-acetic acids; Derivatives thereof **[3]**

41/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic compounds containing a sulfur atom bound to a hetero atom [3]

41/02 . containing a sulfur-to-oxygen double bond **[3]**

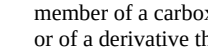
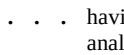
41/04 . . Sulfonic acids; Derivatives thereof **[3]**

41/06 . . . Sulfonic acid amides **[3]**

41/08 . . . Sulfonic acid halides; alpha-Hydroxy-sulfonic acids; Amino-sulfonic acids; Thiosulfonic acids; Derivatives thereof **[3]**

41/10 . . Sulfones; Sulfoxides **[3]**

41/12 . not containing sulfur-to-oxygen bonds, e.g. polysulfides **[3]**

43/00 Biocides, pest repellants or attractants, or plant growth regulators containing heterocyclic compounds (containing cyclic anhydrides, cyclic imides A01N 37/00; containing compounds of the formula  **, containing only one heterocyclic ring, wherein m>=1 and n>=0 and**  **is unsubstituted or alkylsubstituted pyrrolidine, piperidine, morpholine, thiomorpholine, piperazine or a polymethyleneimine with four or more** CH_2 groups A01N 33/00 to A01N 41/12; containing cyclopropane carboxylic acids or derivatives thereof, e.g. esters having heterocyclic rings, A01N 53/00) **[3]**

(1) In this group, the following terms or expressions are used with the meanings indicated:
- "hetero ring" is a ring having at least one halogen, nitrogen, oxygen or sulfur atom as a ring member;
- "bridged" means the presence of at least one fusion other than ortho, peri and spiro;
- two rings are "condensed" if they share at least one ring member, i.e. "spiro" and "bridged" are considered as condensed;
- "condensed ring system" is a ring system in which all rings are condensed among themselves. **[3]**

(2) In this group, the number of rings in a condensed ring system equals the number of scissions necessary to convert the ring system into one acyclic chain. The relevant rings in a condensed system are chosen according to the following criteria consecutively:
(i) lowest number of ring members,
(ii) highest number of hetero atoms as ring members.
Ring members shared by two or more rings are regarded as being a member of each of these rings. **[3]**

43/02 . having rings with one or more oxygen or sulfur atoms as the only ring hetero atom **[3]**

43/04 . . with one hetero atom **[3]**

43/06 . . . five-membered rings **[3]**

43/08 . . . . with oxygen as the ring hetero atom **[3]**

43/10 . . . . with sulfur as the ring hetero atom **[3]**

43/12 . . . . condensed with a carbocyclic ring **[3]**

43/14 . . . six-membered rings **[3]**

43/16 . . . . with oxygen as the ring hetero atom **[3]**

43/18 . . . . with sulfur as the ring hetero atom **[3]**

43/20 . . . three- or four-membered rings **[3]**

43/22 . . . rings with more than six members **[3]**

43/24 . . with two or more hetero atoms **[3]**

43/26 . . . five-membered rings **[3]**

43/28 . . . . with two hetero atoms in positions 1,3 **[3]**

43/30 . . . . . with two oxygen atoms in positions 1,3, condensed with a carbocyclic ring **[3]**

43/32 . . . six-membered rings **[3]**

43/34 . having rings with one nitrogen atom as the only ring hetero atom **[3]**

43/36 . . five-membered rings **[3]**

43/38 . . . condensed with carbocyclic rings **[3]**

43/40 . . six-membered rings **[3]**

43/42 . . . condensed with carbocyclic rings **[3]**

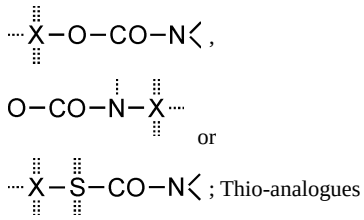
43/44 . . three- or four-membered rings **[3]**

43/46 . . rings with more than six members **[3]**

43/48 . having rings with two nitrogen atoms as the only ring hetero atoms **[3]**
43/50 . . 1,3-Diazoles; Hydrogenated 1,3-diazoles **[3]**
43/52 . . . condensed with carbocyclic rings, e.g. benzimidazoles **[3]**
43/54 . . 1,3-Diazines; Hydrogenated 1,3-diazines **[3]**
43/56 . . 1,2-Diazoles; Hydrogenated 1,2-diazoles **[3]**
43/58 . . 1,2-Diazines; Hydrogenated 1,2-diazines **[3]**
43/60 . . 1,4-Diazines; Hydrogenated 1,4-diazines **[3]**
43/62 . . three- or four-membered rings or rings with more than six members **[3]**
43/64 . having rings with three nitrogen atoms as the only ring hetero atoms **[3,4]**
43/647 . . Triazoles; Hydrogenated triazoles **[4]**
43/653 . . . 1,2,4-Triazoles; Hydrogenated 1,2,4-triazoles **[4]**
43/66 . . 1,3,5-Triazines, not hydrogenated and not substituted at the ring nitrogen atoms **[3]**
43/68 . . . with two or three nitrogen atoms directly attached to ring carbon atoms **[3]**
43/70 . . . . Diamino-1,3,5-triazines with only one oxygen, sulfur or halogen atom or only one cyano, thiocyano (−SCN), cyanato (−OCN) or azido ($-N_3$) group directly attached to a ring carbon atom **[3]**
43/707 . . 1,2,3- or 1,2,4-Triazines; Hydrogenated 1,2,3- or 1,2,4-triazines **[4]**
43/713 . having rings with four or more nitrogen atoms as the only ring hetero atoms **[4]**
43/72 . having rings with nitrogen atoms and oxygen or sulfur atoms, as ring hetero atoms **[3]**
43/74 . . five-membered rings with one nitrogen atom and either one oxygen atom or one sulfur atom in positions 1,3 **[3]**
43/76 . . . 1,3-Oxazoles; Hydrogenated 1,3-oxazoles **[3]**
43/78 . . . 1,3-Thiazoles; Hydrogenated 1,3-thiazoles **[3]**
43/80 . . five-membered rings with one nitrogen atom and either one oxygen atom or one sulfur atom in positions 1,2 **[3]**
43/82 . . five-membered rings with three hetero atoms **[3]**
43/824 . . . 1,3,4-Oxa(thia)diazoles; Hydrogenated 1,3,4-oxa(thia)diazoles **[6]**
43/828 . . . 1,2,3-Oxa(thia)diazoles; Hydrogenated 1,2,3-oxa(thia)diazoles **[6]**
43/832 . . . 1,2,5-Oxa(thia)diazoles; Hydrogenated 1,2,5-oxa(thia)diazoles **[6]**
43/836 . . . 1,2,4-Oxa(thia)diazoles; Hydrogenated 1,2,4-oxa(thia)diazoles **[6]**
43/84 . . six-membered rings with one nitrogen atom and either one oxygen atom or one sulfur atom in positions 1,4 **[3]**
43/86 . . six-membered rings with one nitrogen atom and either one oxygen atom or one sulfur atom in positions 1,3 **[3]**
43/88 . . six-membered rings with three ring hetero atoms **[3]**
43/90 . having two or more relevant hetero rings, condensed among themselves or with a common carbocyclic ring system **[3]**
43/92 . having rings with one or more halogen atoms as ring hetero atoms **[3]**

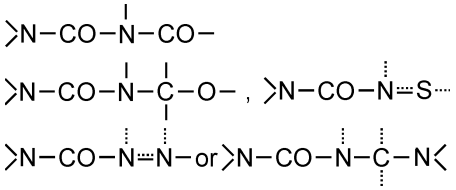
45/00 Biocides, pest repellants or attractants, or plant growth regulators containing compounds having three or more carbocyclic rings condensed among themselves, at least one ring not being a six-membered ring (halogenated hydrocarbons A01N 29/08; condensed with heterocyclic rings A01N 43/00) **[3]**
45/02 . having three carbocyclic rings **[3]**

47/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic compounds containing a carbon atom not being member of a ring and having no bond to a carbon or hydrogen atom, e.g. derivatives of carbonic acid (carbon tetrahalides A01N 29/02) **[3]**
47/02 . the carbon atom having no bond to a nitrogen atom **[3]**
47/04 . . containing $\rangle N-S-C\equiv Hal_3$ groups **[3]**
47/06 . . containing −O−CO−O− groups; Thio-analogues thereof **[3]**
47/08 . the carbon atom having one or more single bonds to nitrogen atoms **[3]**
47/10 . . Carbamic acid derivatives, i.e. containing the group −O−CO−N⟨; Thio-analogues thereof **[3]**
47/12 . . . containing a −O−CO−N⟨ group, or a thio-analogue thereof, neither directly attached to a ring nor the nitrogen atom being a member of a heterocyclic ring **[3]**
47/14 . . . . Di-thio-analogues thereof **[3]**
47/16 . . . the nitrogen atom being part of a heterocyclic ring **[3]**
47/18 . . . containing a −O−CO−N⟨ group, or a thio-analogue thereof, directly attached to a heterocyclic or cycloaliphatic ring **[3]**
47/20 . . . N-Aryl derivatives thereof **[3]**
47/22 . . . O-Aryl or S-Aryl esters thereof **[3]**
47/24 . . . containing the groups



thereof **[3]**
47/26 . . . Oxidation products of dithiocarbamic acid derivatives, e.g. thiuram sulfides **[3]**
47/28 . . Ureas or thioureas containing the groups $\rangle N-CO-N\langle$ or $\rangle N-CS-N\langle$ (isoureas, isothioureas A01N 47/42) **[3]**
47/30 . . . Derivatives containing the group $\rangle N-CO-N-$aryl or $\rangle N-CS-N-$aryl **[3]**
47/32 . . . containing $\rangle N-CO-N\langle$ or $\rangle N-CS-N\langle$ groups directly attached to a cycloaliphatic ring **[3]**

47/34 . . . containing the groups



, e.g. biuret; Thio-analogues thereof; Urea-aldehyde condensation products **[3]**

47/36 . . . containing the group 〉N−CO−N〈 directly attached to at least one heterocyclic ring; Thio-analogues thereof **[3]**

47/38 . . . containing the group 〉N−CO−N〈 where at least one nitrogen atom is part of a heterocyclic ring; Thio-analogues thereof **[3]**

47/40 . the carbon atom having a double or triple bond to nitrogen, e.g. cyanates, cyanamides (inorganic cyanamides A01N 59/24) **[3]**

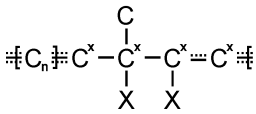
47/42 . . containing $-N=CX_2$ groups, e.g. isothiourea **[3]**

47/44 . . . Guanidine; Derivatives thereof **[3]**

47/46 . . containing −N=C=S groups **[3]**

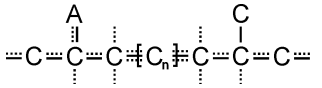
47/48 . . containing −S−C≡N groups (A01N 43/00 to A01N 47/38 take precedence) **[3]**

49/00 Biocides, pest repellants or attractants, or plant growth regulators containing compounds containing the group



wherein m+n>=1,

both X together may also mean −Y− or a direct carbon-to-carbon bond, and the carbon atoms marked with an asterisk are not part of any ring system other than that which may be formed by the atoms X, the carbon atoms in square brackets being part of any acyclic or cyclic structure, or the group

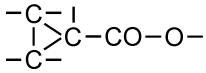


wherein A means a carbon atom or Y, n >= 0, and not more than one of these carbon atoms being a member of the same ring system, e.g. juvenile insect hormones or mimics thereof (containing hydrocarbons A01N 27/00) **[3]**

51/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic compounds having the sequences of atoms O−N−S, X−O−S, N−N−S, O−N−N or O-halogen, regardless of the number of bonds each atom has and with no atom of these sequences forming part of a heterocyclic ring [3]

53/00 Biocides, pest repellants or attractants, or plant growth regulators containing cyclopropane carboxylic acids or derivatives thereof [3]

53/02 . Esters containing the group



, wherein the carbon atom marked with an asterisk is acyclic or part of a ring or ring system; Thio-analogues thereof **[6]**

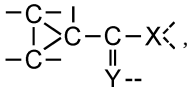
53/04 . . having heterocyclic rings **[6]**

53/06 . . the carbon atom marked with an asterisk being acyclic and directly bound to a carbon atom of a six-membered aromatic ring, e.g. benzyl esters; Thio-analogues thereof **[6]**

53/08 . . . with aryloxy groups bound to the six-membered aromatic ring, e.g. phenoxybenzyl esters; Thio-analogues thereof **[6]**

53/10 . . Esters not provided for in groups A01N 53/04 or A01N 53/06 **[6]**

53/12 . Compounds containing the group



, X or Y being a nitrogen atom, e.g. cyclopropane carboxylic acid amides **[6]**

53/14 . Cyclopropane carboxylic acid nitriles **[6]**

55/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic compounds containing elements other than carbon, hydrogen, halogen, oxygen, nitrogen and sulfur (containing organo-phosphorus compounds A01N 57/00) **[3]**

55/02 . containing metal atoms **[3]**

55/04 . . Tin **[3]**

55/06 . . Mercury **[3]**

55/08 . containing boron **[3]**

55/10 . containing silicon **[6]**

57/00 Biocides, pest repellants or attractants, or plant growth regulators containing organic phosphorus compounds [3]

57/02 . having alternatively specified atoms bound to the phosphorus atom and not covered by a single one of groups A01N 57/10, A01N 57/18, A01N 57/26, A01N 57/34 **[3]**

57/04 . . containing acyclic or cycloaliphatic radicals **[3]**

57/06 . . containing aromatic radicals **[3]**

57/08 . . containing heterocyclic radicals **[3]**

57/10 . having phosphorus-to-oxygen bonds or phosphorus-to-sulfur bonds (A01N 57/02 takes precedence) **[3]**

57/12 . . containing acyclic or cycloaliphatic radicals **[3]**

57/14 . . containing aromatic radicals **[3]**

57/16 . . containing heterocyclic radicals **[3]**

57/18 . having phosphorus-to-carbon bonds (A01N 57/02 takes precedence) **[3]**

57/20 . . containing acyclic or cycloaliphatic radicals **[3]**

57/22 . . containing aromatic radicals **[3]**

57/24 . . containing heterocyclic radicals **[3]**

57/26 . having phosphorus-to-nitrogen bonds (A01N 57/02 takes precedence) **[3]**

57/28 . . containing acyclic or cycloaliphatic radicals **[3]**

57/30 . . containing aromatic radicals **[3]**

57/32 . . containing heterocyclic radicals **[3]**

57/34 . having phosphorus-to-halogen bonds; Phosphonium salts **[3]**

57/36 . having phosphorus as a ring member **[3]**

59/00 Biocides, pest repellants or attractants, or plant growth regulators containing elements or inorganic compounds [3]

59/02 . Sulfur; Selenium; Tellurium; Compounds thereof **[3]**

59/04 . Carbon disulfide; Carbon monoxide; Carbon dioxide (treatment of plants with carbon dioxide A01G 7/02) **[3]**

59/06 . Aluminium; Calcium; Magnesium; Compounds thereof **[3]**

59/08 . Alkali metal chlorides; Alkaline earth metal chlorides **[3]**

59/10 . Fluorides **[3]**
59/12 . Iodine, e.g. iodophors; Compounds thereof **[3]**
59/14 . Boron; Compounds thereof **[3]**
59/16 . Heavy metals; Compounds thereof **[3]**
59/18 . . Mercury **[3]**
59/20 . . Copper **[3]**
59/22 . . Arsenic **[3]**
59/24 . Cyanogen or compounds thereof, e.g. hydrogen cyanide, cyanic acid, cyanamide, thiocyanic acid **[3]**
59/26 . Phosphorus; Compounds thereof **[3]**

61/00 Biocides, pest repellants or attractants, or plant growth regulators containing substances of unknown or undetermined composition, e.g. substances characterised only by the mode of action [3]

61/02 . Mineral oils; Tar oils; Tar; Distillates, extracts or conversion products thereof (containing single chemical compounds isolated from these materials A01N 27/00 to A01N 59/00) **[3]**

63/00 Biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, animals, e.g. nematodes, or substances produced by, or obtained from micro-organisms, viruses, microbial fungi or animals, e.g. enzymes or fermentates (containing compounds of determined constitution A01N 27/00 to A01N 59/00) **[3]**

63/02 . Substances produced by, or obtained from, micro-organisms or animals **[3]**
63/04 . Microbial fungi; Substances produced thereby or obtained therefrom **[3]**

65/00 Biocides, pest repellants or attractants, or plant growth regulators containing material from algae, lichens, bryophyta, multi-cellular fungi or plants, or extracts thereof (containing compounds of determined constitution A01N 27/00 to A01N 59/00) **[3,2009.01]**

65/03 . Algae **[2009.01]**
65/04 . Pteridophyta [fern allies]; Filicophyta [ferns] **[2009.01]**
65/06 . Coniferophyta [gymnosperms], e.g. cypress **[2009.01]**
65/08 . Magnoliopsida [dicotyledons] **[2009.01]**
65/10 . . Apiaceae or Umbelliferae [Carrot family], e.g. parsley, caraway, dill, lovage, fennel or snakebed **[2009.01]**
65/12 . . Asteraceae or Compositae [Aster or Sunflower family], e.g. daisy, pyrethrum, artichoke, lettuce, sunflower, wormwood or tarragon **[2009.01]**
65/14 . . Celastraceae [Staff-tree or Bittersweet family], e.g. spindle tree, bittersweet or thunder god vine **[2009.01]**
65/16 . . Ericaceae [Heath or Blueberry family], e.g. rhododendron, arbutus, pieris, cranberry or bilberry **[2009.01]**
65/18 . . Euphorbiaceae [Spurge family], e.g. ricinus [castorbean] **[2009.01]**
65/20 . . Fabaceae or Leguminosae [Pea or Legume family], e.g. pea, lentil, soybean, clover, acacia, honey locust, derris or millettia **[2009.01]**
65/22 . . Lamiaceae or Labiatae [Mint family], e.g. thyme, rosemary, skullcap, selfheal, lavender, perilla, pennyroyal, peppermint or spearmint **[2009.01]**
65/24 . . Lauraceae [Laurel family], e.g. laurel, avocado, sassafras, cinnamon or camphor **[2009.01]**
65/26 . . Meliaceae [Chinaberry or Mahogany family], e.g. mahogany, langsat or neem **[2009.01]**
65/28 . . Myrtaceae [Myrtle family], e.g. teatree or clove **[2009.01]**
65/30 . . Polygonaceae [Buckwheat family], e.g. red-knees or rhubarb **[2009.01]**
65/32 . . Ranunculaceae [Buttercup family], e.g. hepatica, hydrastis or goldenseal **[2009.01]**
65/34 . . Rosaceae [Rose family], e.g. strawberry, hawthorn, plum, cherry, peach, apricot or almond **[2009.01]**
65/36 . . Rutaceae [Rue family], e.g. lime, orange, lemon, corktree or pricklyash **[2009.01]**
65/38 . . Solanaceae [Potato family], e.g. nightshade, tomato, tobacco or chilli pepper **[2009.01]**
65/40 . Liliopsida [monocotyledons] **[2009.01]**
65/42 . . Aloeaceae [Aloe family] or Liliaceae [Lily family], e.g. aloe, veratrum, onion, garlic or chives **[2009.01]**
65/44 . . Poaceae or Gramineae [Grass family], e.g. bamboo, lemon grass or citronella grass **[2009.01]**
65/46 . . Stemonaceae [Stemona family], e.g. croomia **[2009.01]**
65/48 . . Zingiberaceae [Ginger family], e.g. ginger or galangal **[2009.01]**

A01P BIOCIDAL, PEST REPELLANT, PEST ATTRACTANT OR PLANT GROWTH REGULATORY ACTIVITY OF CHEMICAL COMPOUNDS OR PREPARATIONS [8]

(1) This subclass covers biocidal, pest repellant, pest attractant or plant growth regulatory activity of chemical compounds or preparations already classified as such in subclasses A01N or C12N, or in classes C01, C07 or C08. **[8]**
(2) Attention is drawn to the notes following the title of subclass A01N, which are also applicable to this subclass. **[8]**
(3) In this subclass, activity is classified in all appropriate places. **[8]**
(4) The classification symbols of this subclass are not listed first when assigned to patent documents. **[8]**

1/00 Disinfectants; **Antimicrobial compounds or mixtures thereof [8]**

3/00 Fungicides [8]

5/00 Nematocides [8]

7/00 Arthropodicides [8]
7/02 . Acaricides **[8]**
7/04 . Insecticides **[8]**

9/00 Molluscicides [8]

11/00 Rodenticides [8]

13/00 Herbicides; Algicides [8]

13/02 . selective **[8]**

15/00 Biocides for specific purposes not provided for in groups A01P 1/00 to A01P 13/00 [8]

17/00 Pest repellants [8]

19/00 Pest attractants [8]

21/00 Plant growth regulators [8]

23/00 Chemosterilants [8]

FOODSTUFFS; TOBACCO

A21 BAKING; EQUIPMENT FOR MAKING OR PROCESSING DOUGHS; DOUGHS FOR BAKING [1,8]

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

A21B BAKERS' OVENS; MACHINES OR EQUIPMENT FOR BAKING (domestic baking equipment A47J 37/00; combustion apparatus F23; domestic stoves or ranges being wholly or partly ovens F24B, F24C)

1/00 Bakers' ovens
1/02 . characterised by the heating arrangements
1/04 . . Ovens heated by fire before baking only
1/06 . . Ovens heated by radiators
1/08 . . . by steam-heated radiators
1/10 . . . by radiators heated by fluids other than steam
1/14 . . . Arrangement of radiators
1/22 . . . by electric radiators (A21B 2/00 takes precedence; electric heating elements H05B)
1/24 . . Ovens heated by media flowing therethrough
1/26 . . . by hot air
1/28 . . . by gaseous combustion products
1/33 . . Ovens heated directly by combustion products (A21B 1/04 takes precedence)
1/36 . . Ovens heated directly by hot fluid (A21B 1/06, A21B 1/33 take precedence)
1/40 . characterised by the means for regulating the temperature (temperature-sensitive elements G01K)
1/42 . characterised by the baking surfaces moving during the baking (conveying in general B65G)
1/44 . . with surfaces rotating in a horizontal plane
1/46 . . with surfaces suspended from an endless conveyer or a revolving wheel
1/48 . . with surfaces in the form of an endless band
1/50 . characterised by having removable baking surfaces
1/52 . Portable ovens; Collapsible ovens (travelling or camp cookers A47J 33/00)

2/00 Baking apparatus employing high-frequency or infra-red heating

3/00 Parts or accessories of ovens
3/02 . Doors; Flap gates (general features of doors E06B)
3/04 . Air-treatment devices for ovens, e.g. regulating humidity
3/07 . Charging or discharging ovens (A21B 3/18 takes precedence)
3/10 . Means for illuminating ovens
3/13 . Baking-tins; Baking forms
3/15 . Baking sheets; Baking boards
3/16 . Machines for cleaning or greasing baking surfaces
3/18 . Discharging baked goods from tins (unpacking in general B65B 69/00)

5/00 Baking apparatus for special goods; Other baking apparatus
5/02 . Apparatus for baking hollow articles, waffles, pastry, biscuits, or the like
5/03 . . for baking pancakes (frying pans A47J 37/10) **[3]**
5/04 . Apparatus for baking cylindrical cakes on spits
5/06 . Apparatus for baking in salt solution, e.g. for making pretzels
5/08 . Apparatus for baking in baking fat or oil, e.g. for making doughnuts

7/00 Baking plants

A21C MACHINES OR EQUIPMENT FOR MAKING OR PROCESSING DOUGHS; HANDLING BAKED ARTICLES MADE FROM DOUGH

Subclass index

1/00 Mixing or kneading machines for the preparation of dough (domestic mixing or kneading machines A47J 43/00, A47J 44/00)
1/02 . with vertically-mounted tools; Machines for whipping or beating
1/04 . with inclined rotating mixing arms or levers
1/06 . with horizontally-mounted mixing or kneading tools; Worm mixers
1/08 . with rollers

1/10 . with additional aerating apparatus for the manufacture of aerated doughs
1/12 . for the preparation of dough directly from grain
1/14 . Structural elements of mixing or kneading machines

3/00 Machines or apparatus for shaping batches of dough before subdivision
3/02 . Dough-sheeters; Rolling-machines; Rolling-pins
3/04 . Dough-extruding machines
3/06 . Machines for coiling sheets of dough, e.g. for producing rolls
3/08 . Machines for twisting strips of dough, e.g. for making pretzels
3/10 . combined with dough-dividing apparatus

5/00 Dough-dividing machines
5/02 . with division boxes and ejection plungers
5/04 . . with division boxes in a revolving body with radially-working pistons
5/06 . . with division boxes in a revolving body with axially-working pistons
5/08 . with radial, i.e. star-like, cutter-blades slidable in the slots of, and relatively to, a pressing-plunger

7/00 Machines which homogenise the subdivided dough by working other than by kneading
7/01 . with endless bands
7/02 . with moulding channels (A21C 7/01 takes precedence)
7/04 . with moulding cups (A21C 7/01 takes precedence)
7/06 . combined with dividing machines with radial, i.e. star-like, cutter-blades slidable in the slots of, and relatively to, a pressing-plunger

9/00 Other apparatus for handling dough or dough pieces
9/02 . Apparatus for hanging or distributing strings of dough, such as noodles, spaghetti or macaroni, on bars
9/04 . Apparatus for spreading granular material on, or sweeping or coating the surfaces of, pieces or sheets of dough
9/06 . Apparatus for filling pieces of dough such as doughnuts
9/08 . Depositing, arranging and conveying apparatus for handling pieces, e.g. sheets of dough

11/00 Other machines for forming the dough into its final shape before cooking or baking
11/02 . Embossing machines
11/04 . . with cutting and embossing rollers or drums
11/06 . . handling regularly pre-shaped sheets of dough
11/08 . . with engraved moulds, e.g. rotary machines with die rolls
11/10 . combined with cutting apparatus
11/12 . Apparatus for slotting, slitting or perforating the surface of pieces of dough
11/14 . . for star-like stamping
11/16 . Extruding machines
11/18 . . with pistons
11/20 . . with worms
11/22 . Apparatus with rollers and cutting discs or blades for shaping noodles
11/24 . Apparatus for cutting out noodles from a sheet or ribbon of dough by an engaging pair of grooved rollers

13/00 Provers, i.e. apparatus permitting dough to rise
13/02 . with endless conveyers

14/00 Machines or equipment for making or processing dough, not provided for in other groups of this subclass [8]

15/00 Apparatus for handling baked articles
15/02 . Apparatus for shaping or moulding baked wafers; Making multi-layer wafer sheets
15/04 . Cutting or slicing machines or devices specially adapted for baked articles other than bread (for cutting or slicing bread B26B, B26D)

A21D TREATMENT, E.G. PRESERVATION, OF FLOUR OR DOUGH FOR BAKING, E.G. BY ADDITION OF MATERIALS; BAKING; BAKERY PRODUCTS; PRESERVATION THEREOF [1,8]

Subclass index

PRODUCTS BEFORE BAKING; TREATMENT OR CONSERVATION THEREOF ..... 10/00; 2/00 to 8/00
BAKING OF DOUGH 8/00
BAKERY PRODUCTS; PRESERVATION OR REFRESHING THEREOF 13/00; 15/00, 17/00

2/00 Treatment of flour or dough by adding materials thereto before or during baking (A21D 10/00 takes precedence) **[2,8]**

Note

In groups A21D 2/02 to A21D 2/40, in the absence of an indication to the contrary, a substance is classified in the last appropriate place.

2/02 . by adding inorganic substances
2/04 . . Oxygen; Oxygen-generating compounds, e.g. ozone, peroxides
2/06 . . Reducing agents
2/08 . by adding organic substances
2/10 . . Hydrocarbons
2/12 . . Halohydrocarbons
2/14 . . Organic oxygen compounds
2/16 . . . Fatty acid esters
2/18 . . . Carbohydrates
2/20 . . . Peroxides
2/22 . . . Ascorbic acid
2/24 . . Organic nitrogen compounds
2/26 . . . Proteins
2/28 . . Organic sulfur compounds
2/30 . . Organic phosphorus compounds

2/32 . . . Phosphatides
2/34 . . Animal material
2/36 . . Vegetable material
2/38 . . . Seed germs; Germinated cereals; Extracts thereof
2/40 . Apparatus for the chemical treatment of flour or dough

4/00 Preserving flour or dough before baking by storage in an inert atmosphere

6/00 Other treatment of flour or dough before baking, e.g. cooling, irradiating, heating [2]

8/00 Methods for preparing dough or for baking (A21D 2/00 takes precedence)
8/02 . Methods for preparing dough; Treating dough prior to baking (machines or equipment for making or processing dough A21C)
8/04 . . treating dough with micro-organisms or enzymes
8/06 . Baking processes (bakers' ovens A21B)
8/08 . Prevention of sticking, e.g. to baking plates
8/10 . . using dusting powders

10/00 Batters, dough or mixtures before baking [2]
10/02 . Ready-for-oven doughs, e.g. packaged doughs **[2]**
10/04 . Batters **[2]**

13/00 Finished or partly finished bakery products
13/02 . Bread from whole meal or containing rough-ground grain or bran
13/04 . Bread from materials other than rye or wheat flour
13/06 . Bread with modified starch or protein content **[2]**
13/08 . Pastry, e.g. cake, biscuit, puff-pastry (icing or frosting or mixes therefor A23G 3/00)

15/00 Preserving finished bakery products; **Improving** (refreshing A21D 17/00; packaging or wrapping bakery products B65B, e.g. B65B 23/10, B65B 25/16) **[2]**
15/02 . by cooling **[2]**
15/04 . by heat treatment **[2]**
15/06 . by irradiation **[2]**
15/08 . by coating **[2]**

17/00 Refreshing bakery products (improving A21D 15/00) **[2]**

A22 BUTCHERING; MEAT TREATMENT; PROCESSING POULTRY OR FISH

A22B SLAUGHTERING

1/00 Apparatus for fettering animals to be slaughtered

3/00 Slaughtering or stunning (cutting in general B26)
3/02 . by means of bolts, e.g. slaughtering pistols, cartridges
3/04 . Masks for animals to be slaughtered; Masks combined with stunning arrangements
3/06 . Slaughtering or stunning by electric current (electric circuits therefor H05C)
3/08 . for poultry or fish, e.g. slaughtering pliers, slaughtering shears
3/10 . Slaughtering tools; Slaughtering knives
3/12 . Kosher slaughtering devices

5/00 Accessories for use during or after slaughtering
5/02 . Slaughtering pens
5/04 . Blood-collecting apparatus; Blood-stirring devices
5/06 . Slaughtering stands or spreaders for cattle
5/08 . Scalding; Scraping; Dehairing; Singeing (treatment of hides or skins C14B)
5/10 . . Hand-operated instruments
5/12 . . Scalding kettles
5/14 . Clips for the tongue; Arrangements for closing the throat
5/16 . Skinning instruments or knives
5/18 . Cleaning the stomach of slaughtered animals
5/20 . Splitting instruments

7/00 Slaughterhouse arrangements

A22C PROCESSING MEAT, POULTRY, OR FISH (preserving A23B; obtaining protein compositions for foodstuffs A23J 1/00; fish, meat or poultry preparations A23L; disintegrating, e.g. chopping meat, B02C 18/00; preparation of proteins C07K 1/00)

Subclass index

Processing meat

5/00 Apparatus for mixing meat, sausage-meat, or meat products (mixing in general B01F)

7/00 Apparatus for pounding, forming, or pressing meat, sausage-meat, or meat products

9/00 Apparatus for tenderising meat, e.g. ham

11/00 Sausage-making
11/02 . Sausage filling or stuffing machines
11/04 . . with mechanically-operated piston moving to-and-fro
11/06 . . with piston operated by liquid or gaseous means
11/08 . . with pressing-worm or other rotary-mounted pressing-members
11/10 . Apparatus for twisting sausages
11/12 . Apparatus for tying sausage skins

13/00 Sausage casings
13/02 . Shirring of sausage casings **[2]**

15/00 Apparatus for hanging-up meat or sausages (conveyers B65G)

17/00 Other devices for processing meat or bones
17/02 . Apparatus for holding meat or bones while cutting
17/04 . Bone cleaning devices
17/06 . Bone-shears; Bone-crushers **[2]**
17/08 . Cleaning, e.g. washing, meat or sausages **[2]**
17/10 . Marking meat or sausages
17/12 . Apparatus for cutting-off rind
17/14 . Working-up animal intestines; Apparatus for cutting intestines; Machines for pulling intestines to pieces
17/16 . Cleaning of intestines; Machines for removing fat or slime from intestines

18/00 Plants, factories, or the like for processing meat (for processing poultry only A22C 21/00; for processing fish only A22C 25/00)

21/00 Processing poultry
21/02 . Plucking mechanisms for poultry
21/04 . Scalding, singeing, waxing, or dewaxing poultry
21/06 . Eviscerating devices for poultry

Processing fish, including shellfish

25/00 Processing fish
25/02 . Washing or descaling fish
25/04 . Sorting fish; Separating ice from fish packed in ice
25/06 . Work-tables; Fish-holding or auxiliary devices in connection with work-tables
25/08 . Holding, guiding, or conveying fish before, during or after its preparation (A22C 25/06 takes precedence)
25/10 . Devices for threading fish on strings or the like
25/12 . Arranging fish, e.g. according to the position of head and tail
25/14 . Beheading, eviscerating, or cleaning fish
25/16 . Removing fish-bones; Filleting fish
25/17 . Skinning fish
25/18 . Cutting fish into portions

25/20 . Shredding; Cutting into cubes; Flaking
25/22 . Fish-rolling apparatus

29/00 Processing shellfish, e.g. oysters, lobsters
29/02 . Processing shrimps, lobsters or the like **[2]**
29/04 . Processing bivalves, e.g. oysters (oyster knives with openers A47G 21/06) **[2]**

A23 FOODS OR FOODSTUFFS; THEIR TREATMENT, NOT COVERED BY OTHER CLASSES

(1) Attention is drawn to the following places:

C08B	Polysaccharides, derivatives thereof
C11	Animal or vegetable oils, fats, fatty substances or waxes
C12	Biochemistry, beer, spirits, wine, vinegar
C13	Sugar industry.

(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

A23B PRESERVING, E.G. BY CANNING, MEAT, FISH, EGGS, FRUIT, VEGETABLES, EDIBLE SEEDS; CHEMICAL RIPENING OF FRUIT OR VEGETABLES; THE PRESERVED, RIPENED, OR CANNED PRODUCTS (preserving foodstuffs in general A23L 3/00; applying food preservatives in packages B65D 81/28)

4/00 General methods for preserving meat, sausages, fish or fish products [2]

4/005 . Preserving by heating **[5]**
4/01 . . by irradiation or electric treatment **[5]**
4/015 . Preserving by irradiation or electric treatment without heating effect **[5]**
4/02 . Preserving by means of inorganic salts (apparatus therefor A23B 4/26, A23B 4/32) **[2]**
4/023 . . by kitchen salt or mixtures thereof with inorganic or organic compounds **[5]**
4/027 . . by inorganic salts other than kitchen salt or mixtures thereof with organic compounds, e.g. biochemical compounds **[5]**
4/03 . Drying; Subsequent reconstitution **[5]**
4/033 . . with addition of chemicals (A23B 4/037 takes precedence) **[5]**
4/037 . . Freeze-drying **[5]**
4/044 . Smoking; Smoking devices **[5]**
4/048 . . with addition of chemicals other than natural smoke **[5]**
4/052 . . Smoke generators **[5]**
4/056 . . Smoking combined with irradiation or electric treatment, e.g. electrostatic smoking **[5]**
4/06 . Freezing; Subsequent thawing; Cooling **[2]**
4/07 . . Thawing subsequent to freezing **[5]**
4/08 . . with addition of chemicals before or during cooling **[2]**
4/09 . . . with direct contact between the food and the chemical, e.g. liquid N_2, at cryogenic temperature **[5]**
4/10 . Coating with a protective layer; Compositions or apparatus therefor **[2]**
4/12 . Preserving with acids; Acid fermentation **[2]**
4/14 . Preserving with chemicals not covered by groups A23B 4/02 or A23B 4/12 **[2]**
4/16 . . in the form of gases, e.g. fumigation; Compositions or apparatus therefor **[5]**
4/18 . . in the form of liquids or solids (apparatus therefor A23B 4/26, A23B 4/32) **[5]**
4/20 . . . Organic compounds; Micro-organisms; Enzymes (acid fermentation A23B 4/12) **[5]**
4/22 . . . . Micro-organisms; Enzymes **[5]**
4/24 . . . Inorganic compounds **[5]**
4/26 . Apparatus for preserving using liquids **[5]**
4/28 . . by injection of liquids **[5]**
4/30 . . by spraying of liquids **[5]**
4/32 . Apparatus for preserving using solids **[5]**

5/00 Preservation of eggs or egg products (preserving dough or bakery products A21D)

5/005 . Preserving by heating **[5]**
5/01 . . by irradiation or electric treatment **[5]**
5/015 . Preserving by irradiation or electric treatment without heating effect **[5]**
5/02 . Drying; Subsequent reconstitution **[5]**
5/025 . . with addition of chemicals (A23B 5/03, A23B 5/035 take precedence) **[5]**
5/03 . . Freeze-drying **[5]**
5/035 . . Spray-drying **[5]**
5/04 . Freezing; Subsequent thawing; Cooling
5/045 . . Thawing subsequent to freezing **[5]**
5/05 . . with addition of chemicals **[5]**
5/055 . . . with direct contact between the food and the chemical, e.g. liquid N_2, at cryogenic temperature **[5]**
5/06 . Coating eggs with a protective layer; Compositions or apparatus therefor **[5]**
5/08 . Preserving with chemicals **[5]**
5/10 . . in the form of gases, e.g. fumigation; Compositions or apparatus therefor **[5]**
5/12 . . in the form of liquids or solids **[5]**
5/14 . . . Organic compounds; Micro-organisms; Enzymes **[5]**
5/16 . . . . Micro-organisms; Enzymes **[5]**
5/18 . . . Inorganic compounds **[5]**
5/20 . . . Apparatus for preserving using liquids **[5]**
5/22 . . . Apparatus for preserving using solids **[5]**

7/00 Preservation or chemical ripening of fruit or vegetables [3]

7/005 . Preserving by heating **[5]**
7/01 . . by irradiation or electric treatment **[5]**
7/015 . Preserving by irradiation or electric treatment without heating effect **[5]**
7/02 . Dehydrating; Subsequent reconstitution (dried cooked potatoes A23L 1/216)
7/022 . . with addition of chemicals (A23B 7/024 to A23B 7/028 take precedence) **[5]**

7/024 . . Freeze-drying **[5]**
7/026 . . Spray-drying **[5]**
7/028 . . Thin layer-, drum- or roller-drying **[5]**
7/03 . . Drying raw potatoes
7/04 . Freezing; Subsequent thawing; Cooling
7/045 . . Thawing subsequent to freezing **[5]**
7/05 . . with addition of chemicals **[5]**
7/055 . . . with direct contact between the food and the chemical, e.g. liquid N_2, at cryogenic temperature **[5]**
7/06 . Blanching (machines therefor A23N 12/00) **[1,3]**
7/08 . Preserving with sugars (marmalade, jam, fruit jellies A23L 1/06)
7/10 . Preserving with acids; Acid fermentation
7/12 . . Apparatus for compressing sauerkraut
7/14 . Preserving or ripening with chemicals not covered by group A23B 7/08 or A23B 7/10
7/144 . . in the form of gases, e.g. fumigation; Compositions or apparatus therefor **[3,5]**
7/148 . . . in a controlled atmosphere, e.g. partial vacuum, comprising only CO_2, N_2, O_2 or H_2O **[3]**
7/152 . . . in a controlled atmosphere comprising other gases in addition to CO_2, N_2, O_2 or H_2O **[3]**
7/153 . . in the form of liquids or solids **[5]**
7/154 . . . Organic compounds; Micro-organisms; Enzymes (acid fermentation A23B 7/10) **[5]**
7/155 . . . . Micro-organisms; Enzymes **[5]**
7/157 . . . Inorganic compounds **[5]**
7/158 . . . Apparatus for preserving using liquids **[5]**
7/159 . . . Apparatus for preserving using solids **[5]**
7/16 . Coating with a protective layer; Compositions or apparatus therefor (A23B 7/08 takes precedence) **[5]**

9/00 Preservation of edible seeds, e.g. cereals
9/02 . Preserving by heating **[5]**
9/04 . . by irradiation or electric treatment **[5]**
9/06 . Preserving by irradiation or electric treatment without heating effect **[5]**
9/08 . Drying; Subsequent reconstitution **[5]**
9/10 . Freezing; Subsequent thawing; Cooling **[5]**
9/12 . . Thawing subsequent to freezing **[5]**
9/14 . Coating with a protective layer; Compositions or apparatus therefor **[5]**
9/16 . Preserving with chemicals **[5]**
9/18 . . in the form of gases, e.g. fumigation; Compositions or apparatus therefor **[5]**
9/20 . . . in a controlled atmosphere, e.g. partial vacuum, comprising only CO_2, N_2, O_2 or H_2O **[5]**
9/22 . . . in a controlled atmosphere comprising other gases in addition to CO_2, N_2, O_2 or H_2O **[5]**
9/24 . . in the form of liquids or solids **[5]**
9/26 . . . Organic compounds; Micro-organisms; Enzymes **[5]**
9/28 . . . . Micro-organisms; Enzymes **[5]**
9/30 . . . Inorganic compounds **[5]**
9/32 . . . Apparatus for preserving using liquids **[5]**
9/34 . . . Apparatus for preserving using solids **[5]**

A23C DAIRY PRODUCTS, E.G. MILK, BUTTER, CHEESE; **MILK OR CHEESE SUBSTITUTES**; **MAKING THEREOF** (obtaining protein compositions for foodstuffs A23J 1/00; preparation of peptides, e.g. of proteins, in general C07K 1/00)

Note

This subclass covers:
– the chemical aspects of making dairy products; **[3]**
– the apparatus used for performing techniques provided for therein, e.g. for concentration, evaporation, drying, preservation, or sterilisation, unless such apparatus is specifically provided for in another subclass, e.g. A01J for treatment of milk or cream for manufacture of butter or cheese. **[3]**

Subclass index

General dairy technology

1/00 Concentration, evaporation or drying (A23C 3/00 takes precedence; products obtained thereby A23C 9/00; making butter powder A23C 15/14, cheese powder A23C 19/086; evaporating in general B01D 1/00) **[3]**
1/01 . Drying in thin layers **[3]**
1/03 . . on drums or rollers **[3]**
1/04 . by spraying into a gas stream
1/05 . . combined with agglomeration **[3]**
1/06 . Concentration by freezing out the water
1/08 . . Freeze drying **[3]**
1/10 . Foam drying (A23C 1/04, A23C 1/08 take precedence) **[3]**
1/12 . Concentration by evaporation **[3]**
1/14 . combined with other treatment **[3]**
1/16 . . using additives **[3]**

3/00 Preservation of milk or milk preparations (of cream A23C 13/08; of butter A23C 15/18; of cheese A23C 19/097)
3/02 . by heating (A23C 3/07 takes precedence) **[3]**
3/023 . . in packages **[3]**
3/027 . . . progressively transported through the apparatus **[3]**
3/03 . . the materials being loose unpacked **[3]**
3/033 . . . and progressively transported through the apparatus **[3]**
3/037 . . . . in direct contact with the heating medium, e.g. steam **[3]**

3/04 . by freezing or cooling
3/05 . . in packages **[3]**
3/07 . by irradiation, e.g. by microwaves **[3]**
3/08 . by addition of preservatives (additions of micro-organisms or enzymes A23C 9/12, of other substances A23C 9/152)

7/00 Other dairy technology
7/02 . Chemical cleaning of dairy apparatus (cleaning in general B08B, e.g. B08B 3/08); Use of sterilisation methods therefor (sterilisation methods per se A61L) **[3]**
7/04 . Removing unwanted substances from milk (by filtering A01J 9/02, A01J 11/06) **[3]**

Dairy products; **Processes specially adapted therefor**

9/00 Milk preparations; **Milk powder or milk powder preparations** (A23C 21/06 takes precedence; preservation A23C 3/00; chocolate milk A23G 1/00; ice-cream, mixtures for preparation of ice-cream A23G 9/00; puddings, dry powder puddings A23L 1/187) **[3]**
9/12 . Fermented milk preparations; Treatment using micro-organisms or enzymes (whey preparations A23C 21/00) **[3]**
9/123 . . using only micro-organisms of the genus lactobacteriaceae; Yoghurt (A23C 9/13 takes precedence) **[3]**
9/127 . . using micro-organisms of the genus lactobacteriaceae and other micro-organisms or enzymes, e.g. kefir, koumiss (A23C 9/13 takes precedence) **[3]**
9/13 . . using additives **[3]**
9/133 . . . Fruit or vegetables **[3]**
9/137 . . . Thickening substances **[3]**
9/14 . in which the chemical composition of the milk is modified by non-chemical treatment **[3]**

Note

When classifying in this group, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

9/142 . . by dialysis, reverse osmosis or ultrafiltration (A23C 9/144 takes precedence) **[3]**
9/144 . . by electrical means, e.g. electrodialysis **[3]**
9/146 . . by ion-exchange **[3]**
9/148 . . by molecular sieve or gel filtration **[3]**
9/15 . Reconstituted or recombined milk products containing neither non-milk fat nor non-milk proteins (containing thickening substances A23C 9/154; mixtures of whey, with milk products or milk components A23C 21/06) **[3]**
9/152 . containing additives (fermented milk preparations containing additives A23C 9/13) **[3]**
9/154 . . containing thickening substances, eggs or cereal preparations; Milk gels **[3]**
9/156 . . Flavoured milk preparations (A23C 9/154 takes precedence) **[3]**
9/158 . . containing vitamins or antibiotics **[3]**
9/16 . Agglomerating or granulating milk powder; Making instant milk powder; Products obtained thereby (A23C 1/05, A23C 9/18 take precedence) **[3]**
9/18 . Milk in dried and compressed or semi-solid form **[3]**
9/20 . Dietetic milk products not covered by groups A23C 9/12 to A23C 9/18 **[3]**

11/00 Milk substitutes, e.g. coffee whitener compositions (cheese substitutes A23C 20/00; butter substitutes A23D; cream substitutes A23L 1/19)
11/02 . containing at least one non-milk component as source of fats or proteins (A23C 19/055, A23C 21/04 take precedence) **[3]**
11/04 . . containing non-milk fats but no non-milk proteins (A23C 11/08, A23C 11/10 take precedence) **[3]**
11/06 . . containing non-milk proteins (A23C 11/08, A23C 11/10 take precedence) **[3]**
11/08 . . containing caseinates but no other milk proteins nor milk fats **[3]**
11/10 . . containing or not lactose but no other milk components as source of fats, carbohydrates or proteins, e.g. soy milk **[3]**

13/00 Cream; **Cream preparations** (ice-cream A23G 9/00); **Making thereof** (coffee whitener compositions A23C 11/00; cream substitutes A23L 1/19)
13/08 . Preservation **[3]**
13/10 . . by addition of preservatives (A23C 13/14, A23C 13/16 take precedence) **[3]**
13/12 . Cream preparations
13/14 . . containing milk products or milk components **[3]**
13/16 . . containing, or treated with, micro-organisms, enzymes, or antibiotics; Sour cream **[3]**

15/00 Butter; **Butter preparations**; **Making thereof** (butter substitutes A23D)
15/02 . Making thereof
15/04 . . from butter oil or anhydrous butter **[3]**
15/06 . . Treating cream prior to phase inversion **[3]**
15/12 . Butter preparations
15/14 . . Butter powder; Butter oil, i.e. melted butter, e.g. ghee **[3]**
15/16 . . Butter having reduced fat content **[3]**
15/18 . Preservation **[3]**
15/20 . . by addition of preservatives **[3]**

17/00 Buttermilk; **Buttermilk preparations** (A23C 9/14 takes precedence; preservation A23C 3/00) **[3]**
17/02 . containing, or treated with, micro-organisms or enzymes **[3]**

19/00 Cheese; **Cheese preparations**; **Making thereof** (cheese substitutes A23C 20/00; casein A23J 1/20)
19/02 . Making cheese curd **[3]**
19/024 . . using continuous procedure **[3]**
19/028 . . without substantial whey separation from coagulated milk **[3]**
19/032 . . characterised by the use of specific micro-organisms, or enzymes of microbial origin **[3]**
19/04 . . characterised by the use of specific enzymes of vegetable or animal origin (A23C 19/032 takes precedence) **[3]**
19/045 . . Coagulation of milk without rennet or rennet substitutes **[3]**
19/05 . . Treating milk before coagulation; Separating whey from curd (A23C 19/097 takes precedence) **[3]**
19/055 . . Addition of non-milk fats or non-milk proteins **[3]**
19/06 . Treating cheese curd after whey separation; Products obtained thereby (A23C 19/097 takes precedence) **[3]**
19/064 . . Salting **[3]**
19/068 . . Particular types of cheese **[3]**

19/072 . . . Cheddar type **[3]**
19/076 . . . Soft unripened cheese, e.g. cottage or cream cheese **[3]**
19/08 . . . Process cheese preparations; Making thereof, e.g. melting, emulsifying, sterilizing **[3]**
19/082 . . . . Adding substances to the curd before or during melting; Melting salts **[3]**
19/084 . . . . Treating the curd, or adding substances thereto, after melting (adding non-milk components A23C 19/093) **[3]**
19/086 . . Cheese powder; Dried cheese preparations **[3]**
19/09 . . Other cheese preparations; Mixtures of cheese with other foodstuffs (preservation A23C 19/097) **[3]**
19/093 . . . Addition of non-milk fats or non-milk proteins **[3]**
19/097 . Preservation **[3]**
19/10 . . Addition of preservatives **[3]**
19/11 . . . of antibiotics **[3]**
19/14 . Treating cheese after having reached its definite form, e.g. ripening, smoking (preservation A23C 19/097)
19/16 . . Covering the cheese surface, e.g. with paraffin wax

20/00 **Cheese substitutes** (A23C 19/055, A23C 19/093 take precedence) **[3]**
20/02 . containing neither milk components, nor caseinate, nor lactose, as sources of fats, proteins or carbohydrates **[3]**

21/00 **Whey**; **Whey preparations** (A23C 1/00, A23C 3/00, A23C 9/14 take precedence) **[3]**
21/02 . containing, or treated with, micro-organisms or enzymes **[3]**
21/04 . containing non-milk components as source of fats or proteins **[3]**
21/06 . Mixtures of whey with milk products or milk components **[3]**
21/08 . containing other organic additives, e.g. vegetable or animal products **[3]**
21/10 . containing inorganic additives **[3]**

23/00 **Other dairy products**

A23D **EDIBLE OILS OR FATS, E.G. MARGARINES, SHORTENINGS, COOKING OILS** (obtaining, refining, preserving C11B, C11C; hydrogenation C11C 3/12)

7/00 **Edible oil or fat compositions containing an aqueous phase, e.g. margarines [5]**
7/005 . characterised by ingredients other than fatty acid triglycerides **[6]**
7/01 . . Other fatty acid esters, e.g. phosphatides **[6]**
7/015 . Reducing calorie content; Reducing fat content **[6]**
7/02 . characterised by the production or working-up **[5]**
7/04 . . Working-up **[5]**
7/05 . . . characterised by essential cooling **[6]**
7/06 . Preservation of finished products **[5]**

9/00 **Other edible oils or fats, e.g. shortenings, cooking oils [5]**
9/007 . characterised by ingredients other than fatty acid triglycerides **[6]**
9/013 . . Other fatty acid esters, e.g. phosphatides **[6]**
9/02 . characterised by the production or working-up **[5]**
9/04 . . Working-up **[5]**
9/05 . . . Forming free-flowing pieces **[6]**
9/06 . Preservation of finished products **[5]**

A23F **COFFEE**; **TEA**; **THEIR SUBSTITUTES**; **MANUFACTURE, PREPARATION, OR INFUSION THEREOF**

3/00 **Tea**; **Tea substitutes**; **Preparations thereof**
3/06 . Treating tea before extraction (reducing or removing alkaloid content A23F 3/36); Preparations produced thereby (tea extract preparations A23F 3/16) **[3]**
3/08 . . Oxidation; Fermentation **[3]**
3/10 . . . Fermentation with addition of micro-organisms or enzymes **[3]**
3/12 . . Rolling or shredding tea leaves **[3]**
3/14 . . Tea preparations, e.g. using additives (flavouring A23F 3/40) **[3]**
3/16 . Tea extraction; Tea extracts; Treating tea extract; Making instant tea **[3]**
3/18 . . Extraction of water soluble tea constituents (isolation of tea flavour or tea oil A23F 3/42) **[3]**
3/20 . . Removing unwanted substances (reducing or removing alkaloid content A23F 3/38) **[3]**
3/22 . . Drying or concentrating tea extract **[3]**
3/24 . . . by freezing out the water **[3]**
3/26 . . . by lyophilisation **[3]**
3/28 . . . by spraying into a gas stream **[3]**
3/30 . . Further treatment of dried tea extract; Preparations produced thereby, e.g. instant tea (flavouring A23F 3/40) **[3]**
3/32 . . . Agglomerating, flaking or tabletting **[3]**
3/34 . Tea substitutes, e.g. mate; Extracts or infusions thereof **[3]**
3/36 . Reducing or removing alkaloid content; Preparations produced thereby; Extracts or infusions thereof **[3]**
3/38 . . Reducing or removing alkaloid content from tea extract **[3]**
3/40 . Tea flavour; Tea oil; Flavouring of tea or tea extract (synthetic tea flavours A23L 1/226) **[3]**
3/42 . . Isolation of tea flavour or tea oil **[3]**

5/00 **Coffee**; **Coffee substitutes**; **Preparations thereof [3]**
5/02 . Treating green coffee; Preparations produced thereby (roasting A23F 5/04; removing unwanted substances A23F 5/16; reducing or removing alkaloid content A23F 5/20; extraction A23F 5/24) **[3]**
5/04 . Methods of roasting coffee (machines therefor A23N 12/00) **[3]**
5/06 . . of roasting extracted coffee **[3]**
5/08 . Methods of grinding coffee (coffee mills A47J 42/00) **[3]**
5/10 . Treating roasted coffee; Preparations produced thereby (removing unwanted substances A23F 5/16; reducing or removing alkaloid content A23F 5/20; coffee extraction, making instant coffee A23F 5/24) **[3]**
5/12 . . Agglomerating, flaking or tabletting (of coffee extract or instant coffee A23F 5/38) **[3]**
5/14 . . using additives, e.g. milk, sugar; Coating, e.g. for preserving (flavouring A23F 5/46) **[3]**
5/16 . Removing unwanted substances (reducing or removing alkaloid content A23F 5/20) **[3]**
5/18 . . from coffee extract **[3]**
5/20 . Reducing or removing alkaloid content; Preparations produced thereby; Extracts or infusions thereof **[3]**
5/22 . . Reducing or removing alkaloid content from coffee extract **[3]**
5/24 . Extraction of coffee (isolation of coffee flavour or coffee oil A23F 5/48); Coffee extracts (with reduced alkaloid content A23F 5/20); Making instant coffee (methods of roasting extracted coffee A23F 5/06) **[3]**
5/26 . . Extraction of water soluble constituents **[3]**
5/28 . . Drying or concentrating coffee extract **[3]**
5/30 . . . by freezing out the water **[3]**
5/32 . . . by lyophilisation **[3]**
5/34 . . . by spraying into a gas stream **[3]**
5/36 . . Further treatment of dried coffee extract; Preparations produced thereby, e.g. instant coffee (removing unwanted substances A23F 5/18; flavouring A23F 5/46) **[3]**
5/38 . . . Agglomerating, flaking or tabletting **[3]**
5/40 . . . using organic additives, e.g. milk, sugar **[3]**
5/42 . . . using inorganic additives **[3]**
5/44 . Coffee substitutes **[3]**
5/46 . Coffee flavour; Coffee oil; Flavouring of coffee or coffee extract (synthetic coffee flavours A23L 1/234) **[3]**
5/48 . . Isolation of coffee flavour or coffee oil **[3]**
5/50 . . . from coffee extract **[3]**

A23G **COCOA**; **COCOA PRODUCTS, E.G. CHOCOLATE**; **SUBSTITUTES FOR COCOA OR COCOA PRODUCTS**; **CONFECTIONERY**; **CHEWING GUM**; **ICE-CREAM**; **PREPARATION THEREOF [1,8]**

(1) In this subclass, the following term is used with the meaning indicated:
– "ice-cream" includes any edible frozen or congealed semi-liquid or pasty substance, e.g. slush-ice. **[2]**
(2) In this subclass, subject matter which cannot be completely classified in a single one of the main groups should be classified in each relevant main group. **[8]**

1/00 **Cocoa**; **Cocoa products, e.g. chocolate**; **Substitutes therefor** (kitchen equipment for cocoa preparation A47J, e.g. apparatus for making beverages A47J 31/00)
1/02 . Preliminary treatment, e.g. fermentation of cocoa (machines for roasting cocoa A23N 12/00)
1/04 . Apparatus specially adapted for manufacture or treatment of cocoa or cocoa products (machines for roasting cocoa A23N 12/00; crushing or grinding apparatus in general B02C) **[3]**
1/06 . . Apparatus for preparing or treating cocoa beans or nibs
1/08 . . Cocoa butter presses (presses for squeezing out liquid from liquid-containing material in general B30B)
1/10 . . Mixing apparatus; Roller mills for preparing chocolate
1/12 . . Chocolate-refining mills, i.e. roll refiners
1/14 . . Longitudinal conches
1/16 . . Circular conches
1/18 . . Apparatus for conditioning chocolate masses for moulding
1/20 . . Apparatus for moulding, cutting, or dispensing chocolate
1/21 . . . Apparatus for moulding hollow products, open shells or other articles having cavities, e.g. open cavities **[3,7]**
1/22 . . . Chocolate moulds (A23G 1/21 takes precedence) **[3]**
1/24 . . . Tapping or jolting tables **[1,7]**
1/26 . . . Conveying devices for chocolate moulds **[1,7]**
1/28 . . . Apparatus for removing chocolate from the moulds (discharging baked goods from tins A21B 3/18) **[1,7]**
1/30 . Cocoa products, e.g. chocolate; Substitutes therefor **[8]**
1/32 . . characterised by the composition **[8]**
1/34 . . . Cocoa substitutes **[8]**
1/36 . . . characterised by the fats used (containing dairy products A23G 1/46) **[8]**
1/38 . . . . Cocoa butter substitutes **[8]**
1/40 . . . characterised by the carbohydrates used, e.g. polysaccharides (containing dairy products A23G 1/46) **[8]**
1/42 . . . containing micro-organisms or enzymes; containing paramedical or dietetical agents, e.g. vitamins (containing dairy products A23G 1/46) **[8]**
1/44 . . . containing peptides or proteins (containing dairy products A23G 1/46) **[8]**
1/46 . . . containing dairy products **[8]**
1/48 . . . containing plants or parts thereof, e.g. fruits, seeds, extracts (containing gums A23G 1/40) **[8]**
1/50 . . characterised by shape, structure or physical form, e.g. products with an inedible support (liquid products, solid products in the form of powders, flakes or granules for making liquid products A23G 1/56) **[8]**

1/52 . . . Aerated, foamed, cellular or porous products **[8]**

1/54 . . . Composite products, e.g. layered, coated, filled **[8]**

1/56 . . Liquid products; Solid products in the form of powders, flakes or granules for making liquid products, e.g. for making chocolate milk **[8]**

3/00 Sweetmeats; **Confectionery**; **Marzipan**; **Coated or filled products** (chewing gum A23G 4/00) **[1,8]**

3/02 . Apparatus specially adapted for manufacture or treatment of sweetmeats or confectionery; Accessories therefor

3/04 . . Sugar-cookers

3/06 . . Batch-rolling, rope-forming, or sizing machines

3/08 . . Candy batch cooling tables

3/10 . . Candy-pulling machines

3/12 . . Apparatus for moulding candy in the plastic state

3/14 . . Fondant beating or creaming machines

3/16 . . Apparatus for casting fondant in bulk

3/18 . . Apparatus for moulding fondants

3/20 . . Apparatus for coating or filling sweetmeats or confectionery

3/22 . . . Apparatus for coating by casting

3/24 . . . Apparatus for coating by dipping

3/26 . . . Apparatus for coating by tumbling

3/28 . . Apparatus for decorating sweetmeats or confectionery (applying liquids to surfaces in general B05)

3/32 . Processes for preparing caramel or sugar colours (colouring or flavouring foodstuffs A23L 1/27)

3/34 . Sweetmeats, confectionery or marzipan; Processes for the preparation thereof **[8]**

3/36 . . characterised by the composition **[8]**

3/38 . . . Sucrose-free products **[8]**

3/40 . . . characterised by the fats used (containing dairy products A23G 3/46) **[8]**

3/42 . . . characterised by the carbohydrates used, e.g. polysaccharides (containing dairy products A23G 3/46) **[8]**

3/44 . . . containing peptides or proteins (containing dairy products A23G 3/46) **[8]**

3/46 . . . containing dairy products **[8]**

3/48 . . . containing plants or parts thereof, e.g. fruits, seeds, extracts (containing gums A23G 3/42) **[8]**

3/50 . . characterised by shape, structure or physical form, e.g. products with supported structure (composite structures including chocolate, e.g. as layer, coating or filler A23G 1/54) **[8]**

3/52 . . . Aerated, foamed, cellular or porous products **[8]**

3/54 . . . Composite products, e.g. layered, coated, filled **[8]**

3/56 . . . Products with edible or inedible supports, e.g. lollipops **[8]**

4/00 Chewing gum (medicinal preparations characterised by chewing gum form A61K 9/68) **[8]**

4/02 . Apparatus specially adapted for manufacture or treatment of chewing gum **[8]**

4/04 . . for moulding or shaping **[8]**

4/06 . characterised by the composition **[8]**

4/08 . . of the chewing gum base **[8]**

4/10 . . characterised by the carbohydrates used, e.g. polysaccharides (containing dairy products A23G 4/16) **[8]**

4/12 . . containing micro-organisms or enzymes; containing paramedical or dietetical agents, e.g. vitamins (containing dairy products A23G 4/16) **[8]**

4/14 . . containing peptides or proteins (containing dairy products A23G 4/16) **[8]**

4/16 . . containing dairy products **[8]**

4/18 . characterised by shape, structure or physical form, e.g. aerated products **[8]**

4/20 . . Composite products, e.g. centre-filled **[8]**

7/00 Other apparatus specially adapted for the chocolate or confectionery industry

7/02 . Cooling or drying apparatus

9/00 Frozen sweets, e.g. ice confectionery, ice-cream; **Mixtures therefor [2]**

9/04 . Production of frozen sweets, e.g. ice-cream (packages B65D 85/78) **[2]**

9/06 . . characterised by using carbon dioxide or carbon dioxide snow as cooling medium **[2]**

Note

Group A23G 9/06 takes precedence over groups A23G 9/08 to A23G 9/14. **[2]**

9/08 . . Batch production (continuous production A23G 9/14) **[2]**

9/10 . . . using containers which are rotated or otherwise moved in a cooling medium **[2]**

9/12 . . . using means for stirring the contents in a non-moving container **[2]**

9/14 . . Continuous production (A23G 9/20 takes precedence) **[2]**

9/16 . . . the products being within a cooled chamber, e.g. drum **[2]**

9/18 . . . the products being on the outer wall of a cooled body, e.g. drum or endless band **[2]**

9/20 . . the products being mixed with gas, e.g. soft-ice **[2]**

9/22 . . Details, component parts or accessories of apparatus insofar as not peculiar to a single one of the preceding groups **[2]**

9/24 . . . for coating or filling the products **[2]**

9/26 . . . for producing frozen sweets on sticks **[2]**

9/28 . . . for portioning or dispensing **[2]**

9/30 . . . Cleaning; Keeping clean; Sterilisation **[2]**

9/32 . characterised by the composition **[8]**

9/34 . . characterised by carbohydrates used, e.g. polysaccharides (characterised by the dairy products used A23G 9/40) **[8]**

9/36 . . containing micro-organisms or enzymes; containing paramedical or dietetical agents, e.g. vitamins (characterised by the dairy products used A23G 9/40) **[8]**

9/38 . . containing peptides or proteins (characterised by the dairy products used A23G 9/40) **[8]**

9/40 . . characterised by the dairy products used **[8]**

9/42 . . containing plants or parts thereof, e.g. fruits, seeds, extracts (containing gums A23G 9/34) **[8]**

9/44 . characterised by shape, structure or physical form (liquid products, solid products in the form of powders, flakes or granules for making liquid products A23G 9/52) **[8]**

9/46 . . Aerated, foamed, cellular or porous products **[8]**

9/48 . . Composite products, e.g. layered, coated, filled **[8]**
9/50 . . Products with edible or inedible supports, e.g. cornets **[8]**
9/52 . Liquid products; Solid products in the form of powders, flakes or granules for making liquid products **[8]**

A23J PROTEIN COMPOSITIONS FOR FOODSTUFFS; WORKING-UP PROTEINS FOR FOODSTUFFS; PHOSPHATIDE COMPOSITIONS FOR FOODSTUFFS [4]

1/00 Obtaining protein compositions for foodstuffs; Bulk opening of eggs and separation of yolks from whites [4]
1/02 . from meat
1/04 . from fish or other sea animals
1/06 . from blood **[2]**
1/08 . from eggs
1/09 . . separating yolks from whites
1/10 . from hair, feathers, horn, skins, leather, bones, or the like
1/12 . from cereals, wheat, bran, or molasses
1/14 . from leguminous or other vegetable seeds; from press-cake or oil-bearing seeds
1/16 . from waste water of starch-manufacturing plant or like wastes
1/18 . from yeasts
1/20 . from milk, e.g. casein (curds or cheese A23C); from whey
1/22 . . Drying casein

3/00 Working-up of proteins for foodstuffs

Note

In groups A23J 3/04 to A23J 3/20, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

3/04 . Animal proteins **[5]**
3/06 . . Gelatine **[5]**
3/08 . . Dairy proteins **[5]**
3/10 . . . Casein (drying casein A23J 1/22) **[5]**
3/12 . . from blood **[5]**
3/14 . Vegetable proteins **[5]**
3/16 . . from soybean **[5]**
3/18 . . from wheat **[5]**
3/20 . Proteins from micro-organisms or unicellular algae **[5]**

Note

Subject matter classified in groups A23J 3/22 to A23J 3/30 is also classified in groups A23J 3/04 to A23J 3/20, if the nature of the protein is of interest. **[5]**

3/22 . by texturising **[5]**
3/24 . . using freezing **[5]**
3/26 . . using extrusion or expansion **[5]**
3/28 . . using coagulation from or in a bath, e.g. spun fibres **[5]**
3/30 . by hydrolysis **[5]**
3/32 . . using chemical agents **[5]**
3/34 . . . using enzymes **[5]**

7/00 Phosphatide compositions for foodstuffs, e.g. lecithin [4]

A23K FEEDING-STUFFS SPECIALLY ADAPTED FOR ANIMALS; METHODS SPECIALLY ADAPTED FOR PRODUCTION THEREOF

1/00 Animal feeding-stuffs
1/02 . from molasses
1/04 . from blood
1/06 . from distillers' or brewers' waste
1/08 . from waste products of dairy plant
1/10 . from meat, fish, or bones; from kitchen waste
1/12 . from hydrolysates of wood or straw
1/14 . from vegetable materials, e.g. potatoes or roots without ensilaging
1/16 . supplemented with accessory food factors; Salt blocks
1/165 . . with steroids, hormones, or enzymes
1/17 . . with antibiotics
1/175 . . with inorganic substances; Salt blocks
1/18 . specially adapted for particular animals
1/20 . Cakes or briquettes
1/22 . containing chemicals which are converted to proteins by cattle, e.g. ammonium salts, urea
1/24 . Poultry grit **[2]**

3/00 Processes specially adapted for preservation of materials in order to produce animal feeding-stuffs
3/02 . of green fodder (mechanical aspects of methods specially adapted for storing agricultural or horticultural crops A01F 25/00)
3/03 . . using chemicals for ensilaging
3/04 . of potatoes; of roots

A23L FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A21D OR A23B TO A23J; THEIR PREPARATION OR TREATMENT, E.G. COOKING, MODIFICATION OF NUTRITIVE QUALITIES, PHYSICAL TREATMENT (shaping or working, not fully covered by this subclass, A23P); **PRESERVATION OF FOODS OR FOODSTUFFS, IN GENERAL** (preservation of flour or dough for baking A21D) **[4,8]**

1/00 Foods or foodstuffs; Their preparation or treatment (preservation thereof in general A23L 3/00) **[4]**

1/01 . General methods of cooking foods, e.g. by roasting or frying (methods specialized to particular food, see the relevant subgroups) **[2]**

1/015 . Removal of unwanted matter, e.g. deodorisation, detoxification (A23L 1/211 takes precedence) **[4]**

1/025 . Physical treatment, e.g. with wave energy, irradiation, electrical means, magnetic fields (cooking A23L 1/01; preserving A23L 3/00, A23B) **[4]**

1/03 . containing additives (A23L 1/05, A23L 1/30, A23L 1/308 take precedence) **[4,5]**

1/035 . . Emulsifiers **[4]**

1/05 . containing gelling or thickening agents (A23L 1/06 takes precedence) **[5]**

1/052 . . of vegetable origin **[5]**

1/0522 . . . Starch; Modified starch; Starch derivatives, e.g. esters, ethers **[5]**

1/0524 . . . Pectin; Derivatives thereof **[5]**

1/0526 . . . from seeds, e.g. locust bean gum, guar gum (A23L 1/0522, A23L 1/0524 take precedence) **[5]**

1/0528 . . . from corms, tubers or roots, e.g. glucomannan (A23L 1/0522 takes precedence) **[5]**

1/053 . . . Exudates, e.g. gum arabic, gum acacia, gum karaya, tragacanth **[5]**

1/0532 . . . from seaweeds, e.g. alginates, agar, carrageenan **[5]**

1/0534 . . . Cellulose; Derivatives thereof, e.g. ethers **[5]**

1/054 . . of microbial origin, e.g. xanthan, dextran **[5]**

1/056 . . of animal origin, e.g. chitin **[5]**

1/0562 . . . Proteins, e.g. gelatin, collagen **[5]**

1/058 . . Synthetic resins, e.g. polyvinylpyrrolidone **[5]**

1/059 . . Inorganic additives, e.g. silica **[5]**

1/06 . Marmalades; Jams; Jellies; Other similar fruit or vegetable compositions; Simulated fruit products **[4]**

1/064 . . derived from fruit or vegetable solids **[4]**

1/068 . . derived from fruit or vegetable juices **[4]**

1/072 . . Simulated fruit products **[4]**

1/076 . Products from apiculture, e.g. royal jelly or pollen; Substitutes therefor **[4]**

1/08 . . Honey; Honey substitutes **[2]**

1/09 . containing carbohydrate syrups; containing sugars; containing sugar alcohols, e.g. xylitol; containing starch hydrolysates, e.g. dextrin (A23L 1/076, A23L 1/236 take precedence) **[4,5]**

1/10 . containing cereal-derived products **[2]**

1/105 . . Fermentation of farinaceous cereal or cereal material; Addition of enzymes or micro-organisms (A23L 1/16, A23L 1/185, A23L 1/238 take precedence) **[4]**

1/16 . . Types of pasta, e.g. macaroni, noodles **[2]**

1/162 . . . Par-boiled or instant pasta **[4]**

1/164 . . Flakes or other shapes of the ready-to-eat type (A23L 1/18 takes precedence) **[2]**

1/168 . . Cereal granules or flakes to be cooked and eaten hot, e.g. oatmeal **[2]**

1/172 . . Cereal germ products **[2]**

1/176 . . Farinaceous granules for dressing meat, fish or the like **[2]**

1/18 . . Puffed cereals, e.g. popcorn, puffed rice

1/182 . . Products in which the original granular shape is maintained, e.g. par-boiled rice **[2]**

1/185 . Malt products (malt products of pulse A23L 1/202; preparation of malt for brewing C12C) **[2]**

1/186 . . Fermentation of cereal malt, or of cereal by malting **[4]**

1/187 . Puddings; Dry powder puddings **[2]**

1/19 . Cream substitutes **[2]**

1/20 . Treatment of pulse, i.e. fruits of leguminous plants, for production of fodder or food; Preparation of products from legumes; Chemical means for rapid cooking of these foods, e.g. treatment with phosphates **[2]**

1/201 . . Rapid cooking pulse **[4]**

1/202 . . Malt products; Fermented malt products (A23L 1/22 takes precedence; malt products of cereals A23L 1/185) **[2]**

1/211 . . Removing bitter or other undesirable substances **[4]**

1/212 . Preparation of fruits or vegetables (of pulse A23L 1/20; treating harvested fruit or vegetables in bulk A23N) **[2]**

1/214 . . of tuberous or like starch containing root crops **[2]**

1/216 . . . of potatoes **[2]**

1/2165 . . . . Unshaped dry products, e.g. powders, flakes, granules or agglomerates **[4]**

1/217 . . . . Roasted or fried products, e.g. snacks or chips **[4]**

1/218 . . by pickling, e.g. sauerkraut, pickles **[2]**

1/22 . Spices; Flavouring agents or condiments; Artificial sweetening agents; Table salts; Dietetic salt substitutes **[2,5]**

1/221 . . Natural spices, flavouring agents, or condiments; Extracts thereof **[2]**

1/222 . . . from fruit, e.g. essential oils **[2]**

1/223 . . . Dried spices **[2]**

1/224 . . . . Onions **[2]**

1/225 . . . Mustard **[2]**

1/226 . . Synthetic spices or flavouring agents or condiments **[2]**

1/227 . . . containing amino acids **[2]**

1/228 . . . . containing glutamic acids **[2]**

1/229 . . . containing nucleotides **[2]**

1/23 . . . prepared by fermentation **[2]**

1/231 . . . Meat flavours **[2]**

1/232 . . . Smoke flavours **[2]**

1/234 . . . Coffee or cocoa flavours **[2]**

1/235 . . . Fruit flavours **[2]**

1/236 . . Artificial sweetening agents **[2]**

1/237 . . Table salts; Dietetic salt substitutes **[2]**

1/238 . . Soya sauce **[2]**

1/24 . . Salad dressings; Mayonnaise; Ketchup **[2]**

1/27 . Colouring or decolouring of foods **[2]**

1/272 . . Retaining or modifying natural colour by use of additives, e.g. optical brighteners (A23L 1/275 takes precedence) **[2]**

1/275 . . Addition of dyes or pigments with or without optical brighteners **[2]**
1/277 . . Removing colour by chemical reaction, e.g. bleaching **[2]**
1/28 . Edible extracts or preparations of fungi (for medicinal purposes A61K)
1/29 . Modifying nutritive qualities of foods; Dietetic products (A23L 1/09 takes precedence; dietetic salt substitutes A23L 1/22) **[4,5]**
1/30 . . containing additives (A23L 1/308 takes precedence) **[2]**
1/302 . . . Vitamins **[4]**
1/303 . . . . Vitamins A or D **[4]**
1/304 . . . Inorganic salts, minerals, trace elements **[4]**
1/305 . . . Amino acids, peptides or proteins **[4]**
1/307 . . Reducing nutritive value; Dietetic products with reduced nutritive value **[4]**
1/308 . . . Addition of substantially indigestible substances, e.g. dietary fibres (A23L 1/05 takes precedence) **[4,5]**
1/31 . Meat products; Meat meal **[4]**
1/311 . . Meat meal or powder; Granules, agglomerates or flakes **[4]**
1/312 . . from offal, e.g. rinds, skins, marrow, tripes, feet, ears or snouts (glands or bones as ingredients of processed meat A23L 1/317) **[4]**
1/313 . . Meat extracts **[2]**
1/314 . . containing additives **[4]**
1/315 . . Poultry products, e.g. poultry sausages **[2]**
1/317 . . Comminuted or emulsified meat products, including sausages; Reformed meat from comminuted meat products **[4]**
1/318 . . Tenderised or flavoured meat pieces, e.g. obtained by injecting solutions; Macerating solutions **[4]**
1/32 . Egg products **[2]**
1/322 . . Egg rolls **[4]**
1/325 . Food-from-the-sea products; Fish products; Fish meal; Fish-egg substitutes **[4]**
1/326 . . Fish meal or powder; Granules, agglomerates or flakes **[4]**
1/327 . . Fish extracts **[4]**
1/328 . . Fish eggs, e.g. caviar; Fish-egg substitutes **[4]**
1/33 . . Shell-fish **[2]**
1/333 . . Molluscs **[2]**
1/337 . . Edible seaweed **[2]**
1/36 . Food consisting mainly of nut meats or seeds **[2]**
1/38 . . Peanut butter
1/39 . Soups; Sauces (A23L 1/238, A23L 1/24 take precedence) **[4]**
1/40 . . Soup concentrates, e.g. powders, cakes
1/48 . Food compositions or treatment thereof not covered by the preceding subgroups **[4]**

2/00 **Non-alcoholic beverages**; **Dry compositions or concentrates therefor**; **Their preparation** (soup concentrates A23L 1/40; preparation of non-alcoholic beverages by removal of alcohol C12H 3/00) **[2]**
2/02 . containing fruit or vegetable juices **[2]**
2/04 . . Extraction of juices (machines or apparatus for extracting juice A23N 1/00, A47J 19/00) **[2]**
2/06 . . . from citrus fruits **[2]**
2/08 . . Concentrating or drying of juices **[2]**
2/10 . . . by heating or contact with dry gases **[2]**
2/12 . . . by freezing **[2]**
2/14 . . . . and sublimation **[2]**
2/38 . Other non-alcoholic beverages **[2,6]**
2/385 . Concentrates of non-alcoholic beverages **[6]**
2/39 . . Dry compositions **[6]**
2/395 . . . in a particular shape or form **[6]**
2/40 . Effervescence-generating compositions **[2]**
2/42 . Preservation of non-alcoholic beverages **[6]**
2/44 . . by adding preservatives **[6]**
2/46 . . by heating **[6]**
2/48 . . . by irradiation or electric treatment **[6]**
2/50 . . by irradiation or electric treatment without heating **[6]**
2/52 . Adding ingredients (adding preservatives A23L 2/44) **[6]**
2/54 . . Mixing with gases **[6]**
2/56 . . Flavouring or bittering agents (sweeteners A23L 2/60) **[6]**
2/58 . . Colouring agents **[6]**
2/60 . . Sweeteners **[6]**
2/62 . . Clouding agents; Agents to improve the cloud-stability **[6]**
2/64 . . Re-adding volatile aromatic ingredients **[6]**
2/66 . . Proteins **[6]**
2/68 . . Acidifying substances **[6]**
2/70 . Clarifying or fining of non-alcoholic beverages; Removing unwanted matter **[6]**
2/72 . . by filtration **[6]**
2/74 . . . using membranes, e.g. osmosis, ultrafiltration **[6]**
2/76 . . by removal of gases **[6]**
2/78 . . by ion-exchange **[6]**
2/80 . . by adsorption **[6]**
2/82 . . by flocculation **[6]**
2/84 . . using micro-organisms or biological material, e.g. enzymes **[6]**

3/00 **Preservation of foods or foodstuffs, in general, e.g. pasteurising, sterilising, specially adapted for foods or foodstuffs** (preserving foods or foodstuffs in association with packaging B65B 55/00)
3/005 . by heating using irradiation or electric treatment (drying or kilning A23L 3/40) **[5]**
3/01 . . using micro-waves or dielectric heating **[5]**
3/015 . by treatment with pressure variation, shock, acceleration or shear stress **[5]**
3/02 . by heating materials in packages which are progressively transported, continuously or stepwise, through the apparatus (A23L 3/005 takes precedence) **[5]**
3/04 . . with packages on endless chain or band conveyers
3/06 . . with packages transported along a helical path
3/08 . . with packages on a revolving platform
3/10 . by heating materials in packages which are not progressively transported through the apparatus (A23L 3/005 takes precedence) **[5]**
3/12 . . with packages in intercommunicating chambers through which the heating medium is circulated
3/14 . . with packages moving on the spot
3/16 . by heating loose unpacked materials (A23L 3/005 takes precedence) **[5]**
3/18 . . while they are progressively transported through the apparatus
3/20 . . . with transport along plates
3/22 . . . with transport through tubes
3/24 . . with the materials in spray form
3/26 . by irradiation without heating
3/28 . . with ultra-violet light

3/30 . . by treatment with ultrasonic waves
3/32 . by treatment with electric currents without heating effect
3/34 . by treatment with chemicals
3/3409 . . in the form of gases, e.g. fumigation; Compositions or apparatus therefor **[5]**
3/3418 . . . in a controlled atmosphere, e.g. partial vacuum, comprising only CO_2, N_2, O_2 or H_2O **[5]**
3/3427 . . . . in which an absorbent is placed or used (packages for foodstuffs with provision for absorbing fluids B65D 81/26) **[5]**
3/3436 . . . . . Oxygen absorbent **[5]**
3/3445 . . . in a controlled atmosphere comprising other gases in addition to CO_2, N_2, O_2 or H_2O **[5]**
3/3454 . . in the form of liquids or solids **[5]**
3/3463 . . . Organic compounds; Micro-organisms; Enzymes **[5]**

Note

In groups A23L 3/3472 to A23L 3/3562, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

3/3472 . . . . Compounds of undetermined constitution obtained from animals or plants **[5]**
3/3481 . . . . Organic compounds containing oxygen **[5]**
3/349 . . . . . with singly-bound oxygen **[5]**
3/3499 . . . . . with doubly-bound oxygen **[5]**
3/3508 . . . . . containing carboxyl groups **[5]**
3/3517 . . . . . Carboxylic acid esters **[5]**
3/3526 . . . . Organic compounds containing nitrogen **[5]**
3/3535 . . . . Organic compounds containing sulfur **[5]**
3/3544 . . . . Organic compounds containing hetero rings **[5]**
3/3553 . . . . Organic compounds containing phosphorus **[5]**
3/3562 . . . . Sugars; Derivatives thereof **[5]**
3/3571 . . . . Micro-organisms; Enzymes **[5]**
3/358 . . . Inorganic compounds **[5]**
3/3589 . . . Apparatus for preserving using liquids **[5]**
3/3598 . . . Apparatus for preserving using solids **[5]**
3/36 . Freezing; Subsequent thawing; Cooling **[5]**
3/365 . . Thawing subsequent to freezing **[5]**
3/37 . . with addition of chemicals **[5]**
3/375 . . . with direct contact between the food and the chemical, e.g. liquid N_2, at cryogenic temperature **[5]**
3/40 . by drying or kilning; Subsequent reconstitution **[4,5]**
3/42 . . with addition of chemicals before or during drying **[5]**
3/44 . . Freeze-drying **[5]**
3/46 . . Spray-drying **[5]**
3/48 . . Thin layer-, drum- or roller-drying **[5]**
3/50 . . Fluidised-bed drying **[5]**
3/52 . . Foam-drying **[5]**
3/54 . . using irradiation or electric treatment, e.g. ultrasonic waves **[5]**

A23N MACHINES OR APPARATUS FOR TREATING HARVESTED FRUIT, VEGETABLES, OR FLOWER BULBS IN BULK, NOT OTHERWISE PROVIDED FOR; **PEELING VEGETABLES OR FRUIT IN BULK**; **APPARATUS FOR PREPARING ANIMAL FEEDING-STUFFS** (machines for cutting straw or fodder A01F 29/00; disintegrating, e.g. shredding, B02C; severing, e.g. cutting, splitting, slicing, B26B, B26D)

Subclass index

1/00 Machines or apparatus for extracting juice (preparation of non-alcoholic beverages, e.g. by adding ingredients to fruit or vegetable juices, A23L 2/00; apparatus for making beverages A47J 31/00; extracting presses B30B)
1/02 . combined with disintegrating or cutting

3/00 Machines for coring or stoning fruit, characterised by their feeding device (A23N 4/00 takes precedence) **[2]**
3/02 . with feeder-drums
3/04 . with endless feeder-belts
3/06 . with feeder-tables

4/00 Machines for stoning fruit or removing seed-containing sections from fruit, characterised by their stoning or removing device (for peeling fruit and removing seed-containing sections A23N 7/08; domestic devices for stoning fruit A47J 23/00, for coring fruit A47J 25/00) **[2,3]**
4/02 . for stoning fruit **[2]**
4/04 . . for peaches, plums, apricots or the like **[2]**
4/06 . . for cherries or the like (A23N 4/04 takes precedence) **[2]**
4/08 . . for dates, olives or the like oblong fruits **[2]**
4/10 . . for fruit with very small pips e.g. raisins **[2]**
4/12 . for coring fruit **[2]**
4/14 . . for apples, pears or the like **[2]**
4/16 . . for tomatoes or the like **[2]**
4/18 . . for citrus fruits **[2]**
4/20 . . for pineapples **[2]**

4/22 . for both splitting and stoning **[2]**
4/24 . for removing seed-containing sections from cut fruit **[2]**

5/00 Machines for hulling, husking, or cracking nuts
5/01 . for peanuts **[2]**
5/03 . for coconuts (A23N 5/08 takes precedence) **[2]**
5/08 . for removing fleshy or fibrous hulls of nuts (for peanuts A23N 5/01)

7/00 Peeling vegetables or fruit (devices for skinning onions A23N 15/08; peeling machines of the household type A47J 17/00) **[3]**
7/01 . using chemical substances, e.g. lye **[2,3]**
7/02 . Peeling potatoes, apples or similarly shaped vegetables or fruit (A23N 7/01 takes precedence) **[3]**
7/04 . Peeling asparagus (A23N 7/01 takes precedence) **[3]**
7/08 . for peeling fruit and removing seed-containing sections
7/10 . Driving mechanisms

11/00 Removing pith from stems

12/00 Machines for cleaning, blanching, drying or roasting fruits or vegetables, e.g. coffee, cocoa, nuts (methods for treating, e.g. roasting, coffee or cocoa A23F, A23G; cleaning, e.g. washing, or drying grain B02B 1/00; separating solids from solids for cleaning B07B; cleaning in general B08B; heating devices per se, see the relevant classes, e.g. F24; drying machines in general F26B) **[3]**
12/02 . for washing or blanching (A23N 12/06 takes precedence; blanching methods A23B 7/06) **[3]**
12/04 . . for blanching **[3]**
12/06 . for washing or blanching, combined with subsequent drying **[3]**
12/08 . for drying or roasting (A23N 12/06 takes precedence) **[3]**
12/10 . . Rotary roasters **[3]**
12/12 . . Auxiliary devices for roasting machines **[3]**

15/00 Machines or apparatus for other treatment of fruits or vegetables for human purposes; **Machines or apparatus for topping or skinning flower bulbs [2]**
15/01 . for stripping brussels' sprouts from stalks **[2]**
15/02 . for stemming, piercing or stripping fruit; Removing sprouts of potatoes
15/04 . Devices for topping fruit or vegetables (topping onions A23N 15/08) **[2]**
15/06 . Devices for other treatment of fruit, e.g. marking, maturing, polishing
15/08 . Devices for topping or skinning onions or flower bulbs **[2]**
15/10 . for shelling peas or beans **[2]**
15/12 . for snipping or stringing beans **[3]**

17/00 Apparatus specially adapted for preparing animal feeding-stuffs
17/02 . Fodder mashers (household implements for mashing potatoes or other foodstuffs A47J 19/04)

A23P SHAPING OR WORKING OF FOODSTUFFS, NOT FULLY COVERED BY A SINGLE OTHER SUBCLASS (shaping substances in a plastic state in general B29C)

Note

Attention is drawn to subclasses A01J, A21C, A22C, A47J, B02C, in addition to other subclasses of A23, in connection with the shaping or working of foodstuffs.

1/00 Shaping or working of foodstuffs
1/02 . Agglomerating; Granulating; Tabletting **[4]**
1/04 . Encapsulation of particles, e.g. foodstuff additives (flavouring agents A23L 1/22) **[4]**
1/06 . Making free-flowing or instant powder (A23P 1/02, A23P 1/04 take precedence) **[4]**
1/08 . Coating of foodstuffs; Coatings therefor; Making of laminated, multilayered or stuffed foodstuffs **[4]**
1/10 . Other shaping methods, e.g. moulding **[4]**
1/12 . . Extruding **[4]**
1/14 . . Puffing or expanding (A23L 1/164, A23L 1/18, A23L 1/217 take precedence) **[4]**
1/16 . . Foaming or whipping (cream substitutes A23L 1/19) **[4]**

A24 TOBACCO; CIGARS; CIGARETTES; SMOKERS' REQUISITES

A24B MANUFACTURE OR PREPARATION OF TOBACCO FOR SMOKING OR CHEWING; TOBACCO; SNUFF

Subclass index

1/00 **Preparation of tobacco on the plantation** (harvesters for tobacco A01D 45/16)

1/02 . Arrangements in barns for preparatory treatment of the tobacco, e.g. with devices for drying

1/04 . Sifting, sorting, cleaning or removing impurities from tobacco (purifying by sifting or sorting in general B07B)

1/06 . Stringing tobacco leaves

1/08 . Suspending devices for tobacco leaves

1/10 . Packing or pressing tobacco

3/00 **Preparing tobacco in the factory**

3/02 . Humidifying packed raw tobacco (containers for packaging contents in moist condition B65D 81/22)

3/04 . Humidifying or drying tobacco bunches or cut tobacco (A24B 3/12 takes precedence)

3/06 . Loosening tobacco leaves or cut tobacco (A24B 3/07 takes precedence)

3/07 . Cutting or removing tie leaves; Cutting-off stem butts

3/08 . Blending tobacco

3/10 . Roasting or cooling tobacco

3/12 . Steaming, curing, or flavouring tobacco

3/14 . Forming reconstituted tobacco products, e.g. wrapper materials, sheets, imitation leaves, rods, cakes; Forms of such products (delustering A24C 1/40; tobacco or cigarette paper D21H)

3/16 . Classifying or aligning leaves

3/18 . Other treatment of leaves, e.g. puffing, crimpling, cleaning

5/00 **Stripping tobacco**; **Treatment of stems or ribs**

5/02 . by plucking out the stem

5/04 . by cutting out the stem

5/06 . by stripping leaf-parts from the stem

5/08 . by cutting-off, shaving off, pressing flat the thick parts of stems or ribs

5/10 . by crushing the leaves with subsequent separating

5/12 . Auxiliary devices for stripping

5/14 . Flattening machines for leaves or stems

5/16 . Other treatment of stems or ribs, e.g. bending, chopping, incising (humidifying A24B 3/04)

7/00 **Cutting tobacco** (hand-cutting tools B26B; slicing in general B26D 1/00, B26D 3/00)

7/02 . by machines with reciprocating knives

7/04 . by machines with revolving knives

7/06 . . with two co-operating sets of knife discs

7/08 . . with several knives which act one after the other

7/10 . . . with cutter axes parallel to the feeding direction

7/12 . . . with cutter axes transverse to the feeding direction

7/14 . Feeding or regulating devices for tobacco-cutting apparatus

9/00 **Control of the moisture content of tobacco products, e.g. cigars, cigarettes, pipe tobacco** (devices for use by the smoker for controlling the moisture content of tobacco products A24F 25/00)

11/00 **Tobacco-twisting machines**

13/00 **Tobacco for pipes, for cigars, e.g. cigar inserts, or for cigarettes**; **Chewing tobacco**; **Snuff** (mechanical treatment A24B 3/00 to A24B 11/00; reconstituted tobacco products A24B 3/14; chemical features or treatment of tobacco A24B 15/00)

13/02 . Flakes or shreds of tobacco

15/00 **Chemical features or treatment of tobacco**; **Tobacco substitutes** (A24B 3/00 takes precedence)

15/10 . Chemical features of tobacco products or tobacco substitutes **[3]**

15/12 . . of reconstituted tobacco **[3]**

15/14 . . . made of tobacco and a binding agent not derived from tobacco **[3]**

15/16 . . of tobacco substitutes **[3]**

15/18 . Treatment of tobacco products or tobacco substitutes **[3]**

15/20 . . Biochemical treatment **[3]**

15/22 . . by application of electric or wave energy or particle radiation **[3]**

15/24 . . by extraction; Tobacco extracts **[3]**

15/26 . . . Use of organic solvents for extraction **[3]**

15/28 . . by chemical substances **[3]**

Note

In groups A24B 15/30 to A24B 15/42, in the absence of an indication to the contrary, classification is made in the last appropriate place for a substance. **[3]**

15/30 . . . by organic substances **[3]**

15/32 . . . . by acyclic compounds **[3]**

15/34 . . . . containing a carbocyclic ring other than a six-membered aromatic ring **[3]**

15/36 . . . . containing a heterocyclic ring **[3]**

15/38 . . . . . having only nitrogen as hetero-atoms **[3]**

15/40 . . . . . having only oxygen or sulfur as hetero-atoms **[3]**

15/42 . . . by organic and inorganic substances **[3]**

A24C MACHINES FOR MAKING CIGARS OR CIGARETTES

Making cigars

1/00 **Elements of cigar manufacture** (combinations of two or more elements of cigar manufacture A24C 3/00; attaching or incorporating filters or mouthpieces A24C 5/47, A24C 5/52; cutting machines in general B26D)
1/02 . Tobacco-feeding devices with or without means for dividing the tobacco into measured quantities
1/04 . Devices for cutting cigar binders or wrappers
1/08 . Making tobacco bunches
1/10 . . Bunch-making machines with aprons and tables for wrapping
1/12 . . Bunch-making machines with wrapping rollers
1/14 . . Bunch-making machines with grippers
1/16 . Treating bunches
1/18 . . Moulds or presses for cigar bunches
1/20 . . . Rotating moulds for cigar bunches
1/22 . . Rolling formed bunches
1/24 . . Cutting bunches to length
1/26 . Applying the wrapper
1/28 . . Wrapper transferring mechanisms
1/30 . . Devices for applying the wrapper to the bunch
1/32 . . Devices for forming the tips of cigars (filter tips, mouthpieces A24D 3/00)
1/34 . . Adhesive-applying means
1/36 . . Cutting wrapped bunches to length
1/38 . Final treatment of cigars, e.g. sorting (drying cigars A24B 9/00)
1/40 . . Delustering or powdering cigars
1/42 . . Marking, printing, or decorating cigars
1/44 . . Bundling and pressing devices for cigars

3/00 **Complete manufacture of cigars**; **Combinations of two or more elements of cigar manufacture**

5/00 **Making cigarettes**; **Making tipping materials for, or attaching filters or mouthpieces to, cigars or cigarettes [3]**
5/02 . Cigarette-filling machines
5/04 . . with continuous rod (A24C 5/14 takes precedence)
5/06 . . with pressing-chamber
5/08 . Machines with aprons and tables for wrapping
5/10 . Machines with wrapping rollers
5/12 . Cutting the ends of filled and rolled cigarettes
5/14 . Machines of the continuous-rod type (tobacco feeding devices A24C 5/39)
5/18 . . Forming the rod
5/20 . . Reels; Supports for bobbins; Other accessories
5/22 . . Creasing the paper seam
5/24 . . Pasting the seam
5/26 . . Drying the seam
5/28 . . Cutting-off the tobacco rod
5/30 . . . Machines combined with devices for grinding the knives
5/31 . . with special arrangements coming into operation during starting, slowing-down, or breakdown of the machine, e.g. for diverting or breaking the continuous rod
5/32 . Separating, ordering, counting, or examining cigarettes (in relation to packaging B65B 19/00); Regulating the feeding of tobacco according to rod or cigarette condition (investigating or analysing materials by determining their chemical or physical properties G01N; controlling in general G05)
5/33 . . Catching or ordering devices
5/34 . . Examining cigarettes or the rod, e.g. for regulating the feeding of tobacco; Removing defective cigarettes
5/343 . . . by mechanical means, e.g. feelers
5/345 . . . Removing defective cigarettes (A24C 5/31 takes precedence)
5/35 . Adaptations of conveying apparatus for transporting cigarettes from making machine to packaging machine
5/352 . . using containers, i.e. boats
5/354 . . . Filling the boats at the making machine
5/356 . . . Emptying the boats into the hopper of the packaging machine (hopper construction B65B 19/04)
5/358 . . . Boat constructions
5/36 . Removing papers or other parts from defective cigarettes
5/38 . Machines combined with printing devices
5/39 . Tobacco feeding devices (regulating feed according to rod or cigarette condition A24C 5/34)
5/40 . Hand-driven apparatus for making cigarettes
5/42 . . Pocket cigarette-fillers
5/44 . . Pocket cigarette-rollers
5/46 . Making paper tubes for cigarettes (making paper tubes in general B31C)
5/47 . Attaching filters or mouthpieces to cigars or cigarettes, e.g. inserting filters into cigarettes or their mouthpieces (A24C 5/52 takes precedence; filters, their manufacture, mouthpieces A24D 3/00) **[3]**
5/52 . Incorporating filters or mouthpieces into a cigarette rod or a tobacco rod (filters, their manufacture, mouthpieces A24D 3/00)
5/54 . Folding the ends of cigarette paper tubes after filling them with tobacco
5/56 . Making tipping materials, e.g. sheet cork for mouthpieces of cigars or cigarettes, by mechanical means (chemical part of making tipping material C08; wrapping papers for cigarettes D21H)
5/58 . . Applying the tipping materials
5/60 . Final treatment of cigarettes, e.g. marking, printing, branding, decorating

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A24D CIGARS; CIGARETTES; TOBACCO SMOKE FILTERS; MOUTHPIECES FOR CIGARS OR CIGARETTES; MANUFACTURE OF TOBACCO SMOKE FILTERS OR MOUTHPIECES

1/00 **Cigars**; **Cigarettes**
1/02 . with special covers
1/04 . with mouthpieces or filter-tips (mouthpieces, filter-tips per se A24D 3/00)

1/08 . with lighting means (pyrophoric compositions C06C 15/00; lighters per se F23Q)
1/10 . with extinguishers
1/12 . with ash-retaining attachments, holders, or other equipment
1/14 . Tobacco cartridges for pipes
1/16 . Bands for cigars or cigarettes (machines for applying bands B65C)
1/18 . Selection of materials, other than tobacco, suitable for smoking

3/00 **Tobacco smoke filters, e.g. filter-tips, filtering inserts** (filters in general B01D); **Mouthpieces for cigars or cigarettes** (for pipes, for cigar or cigarette holders A24F 7/00) **[3]**
3/02 . Manufacture of tobacco smoke filters (manufacture of paper or cellulosic materials for filters D21) **[3]**
3/04 . Tobacco smoke filters characterised by their shape or structure **[3]**
3/06 . Use of materials for tobacco smoke filters **[3]**
3/08 . . of organic materials as carrier or major constituent (of ion exchange materials A24D 3/12) **[3]**
3/10 . . . of cellulose or cellulose derivatives **[3]**
3/12 . . of ion exchange materials **[3]**
3/14 . . of organic materials as additive (of ion exchange materials A24D 3/12) **[3]**
3/16 . . of inorganic materials **[3]**
3/18 . Mouthpieces for cigars or cigarettes; Manufacture thereof (A24D 3/02 takes precedence; making tipping materials for, or attaching them to mouthpieces of, cigars or cigarettes A24C 5/56; producing cigar or cigarette holders from plastics or from substances in a plastic state B29D 23/14; manufacture from metal, see the relevant subclasses of Section B) **[3]**

A24F **SMOKERS' REQUISITES**; **MATCH BOXES** (lighters F23Q)

Subclass index

Tobacco pipes

1/00 **Tobacco pipes** (bee-keepers' pipes A01K 55/00)
1/02 . with arrangements for cleaning or cooling the smoke (hookahs A24F 1/30)
1/04 . . with smoke chamber or slobber traps
1/06 . . . inside the pipe
1/08 . . . . inside the stem
1/10 . . . . inside the bowl
1/12 . . . outside the pipe
1/14 . . . . with liquid-container
1/16 . . with zigzag or like passages for the smoke
1/18 . . with non-absorbent linings
1/20 . . with absorbent linings
1/22 . . with arrangements for cooling by air, e.g. pipes with double walls
1/24 . for burning the tobacco from below
1/26 . with filling devices
1/28 . Tubular pipes, e.g. in the form of cigars
1/30 . Hookahs
1/32 . Selection of materials for pipes

3/00 **Tobacco pipes combined with other objects** (smoking appliances on walking sticks or canes A45B 3/16)
3/02 . with cleaning appliances

Component parts or accessories for pipes; **Mouthpieces**

5/00 **Bowls for pipes**
5/02 . with arrangements for keeping upright, when put aside
5/04 . with holes for admitting air
5/06 . with insets of clay or the like
5/08 . . with grates, sieves, or the like
5/10 . Bowl-covers, attached and removable
5/12 . . with attached stoppers
5/14 . . with wind screens

7/00 **Mouthpieces for pipes**; **Mouthpieces for cigar or cigarette holders**
7/02 . with detachable connecting members
7/04 . with smoke filters (filters therefor A24D 3/00)

9/00 **Accessories for smokers' pipes**
9/02 . Tobacco stoppers, i.e. devices for tamping tobacco down into the pipe (combined with tobacco cases A24F 23/04)
9/04 . Cleaning devices for pipes (combined with pipes A24F 3/02)
9/06 . . for stems, e.g. brushes, needles, strings
9/08 . . Cleaning-sets
9/10 . . for bowls, e.g. scrapers, bowl-cleaners with cutting-teeth
9/12 . . Devices for cleaning tobacco pipes by steam, air, or water
9/14 . Stands or supports for tobacco pipes
9/16 . Protective coverings or cases for pipes or parts thereof

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11/00 **Seasoning of tobacco pipes**

13/00 **Appliances for smoking cigars or cigarettes**
13/02 . Cigar or cigarette holders (mouthpieces A24F 7/00)
13/04 . . with arrangements for cleaning or cooling the smoke (hookahs A24F 1/30)
13/06 . . . with smoke filters (filters therefor A24D 3/00)
13/08 . . with special devices, e.g. spikes or grippers, for holding the cigars or cigarettes

13/10 . . with end-ejectors
13/12 . . combined with other objects, e.g. writing utensils (combined with walking or umbrella sticks A45B 3/16)
13/14 . . Protecting cases
13/16 . Safety sleeves for cigars or cigarettes preventing damage by glowing ash
13/18 . Extinguishers for cigars or cigarettes
13/20 . . Means for cutting-off the glowing ash
13/22 . Supports for holding cigars or cigarettes while smoking
13/24 . Cigar cutters, slitters, or perforators, e.g. combined with lighters (combined with hand-shears or scissors B26B 13/22)
13/26 . . formed as pocket devices
13/28 . Devices for blowing through cigars
13/30 . Arrangements for producing smoke images or rings (smoke toys A63H 33/28)

15/00 Cigar or cigarette receptacles or boxes (adaptations for use in vehicles B60N 3/12; packages B65D)
15/02 . for domestic use
15/04 . . with appliances for releasing a single cigar or cigarette
15/06 . . with means for offering (A24F 15/04 takes precedence) **[2]**
15/08 . . combined with other objects
15/10 . . . with lighters
15/12 . for pocket use
15/14 . . with appliances for releasing a single cigar or cigarette
15/16 . . with means for offering (A24F 15/14 takes precedence) **[2]**
15/18 . . combined with other objects
15/20 . with separate compartments for each cigar or cigarette

17/00 Receptacles for cigarette papers

Other smokers' requisites

19/00 Ash-trays (arrangements in vehicle passenger accommodation B60N 3/08)
19/02 . with removable insets
19/04 . with depressible false floor
19/06 . with tiltable bowl or false floor
19/08 . with slidably mounted false floor
19/09 . with automatically-acting safety devices, e.g. heat-responsive
19/10 . combined with other articles (A24F 15/08 takes precedence)
19/12 . . with match-boxes
19/14 . . with extinguishers

21/00 Stands for smokers' requisites

23/00 Cases for tobacco, snuff, or chewing tobacco
23/02 . Tobacco pouches
23/04 . . combined with other objects, e.g. with filling devices for pipes

25/00 Devices used by the smoker for controlling the moisture content of, or for scenting, cigars, cigarettes or tobacco (humidifying in the factory A24B 3/04)
25/02 . Moistening devices

27/00 Match receptacles or boxes (packages B65D; composition of strike-surfaces, matches C06F)
27/02 . with means for storing the matches separately
27/04 . Protective coverings for match receptacles
27/06 . with wind-guards
27/08 . Stands for match-boxes (A24F 27/10 takes precedence)
27/10 . Receptacles for matches or match-boxes to be supported on the wall
27/12 . Match-books
27/14 . Match dispensers; Dispensers for matches arranged on strips (dispensing aspects in general B65D 83/00)
27/16 . . for pocket use
27/18 . . . with means preventing spontaneous ignition
27/20 . . . with means for igniting the match as it is dispensed
27/22 . . for domestic use
27/24 . . . with means preventing spontaneous ignition
27/26 . . . with means for igniting the match as it is dispensed; Match strip lighters

29/00 Devices for igniting matches; **Holders for ignited matches**

31/00 Pipe-spills; **Devices for splitting matches**

47/00 Smokers' requisites not provided for elsewhere

PERSONAL OR DOMESTIC ARTICLES

A41 WEARING APPAREL

A41B SHIRTS; UNDERWEAR; BABY LINEN; HANDKERCHIEFS

Subclass index

1/00 Shirts
1/02 . with front inserts
1/04 . convertible into cami-knickers
1/06 . exchangeably attached to underbodices, drawers, or the like
1/08 . Details
1/10 . . Closures (buttons A44B 1/00; sleeve links A44B 5/00)
1/12 . . Neckbands
1/14 . . . Stiffeners for neckbands
1/16 . . . Adjustable neckbands
1/18 . . Shirt-fronts
1/20 . . . Stiffeners for shirt-fronts
1/22 . . . False shirt-fronts, e.g. dickeys, with or without attached collars; Means for attaching or stretching

3/00 Collars (A41B 1/00 takes precedence)
3/02 . Closures, e.g. tabs
3/04 . fastening to shirts (collar-studs A44B 3/00)
3/06 . Stiffeners for collars
3/08 . Combined stiffening and fastening devices
3/10 . chemically stiffened (processes for stiffening D06)
3/12 . with supports for neckties or cravats
3/14 . Reversible collars
3/16 . Plastic collars; Paper collars
3/18 . Protectors for collars

5/00 Fold-line formings for collars or cuffs (folding collar or cuff edges while manufacturing A41H 33/00)

7/00 Cuffs (A41B 1/00, A41B 3/00 take precedence; cuff links A44B 5/00)
7/02 . Closures for cuffs
7/04 . Fastening cuffs to shirts
7/06 . Fastening cuffs to the sleeves of jackets
7/08 . Stiffeners for cuffs
7/10 . Reversible cuffs
7/12 . Protectors for cuffs

9/00 Undergarments (corsets, brassières A41C)
9/02 . Drawers or underpants for men, with or without inserted crotch or seat parts
9/04 . Knickers for ladies, with or without inserted crotch or seat parts
9/06 . Undershirts; Chemises
9/08 . Combined undergarments (panti-hose, body-stockings A41B 11/14)
9/10 . Petticoats
9/12 . Protective undergarments (combined with swabs or absorbent pads or specially adapted for supporting them A61F 13/15)
9/14 . Waistbands forming part of the undergarments; Closures thereof
9/16 . Shoulder-straps forming part of the undergarments (shoulder-straps in general A41F 15/00)

11/00 Hosiery; **Panti-hose** (elastic stockings for curative purposes A61F 13/08) **[2]**
11/01 . Seams **[2]**
11/02 . Reinforcements
11/04 . . of the stocking top
11/06 . with interchangeable foot parts
11/08 . Stockings without foot parts
11/10 . Stocking protectors (to be put in footwear A43B 23/28)
11/12 . Means at the upper end to keep the stockings up (A41B 11/04 takes precedence; suspenders A41F 11/00) **[2]**
11/14 . Panti-hose; Body-stockings **[2]**

13/00 Baby linen (babies' napkins or holders therefor A61F 13/15) **[5]**
13/04 . Babies' pants (combined with swabs or absorbent pads or specially adapted for supporting them A61F 13/15) **[5]**
13/06 . Slip-in bags; Swaddling clothes
13/08 . Bodices **[5]**
13/10 . Bibs

15/00 Handkerchiefs
15/02 . Simulations of breast pocket handkerchiefs; Their attachment **[2]**

17/00 Selection of special materials for underwear

A41C CORSETS; BRASSIÈRES

1/00 **Corsets or girdles** (corset fasteners A41F 1/04; orthopaedic corsets A61F 5/02)
1/02 . Elastic corsets
1/04 . . made of rubber
1/06 . with brassières
1/08 . Abdominal supports
1/10 . . Maternity corsets
1/12 . Component parts
1/14 . . Stays; Steels
1/16 . . . made of wire
1/18 . . . of built-up type
1/20 . . . with protective caps

3/00 **Brassières**
3/02 . with front closures
3/04 . for nursing mothers
3/06 . Strapless brassières
3/08 . combined with other garments (with corsets A41C 1/06)
3/10 . with stiffening or bust-forming inserts (inserts per se A41C 3/14) **[2]**
3/12 . Component parts **[2]**
3/14 . . Stiffening or bust-forming inserts **[2]**

5/00 **Machines, appliances, or methods for manufacturing corsets or brassières**

A41D OUTERWEAR; PROTECTIVE GARMENTS; ACCESSORIES (eye or ear protectors A61F 9/00, A61F 11/00; sweating suits A61H 36/00)

Note

In this subclass, the following term is used with the meaning indicated:
– "outerwear" covers dressing-gowns, bathing costumes and pyjamas.

Subclass index

1/00 **Garments** (for children A41D 11/00)
1/02 . Jackets
1/04 . Vests, jerseys, sweaters, or the like
1/06 . Trousers
1/08 . . for sporting purposes, e.g. ski trousers, riding breeches
1/10 . . Means for maintaining the crease
1/12 . . Means for hiding bandy legs
1/14 . Skirts
1/16 . . Hooped skirts; Crinolines
1/18 . Blouses
1/20 . Maternity clothing
1/22 . Other garments for ladies

3/00 **Overgarments** (fur garments A41D 5/00; for children A41D 11/00; professional or sporting protective garments A41D 13/00)
3/02 . Overcoats
3/04 . . Raincoats
3/06 . . . with leg-protecting means
3/08 . Capes

5/00 **Fur garments**; **Garments of fur substitutes**

7/00 **Bathing gowns**; **Swim-suits, drawers, or trunks**; **Beach suits** (bathing caps A42B 1/12)

10/00 **Pyjamas**; **Nightdresses [3]**

11/00 **Garments for children**

13/00 **Professional, industrial or sporting protective garments, e.g. garments affording protection against blows or punches, surgeons' gowns** (helmets A42B 3/00; clothing affording protection against chemical agents or for use at high altitudes A62B 17/00; life-saving garments for use at sea, diving suits B63C; bulletproof or armoured clothing F41H; clothing affording protection against radiation G21F 3/02; electric heating elements H05B)
13/002 . with controlled internal environment **[7]**
13/005 . . with controlled temperature **[7]**
13/008 . protecting against electric shocks or static electricity **[7]**
13/01 . with reflective or luminous safety means **[7]**
13/012 . for aquatic activities, e.g. with buoyancy aids **[7]**
13/015 . with shock-absorbing means (A41D 13/05 takes precedence) **[7]**
13/018 . . inflatable automatically **[7]**
13/02 . Overalls
13/04 . Aprons; Fastening devices for aprons
13/05 . protecting only a particular body part (sports brassières A41C 3/00) **[7]**
13/06 . . Knee or foot **[1,7]**
13/08 . . Arm or hand (protective gloves A41D 19/015) **[1,7]**
13/11 . . Protective face masks, e.g. for surgical use, or for use in foul atmospheres (eye-masks A61F 9/04) **[7]**
13/12 . Surgeons' or patients' gowns or dresses **[3]**

15/00 **Convertible garments** (for travelling or camp articles A45F 4/00)
15/02 . Skirts convertible into trousers
15/04 . Garments convertible into other articles

17/00 **Gaiters**; **Spats**
17/02 . Leggings
17/04 . Puttees

19/00 **Gloves** (operating gloves A61B 19/04; swimming gloves A63B 31/02; as accessories for games or sports, e.g. baseball, boxing or golf gloves, A63B 71/14; gloves for glove-boxes B25J 21/02) **[1,7]**
19/01 . with undivided covering for all four fingers, i.e. mittens (A41D 19/015 takes precedence) **[2,7]**
19/015 . Protective gloves **[7]**
19/02 . Arrangements for cutting-out, or shapes of, glove blanks
19/04 . Appliances for making gloves; Measuring devices for glove-making

20/00 **Wristbands or headbands, e.g. for absorbing sweat** (hat fittings A42C 5/02) **[5]**

23/00 **Scarves**; **Head-scarves**; **Neckerchiefs**

25/00 **Neckties**
25/02 . with ready-made knot or bow, with or without bands
25/04 . . Fastening devices for the bands
25/06 . with knot, bow, or like tied by the user
25/08 . . Means for forming or tying the knot, or the like
25/10 . . Means for holding the knot, or the like
25/12 . . . attachable to the collar or stud
25/14 . . Means for forming and holding simultaneously
25/16 . Linings; Stiffening-pieces

27/00 **Details of garments or of their making** (haberdashery A44)
27/02 . Linings
27/04 . . Removable linings
27/06 . . Stiffening-pieces
27/08 . Trimmings; Ornaments (trimmings in general D04D)
27/10 . Sleeves; Armholes
27/12 . Shields or protectors
27/13 . . Under-arm shields **[2]**
27/14 . . on the underedge of the garment
27/16 . . Collar-shields
27/18 . Cloth collars
27/20 . Pockets; Making or setting-in pockets
27/22 . Loops or hooks for hanging-up (with locking devices E05B 69/00)
27/24 . Hems; Seams
27/26 . Shoulder-pads; Hip-pads; Bustles
27/28 . Means for ventilation **[2]**

29/00 **Uniforms**; **Parts or accessories of uniforms**

31/00 **Selection of special materials for outerwear**
31/02 . of layered materials **[2]**

A41F GARMENT FASTENINGS; SUSPENDERS

Subclass index

1/00 **Fastening devices specially adapted for garments** (fastening devices in general A44B)
1/02 . Buttonholes; Eyelets for buttonholes
1/04 . Corset fasteners
1/06 . Glove fasteners
1/08 . Garter fasteners

Garment suspenders

3/00 **Braces**
3/02 . Strips, tongues, or the like, for attaching to the trousers
3/04 . Means for joining the strips, tongues, or the like, to the body of the braces
3/06 . Means for rendering braces pliable; Elastic elements for braces; Braces completely made of rubber

5/00 **Trouser supports attached to the shirt, waistcoat, or the like**

7/00 **Devices for connecting underpants to trousers**

9/00 **Belts, girdles, or waistbands for trousers or skirts**
9/02 . Expansible or adjustable belts or girdles

11/00 **Stocking or sock suspenders**
11/02 . Devices for attaching the stocking or sock to the suspender
11/04 . . of the stud-and-loop type
11/06 . . Pivoted-jaw clips
11/08 . . consisting of one part
11/10 . Shields or like intermediate members
11/12 . with devices for adjusting the length
11/14 . Means for fastening the suspender to the garment, e.g. trousers, underpants
11/16 . Garters
11/18 . Means for fastening the stocking directly to the undergarment

13/00 **Other devices for supporting or holding stockings or socks during wear**

15/00 **Shoulder or like straps**
15/02 . Means for retaining the straps in position

17/00 **Means for holding-down garments**
17/02 . Clips or the like for trousers or skirts, e.g. for cyclists
17/04 . Straps on the lower end of legs of trousers

18/00 **Garment suspenders covered by two or more of groups A41F 3/00 to A41F 17/00**

19/00 **Garment suspenders not otherwise provided for**

A41G ARTIFICIAL FLOWERS; WIGS; MASKS; FEATHERS

Subclass index

1/00 **Artificial flowers, fruit, leaves, or trees** (artificial christmas trees A47G 33/06); **Garlands**
1/02 . Implements, apparatus, or machines for making artificial flowers, or the like
1/04 . Garlands; Assembly of garlands

3/00 **Wigs** (for dolls only A63H 3/44)

5/00 **Hair pieces, inserts, rolls, pads, or the like**; **Toupées**
5/02 . Artificial eyelashes; Artificial eyebrows

7/00 **Masks or dominoes for concealing identity, e.g. for theatrical use**
7/02 . with parts for producing a special effect

9/00 **Adornments of natural feathers**; **Working natural feathers** (treatment of bed feathers B68G 3/00, D06M)

11/00 **Artificial feathers**
11/02 . Implements or machines for making artificial feathers

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A41H APPLIANCES OR METHODS FOR MAKING CLOTHES, E.G. FOR DRESS-MAKING, FOR TAILORING, NOT OTHERWISE PROVIDED FOR

(machines, appliances or methods for making particular articles of apparel, see the relevant groups for these articles in A41B to A41F; cutting tools or machines in general B26; weaving, braiding, lace-making, knitting, tufting, treating of textiles D03 to D06; sewing-machines, sewing appliances, seam-ripping devices D05B; cutting or otherwise severing textile materials D06H 7/00)

Subclass index

1/00 **Measuring aids or methods** (making patterns by modelling on the human body A41H 3/04; measuring persons for identification purposes A61B 5/117; measuring in general G01, e.g. G01B)
1/02 . Devices for taking measurements on the human body
1/04 . . Stands for taking measurements
1/06 . in combination with marking (marking per se D06H 1/00)
1/10 . Measuring jackets for marking-out patterns

3/00 **Patterns for cutting-out**; **Methods of drafting or marking-out such patterns, e.g. on the cloth** (woven fabrics characterised by the special disposition of the warp or weft threads D03D 13/00)
3/01 . using stencils
3/015 . . of adjustable type
3/02 . Making patterns by copying (tracing-wheels A41H 11/00)
3/04 . Making patterns by modelling on the human body
3/06 . Patterns on paper
3/08 . Patterns on the cloth, e.g. printed

5/00 **Dress forms**; **Bust forms**; **Stands** (for display purposes A47F 8/00)
5/01 . with means for adjustment, e.g. of height
5/02 . Inflatable forms

9/00 **Devices or methods for trimming, levelling, or straightening the hems of garments** (on sewing machines D05B)
9/02 . Devices for marking the length of garments

11/00 **Tracing-wheels**

15/00 **Cloth-holders**

17/00 **Cushions for needles or pins** (A41H 19/00 takes precedence)

19/00 **Boxes for needles or pins**

21/00 **Supports for the body whilst trying-on or fitting**

23/00 **Devices for applying chalk**; **Sharpening or holding chalk** (writing or drawing implements B43)

25/00 Appliances or methods for marking-out, perforating, or making buttonholes (by sewing D05B)

25/02 . Buttonhole shears

27/00 Mending garments by adhesives or adhesive patches

31/00 Other aids for tailors

33/00 Machines or appliances for folding the edges of collars, cuffs, or the like while manufacturing (turning inside-out only D06G 3/00)

37/00 Machines, appliances or methods for setting fastener-elements on garments (for shoes A43D 100/00; by sewing D05B)

37/02 . Setting hooks or eyes

37/04 . Setting snap fasteners

37/06 . Setting slide or glide fastener elements

37/08 . Setting buckles

37/10 . Setting buttons

41/00 Machines or appliances for making garments from natural or artificial fur (fur garments A41D 5/00)

42/00 Multi-step production lines for making clothes (sewing units consisting of combinations of several sewing machines D05B 25/00) **[3]**

43/00 Other methods, machines, or appliances

43/02 . Handling garment parts or blanks, e.g. feeding, piling, separating, reversing (handling thin material in general B65H) **[3]**

43/04 . Joining garment parts or blanks by gluing or welding (mending garments by adhesives or adhesive patches A41H 27/00; joining during the manufacture of particular garments, except by gluing or welding, see the relevant subclasses for those garments, e.g. A41D; adhesive processes in general C09J 5/00; joining by sewing D05B) **[3]**

A42 HEADWEAR

A42B HATS; HEAD COVERINGS (headbands, head-scarves A41D 20/00, A41D 23/00)

1/00 **Hats**; **Caps**; **Hoods**
1/02 . Hats; Stiff caps
1/04 . Soft caps; Hoods
1/06 . . Caps with flaps; Motoring caps; Caps with means for protecting the eyes, ears, or nape of neck (ear and nape protecting devices in general A41D); Caps with airpads or removable linings
1/08 . . with protection against blows (head-guards for sporting purposes A63B 71/10)
1/10 . . . Miners' caps
1/12 . . Bathing caps
1/14 . Straw hats; Substitutes therefor
1/16 . Ladies' millinery
1/18 . with coverings for protecting against dust, rain, or sunshine
1/20 . Collapsible hats; Hats made of separable parts
1/22 . adjustable in size
1/24 . with means for attaching articles thereto, e.g. memorandum tablets, mirrors, lamps, insignia

3/00 **Helmets**; **Helmet covers** (hoods as protection against chemical agents or for use at high altitudes A62B 17/00; gas helmets A62B 18/04; swimming helmets A63B 33/00; defence protection helmets F41H 1/04)
3/04 . Parts, details or accessories of helmets **[5]**
3/06 . . Impact-absorbing shells, e.g. of crash helmets **[5]**
3/08 . . Chin straps or similar retention devices **[5]**
3/10 . . Linings (A42B 3/16 takes precedence) **[5]**
3/12 . . . Cushioning devices **[5]**
3/14 . . . Suspension devices **[5]**
3/16 . . Ear protection devices **[5]**
3/18 . . Face protection devices **[5]**
3/20 . . . Face guards, e.g. for ice hockey (A42B 3/22 takes precedence) **[5]**
3/22 . . . Visors **[5]**
3/24 . . . . with means for avoiding fogging or misting **[5]**
3/26 . . . . with cleaning means, e.g. wipers **[5]**
3/28 . . Ventilating arrangements (A42B 3/24 takes precedence) **[5]**
3/30 . . Mounting radio sets or communication systems (methods or devices for transmitting, conducting or directing sound G10K 11/18; electric communication technique H04) **[5]**
3/32 . Collapsible helmets; Helmets made of separable parts (A42B 3/04 takes precedence) **[5]**

5/00 **Veils**; **Holders for veils**

7/00 **Fastening means for head coverings**; **Elastic cords**; **Ladies' hat fasteners** (hat-pins A44B 9/06)

A42C MANUFACTURING OR TRIMMING HATS OR OTHER HEAD COVERINGS

1/00 **Manufacturing hats**
1/02 . Making hat-bats; Bat-forming machines; Conical bat machines; Bat-forming tools (felting in general D04H)
1/04 . Blocking; Pressing; Steaming; Stretching
1/06 . Manipulation of hat-brims
1/08 . Hat-finishing, e.g. polishing, ironing, smoothing, brushing, impregnating, stiffening, decorating

2/00 **Manufacturing helmets by processes not otherwise provided for [5]**

3/00 **Appliances for hat-making not provided for in group A42C 1/00, e.g. for making wire forms for hat-frames** (sewing-machines for straw hats D05B; sewing-machines for making hat-brims D05B); **Apparatus for changing the form or size of finished hats**
3/02 . Hat-block holders
3/04 . Stands for trimming ladies' hats
3/06 . Apparatus for measuring hats

5/00 **Fittings or trimmings for hats, e.g. hat-bands** (artificial flowers, feathers A41G)
5/02 . Sweat-bands
5/04 . Ventilating arrangements for head coverings (for helmets A42B 3/28)

99/00 **Subject matter not provided for in other groups of this subclass [8]**

A43 FOOTWEAR

A43B CHARACTERISTIC FEATURES OF FOOTWEAR; PARTS OF FOOTWEAR

Subclass index

Characteristic features of footwear

1/00 **Footwear characterised by the material** (layered products B32B)
1/02 . Footwear made of animal or plant fibres or fabrics made therefrom
1/04 . . Braided, knotted, knitted, or crocheted footwear
1/06 . Footwear made of wood, cork, card-board, paper or like fibrous material (soles A43B 13/00; making of wooden shoes B27M 3/20)
1/08 . Footwear made of metal (soles A43B 13/10)
1/10 . Footwear made of rubber
1/12 . . of rubber waste
1/14 . Footwear made of gutta-percha, celluloid, or plastics

3/00 **Footwear characterised by the shape or the use**
3/02 . Top-boots; Leg-boots; Shoes with batswing tabs
3/04 . . with rubber or elastic insertions or gussets
3/06 . Shoes with flaps; Footwear with divided uppers
3/08 . . with rubber or elastic insertions or gussets
3/10 . Low shoes; Slippers (sandals A43B 3/12)
3/12 . Sandals; Strap guides thereon
3/14 . Moccasins, opanken, or like shoes
3/16 . Overshoes
3/18 . . Devices for holding overshoes in position
3/20 . . Heel-less overshoes
3/22 . . Protecting sheaths worn between shoe and overshoe
3/24 . Collapsible or convertible footwear
3/26 . Footwear adjustable as to length or size
3/28 . Footwear specially adapted for dolls
3/30 . Footwear specially adapted for babies or small children

5/00 **Footwear for sporting purposes** (non-skid devices, e.g. ice spurs, studs for football shoes, A43C 15/00)
5/02 . Football boots
5/04 . Ski boots; Similar boots
5/06 . Running boots
5/08 . Bathing shoes
5/10 . Tennis shoes
5/12 . Dancing shoes
5/14 . Shoes for cyclists
5/16 . Skating boots
5/18 . Attachable overshoes for sporting purposes

7/00 **Footwear with health or hygienic arrangements**
7/02 . Footwear with heating arrangements (footwarmers A61F 7/08; electric heating elements H05B)
7/04 . . Footwear with electric batteries, generators, or the like
7/06 . Ventilated footwear
7/08 . . Footwear with air-holes, with or without closures
7/10 . . . with closable air-slots near the waist
7/12 . Special watertight footwear (overshoes A43B 3/16)
7/14 . Footwear with foot-supporting parts
7/16 . . Footwear with elevated heel parts inside
7/18 . . Joint supports, e.g. instep supports
7/19 . . . engaging the ground directly
7/20 . . . Ankle-joint supports or holders
7/22 . . Footwear with fixed flat-foot insertions, metatarsal supports, ankle flaps, or the like (orthopaedic insertions A61F 5/14)
7/24 . . Insertions or cap supports preventing the foot canting to one side
7/26 . . Footwear with toe-spacers or toe-spreaders
7/28 . . Adapting the inner sole of the shoe to the sole of the foot
7/30 . . Protecting the ball-joint against pressure while standing
7/32 . Footwear with shock-absorbing means (resilient soles A43B 13/18)
7/34 . Footwear with protection against heat or cold
7/36 . with earthing or grounding means
7/38 . Elevating, i.e. height increasing, footwear (with elevated heel parts inside A43B 7/16; lengthening pieces for natural legs A61F 3/00; orthopaedic insertions for conventional shoes A61F 5/14) **[2]**

9/00 **Footwear characterised by the assembling of the individual parts**
9/02 . Footwear stitched or nailed through
9/04 . Welted footwear (welts A43B 15/00)
9/06 . . stitched or nailed through
9/08 . Turned footwear
9/10 . Footwear with out-turned uppers
9/12 . Stuck or cemented footwear
9/14 . Platform shoes
9/16 . Footwear with soles moulded on to uppers or welded on to uppers without adhesive
9/18 . . moulded **[6]**
9/20 . . welded

11/00 **Footwear with arrangements to facilitate putting-on or removing, e.g. with straps**
11/02 . with built-in shoe-horns

Parts of footwear

13/00 **Soles** (socks A43B 17/00); **Sole and heel units**
13/02 . characterised by the material
13/04 . . plastics, rubber or vulcanised fibre
13/08 . . wood
13/10 . . metal
13/12 . . Soles with several layers of different materials
13/14 . characterised by the constructive form
13/16 . . Pieced soles (with several layers of different material A43B 13/12)

13/18 . . Resilient soles
13/20 . . . Pneumatic soles
13/22 . . Soles made slip-preventing or wear-resisting, e.g. by impregnation or spreading a wear-resisting layer
13/24 . . . by use of insertions
13/26 . . . . projecting beyond the sole surface
13/28 . characterised by their attachment, also attachment of combined soles and heels (attachment of heels A43B 21/36; attachment of heel parts A43B 21/52)
13/30 . . by screws
13/32 . . by adhesives
13/34 . . Soles also attached to the inner side of the heels
13/36 . . Easily-exchangeable soles (of metal A43B 13/10; protecting-soles A43C 13/12)
13/37 . Sole and heel units
13/38 . Insoles
13/39 . . with upset sewing ribs
13/40 . . with cushions
13/41 . . combined with heel stiffener, toe stiffener, or shank stiffener
13/42 . Filling materials located between the insole and outer sole; Stiffening materials

15/00 Welts for footwear

17/00 Socks (hosiery A41B 11/00; special medical insertions for shoes A61F 5/14)
17/02 . Wedge-like or resilient socks or sock parts
17/03 . . pneumatic
17/04 . with metal insertions or coverings
17/06 . with metal springs
17/08 . Ventilated socks
17/10 . for sweaty feet; Waterproof socks
17/12 . Wooden socks
17/14 . made of sponge, rubber, or plastic materials
17/16 . with heel or toe caps
17/18 . Arrangements for attaching socks to the footwear

19/00 Shoe-shaped inserts; **Inserts covering the instep**

21/00 Heels; **Top-pieces**
21/02 . characterised by the material
21/03 . . wood
21/04 . . leather
21/06 . . rubber
21/08 . . . combined hard and soft rubber
21/10 . . . Expansible top-pieces
21/12 . . . Tread surfaces with suction cavities
21/14 . . . Heels or top-pieces made of rubber waste
21/16 . . . with non-rubber insertions in the tread surface
21/18 . . combined rubber and leather
21/20 . . plastics
21/22 . Heels or heel attachments specially designed to prevent splashing
21/24 . characterised by the constructive form
21/26 . . Resilient heels
21/28 . . . Pneumatic heels
21/30 . . Heels with metal springs
21/32 . . Resilient supports for the heel of the foot
21/34 . . Hollow metal heels with interchangeable top-pieces
21/36 . characterised by their attachment; Securing devices for the attaching means (combined with soles A43B 13/28)
21/37 . . by hook-shaped or bent attaching means
21/38 . . by screws only
21/39 . . by rib and groove
21/40 . . . by dovetail
21/42 . . Heels with replaceable or adjustable parts
21/433 . . . rotatably mounted
21/437 . . . with axially-adjustable rod-like top-pieces
21/44 . . by claw-like means
21/45 . . . with special tensioning means
21/46 . . by bolts
21/47 . . by resilient means
21/48 . . . by press-buttons
21/50 . . by bayonet catches or the like
21/51 . . with keyhole-shaped opening and pin
21/52 . . Interchangeable heel parts without special attachments
21/54 . . by adhesion or the like

23/00 Uppers; **Boot legs**; **Stiffeners**; **Other single parts of footwear**
23/02 . Uppers; Boot legs
23/04 . . Uppers made of one piece; Uppers with inserted gussets
23/06 . . Waterproof legs
23/07 . Linings therefor
23/08 . Heel stiffeners; Toe stiffeners (footwear with sock-absorbing means A43B 7/32)
23/10 . . made of metal
23/14 . . made of leather
23/16 . . made of impregnated fabrics, plastics or the like
23/17 . . . made of plastics
23/20 . Nails, pegs, pins, clamps, or tacks, for footwear
23/22 . Supports for the shank or arch of the uppers (for health or hygienic purposes A43B 7/14)
23/24 . Ornamental buckles; Other ornaments for shoes without fastening function
23/25 . . Arrangement of ribbons on footwear
23/26 . Tongues for shoes
23/28 . Devices to put in shoes in order to prevent slipping at the heel or to prevent abrading the stockings
23/30 . Heel-protectors for car-drivers

A43C FASTENINGS OR ATTACHMENTS FOR FOOTWEAR; LACES IN GENERAL

Subclass index

1/00 **Shoe lacing fastenings** (garment fastening devices A41F)
1/02 . with elastic laces
1/04 . with rings or loops
1/06 . tightened by draw-strings

3/00 **Hooks for laces** (making from sheet metal B21D 53/46); **Guards for hooks**
3/02 . Lacing-hooks with guide-rollers
3/04 . Spring safety-hooks

5/00 **Eyelets** (machines for setting eyelets A43D 100/00)

7/00 **Holding-devices for laces**
7/02 . Flaps; Pockets
7/04 . Hinged devices
7/06 . Elastic bands
7/08 . Clamps drawn tight by laces

9/00 **Laces**; **Laces in general for garments made of textiles, leather, or plastics**
9/02 . provided with tags, buttons, or decorative tufts
9/04 . Forming ends of laces of plastics, celluloid, rubber, or the like
9/06 . Releasable ends of laces
9/08 . made of paper or wire

11/00 **Other fastenings specially adapted for shoes** (dress fastenings in general A44B)
11/02 . Button fastenings
11/04 . . Studs; Fastening same
11/06 . Snap-button fastenings
11/08 . Hook fastenings; Rotary hooks
11/10 . . Hooks with several tongues
11/12 . Slide or glide fastenings
11/14 . Clamp fastenings; Clamp-buckle fastenings; Fastenings with toggle levers
11/16 . Fastenings secured by wire, bolts, or the like
11/18 . Fastenings of the lazy-tongs type
11/20 . Fastenings with tightening devices mounted on the tongue
11/22 . Fastening devices with elastic tightening parts between pairs of eyelets, e.g. clamps, springs, bands
11/24 . Ornamental buckles or other ornaments for shoes, with fastening function (buckles in general A44B 11/00)

13/00 **Wear-resisting attachments**
13/02 . Metal plates for soles or heels
13/04 . Cleats; Simple studs; Screws; Hob-nails
13/06 . Attachments for edges of soles, especially for ski boots
13/08 . . with rubber, plastics, leather, felt, or like parts
13/10 . . made from wire
13/12 . Releasable protecting-soles of metal (soles of metal A43B 13/10)
13/14 . Special attachments for toe-caps; Protecting caps for toe-caps

15/00 **Non-skid devices or attachments** (apparatus for climbing poles, trees, or the like A63B 27/00)
15/02 . attached to the sole
15/04 . attached to the heel
15/06 . Ice-gripping devices or attachments, e.g. ice-spurs, ice-cleats, ice-creepers, crampons; Climbing devices or attachments (A43C 15/09 takes precedence; ice-spurs for horseshoes A01L 7/08) **[3]**
15/08 . . Reversible ice-spikes
15/09 . Equipment associated with footwear for walking on inclines to compensate for angle of inclination **[3]**
15/10 . Non-ski attachments made of wire, chain, or other meshed material
15/12 . Small releasable non-slip straps
15/14 . with outwardly-movable spikes
15/16 . Studs for football or like boots
15/18 . Serrated grips

17/00 **Spurs**
17/02 . Spurs; Means for fastening spurs
17/04 . Releasable spur fastenings
17/06 . Collapsible spurs

19/00 **Attachments for footwear, not provided for in other groups of this subclass [8]**

A43D **MACHINES, TOOLS, EQUIPMENT OR METHODS FOR MANUFACTURING OR REPAIRING FOOTWEAR** (sewing D05B) **[6]**

Note

In this subclass, a method of manufacturing footwear which is dependent on a distinct machine or tool, is classified in the group covering the machine or tool for the manufacture.

Subclass index

Measuring devices; **Lasts**; **Tools**

1/00 **Foot or last measuring devices**; **Measuring devices for shoe parts**

1/02 . Foot-measuring devices (measuring the shape, pattern or size of the body for diagnostic purposes A61B 5/103, e.g. measuring physical dimensions A61B 5/107)

1/04 . Last-measuring devices

1/06 . Measuring devices for the inside measure of shoes, for the height of heels, or for the arrangement of heels

1/08 . Measuring devices for shoe parts

3/00 **Lasts**

3/02 . Lasts for making or repairing shoes (making of wooden lasts B27M 3/20)

3/04 . Pneumatic lasts; Elastic lasts

3/06 . Wedge locks for lasts

3/08 . Devices for stretching special parts of shoes

3/10 . Devices for removing lasts

3/12 . Devices for inserting or reinserting lasts

3/14 . Stretching or spreading lasts; Boot-trees; Fillers; Devices for maintaining the shape of the shoe (drying of footwear A47L 23/20)

5/00 **Hand appliances or hand tools for making or repairing shoes, other than those covered by groups A43D 15/00, A43D 19/00, A43D 95/00, A43D 100/00, A43D 117/00**

5/02 . Stands for making footwear (stands for cleaning shoes A47L 23/16)

5/04 . Knives (knives in general B26B)

5/06 . Tools for cutting-off the ends of nails or pegs in shoes

5/08 . Awls (making B21G)

5/10 . Shoe-peg rasps (wood rasps B27G 17/06)

5/12 . Hand nailing apparatus for shoemaking (A43D 19/02 takes precedence; nailing apparatus in general B25C, B27F)

5/14 . . Hand pincers for stapling

8/00 **Machines for cutting, ornamenting, marking or otherwise working up shoe part blanks** (pulling-over or lasting A43D 9/00 to A43D 23/00; making or fastening soles, heels or welts A43D 25/00 to A43D 83/00) **[3]**

8/02 . Cutting-out (cutting in general B26D, B26F; of leather articles in general C14B 5/00) **[3]**

8/04 . . Stamping-out (A43D 8/10 takes precedence) **[3]**

8/06 . . . Dies therefor **[3]**

8/08 . . . Combined stamping-out and bonding, e.g. high frequency electric current being applied between cutting edge and work support **[3]**

8/10 . . Cutting-out using pattern grading (for trimming A43D 8/38; pattern grading in making clothes A41H 3/00; pattern copying in general B23Q 33/00, B23Q 35/00) **[3]**

8/12 . . . Patterns or templates therefor **[3]**

8/14 . . . . Applying bindings to pattern edges **[3]**

8/16 . Ornamentation (by creasing A43D 8/44; of leather in general C14B 1/56) **[3]**

8/18 . . by punching or perforating (punching for eyelet-setting A43D 100/02) **[3]**

8/20 . . . Dies therefor **[3]**

8/22 . . by embossing or printing (printing in general, stamping B41) **[3]**

8/24 . . . Embossing using heat, e.g. high frequency electric current **[3]**

8/26 . Marking for future work (A43D 8/16 takes precedence; printing, stamping B41) **[3]**

8/28 . . Patterns for drawing cut-outs (in making clothes A41H 3/00) **[3]**

8/30 . . Charting sheet material for subsequent cutting **[3]**

8/32 . Working on edges or margins (of leather in general C14B 1/02, C14B 11/00) **[3]**

8/34 . . by skiving (A43D 8/48 takes precedence) **[3]**

8/36 . . by trimming the margins of sole blanks (trimming as an intermediate operation in shoemaking A43D 27/00, as a finishing operation in shoemaking A43D 87/00) **[3]**

8/38 . . . by cutting-out, e.g. using templates **[3]**

8/40 . . by folding, turning in or over, hammering **[3]**

8/42 . . by singeing, contracting, dyeing **[3]**

8/44 . Creasing presses (folding on margins A43D 8/40) **[3]**

8/46 . Splitting (of leather in general C14B 1/02) **[3]**

8/48 . . combined with skiving **[3]**

8/50 . . Combined splitting and trimming of the heel-seat portions of sole blanks (of soles fixed to shoe bottoms A43D 27/04) **[3]**

8/52 . Flexing (of leather in general C14B) **[3]**

8/54 . . by milling **[3]**

8/56 . . of sole blanks by slitting **[3]**

Pulling-over or lasting

9/00 **Devices for binding the uppers upon the lasts** (for the toe ends A43D 15/00)

11/00 **Machines for preliminary treatment or assembling of upper-parts, counters, or insoles on their lasts preparatory to the pulling-over or lasting operations**; **Applying or removing protective coverings**

11/01 . Machines for applying or securing reinforcements or ornamental straps to uppers (to soles or insoles A43D 43/06) **[3]**

11/02 . . to the margins thereof **[3]**

11/03 . . Coating with thermoplastic materials to stiffen the toe or heel portion **[3]**
11/04 . Machines for seam-pressing or flattening shoe parts, quarters, or the like (on lasted shoes A43D 55/00)
11/06 . Machines for temporary buttoning of shoe parts
11/08 . Machines for temporary lacing of shoe parts or for cutting-away the lacing strips after lasting
11/10 . Devices for holding the lacing portions in position during lasting
11/12 . Machines for forming the toe part or heel part of shoes, with or without use of heat
11/14 . Devices for treating shoe parts, e.g. stiffeners, with steam or liquid (for soled shoes A43D 95/12)

13/00 Machines for pulling-over the uppers when loosely laid upon the last and tacking the toe end
13/02 . Devices for locating caps or stiffeners on pulling-over machines

15/00 Pulling-over or lasting machines for binding the toe end with cord, string, or wire; **Machines for lasting with clamps**; **Lasting machines with sewing devices, also for platform shoes** (special sewing machines for leather or shoes D05B)

17/00 Pulling-over or lasting machines with oscillating shoe supports

19/00 Hand lasting; **Lasting pincers**
19/02 . Tacking or nailing devices for use with lasting pincers

21/00 Lasting machines
21/02 . with one single lasting gripper
21/04 . for lasting the opposite sides of the shoe one after another
21/06 . for wooden soles (A43D 21/16, A43D 21/18 take precedence)
21/08 . with last supports and toe- or heel-embracing wipers movable both horizontally and vertically (A43D 21/16 takes precedence)
21/10 . Bed-lasting machines
21/12 . with lasting clamps, shoe-shaped clamps, wipers, stretching straps, or the like for forming the toe or heel parts on the last
21/14 . for toe or heel parts, with nailing devices
21/16 . with lasting pincers or toe- or heel-embracing wipers
21/18 . with lasting pincers and straight-acting wipers, also for forming the shank portions of shoes

23/00 Single parts for pulling-over or lasting machines (nailing devices A43D 75/00)
23/02 . Wipers; Sole-pressers; Last-supports; Pincers
23/04 . Last-carriers; Shoe-guides
23/06 . Devices for cutting-off superfluous material on the uppers or linings

Making or fastening soles, heels, or welts, or preparing same for fastening to the shoe; **Carrying out other operations subsequent to lasting**; **Turning**

25/00 Devices for gluing shoe parts
25/047 . Devices for lasting with adhesives or for gluing together insoles and uppers (A43D 25/18, A43D 25/20 take precedence) **[3]**
25/053 . . with rotating gripping means **[3]**
25/06 . Devices for gluing soles on shoe bottoms (A43D 25/18, A43D 25/20 take precedence) **[3]**
25/07 . . using flexible diaphragm pressing devices **[3]**
25/08 . . Welt hold-down devices
25/10 . . Press-pads or other supports of shoe-gluing presses
25/12 . Devices for gluing heel-breasts to heels or for gluing coverings on heels (A43D 25/18, A43D 25/20 take precedence) **[3]**
25/14 . Devices for filling the shoe bottom
25/16 . Devices for making glued platform shoes
25/18 . Devices for applying adhesives to shoe parts (A43D 25/20 takes precedence; applying liquids or other fluent materials to surfaces in general B05) **[3]**
25/20 . Arrangements for activating or for accelerating setting of adhesives, e.g. by using heat **[3]**

27/00 Machines for trimming as an intermediate operation (working on edges or margins, e.g. by trimming, of shoe part blanks A43D 8/32; trimming as a finishing operation in shoemaking A43D 87/00)
27/02 . Soles or heels fixed on shoe bottoms
27/04 . . Heel-end portions of soles **[3]**
27/06 . . Heel breast flaps **[3]**

29/00 Machines for making soles from strips of material

31/00 Machines for making or inserting shank stiffeners
31/02 . Machines for making shank stiffeners
31/04 . Machines for inserting shank stiffeners

33/00 Machines for assembling lifts for heels (cutting-out heel lifts A43D 8/02)
33/02 . Gauges for heel lifts; Magazines for piling up heel lifts
33/04 . Nailing machines for building the heels from lifts
33/06 . Machines for sorting heel lifts

35/00 Presses for shaping pre-existing loose soles, shoe bottoms, or soles fixed to shoe bottoms (gluing soles on shoe bottoms A43D 25/06)

37/00 Machines for roughening soles or other shoe parts preparatory to gluing

39/00 Machines for making foot-supporting pads or instep-raisers for flat feet

43/00 Machines for making stitch lips, or other preparatory treatment of soles or insoles before fixing same (flexing of soles or insoles A43D 8/52)
43/02 . for making stitch lips by cutting
43/06 . for applying reinforcing materials to insoles; Attachment of ornamental tapes or ribs, e.g. sewing ribs, on soles, or the like

44/00 Machines for attaching welts or rands

47/00 Machines for trimming or butting welts fixed on uppers

49/00 Machines for pounding

51/00 Machines for lip-setting

53/00 Machines for trimming-off surplus material along the inseam

55/00 Machines for flattening, pressing, or rubbing the inseams of lasted shoes

57/00 Machines for attaching the welt ends

59/00 Machines for rasping the lasting-margins of shoes which are sewn through

61/00 Machines for nail-pulling, nail-cutting, or nail-detecting

63/00 Machines for carrying out other finishing operations

67/00 Machines for fastening soles or heels by means of screws or screwed wire

69/00 Shoe-nailing machines (nailing machines in general B27F)

69/02 . using ready-made nails

69/04 . with apparatus for separating the nails from a wire or from a strip of metal or other material

69/06 . using ready-made staples

69/08 . with apparatus for making staples

69/10 . using ready-made wooden pegs

69/12 . with apparatus for separating the pegs from a strip of wood

69/14 . for nailing or stapling the lasted margin on to shoes with wooden soles

71/00 Elements of nailing machines; **Nail-feeding devices**

71/02 . Driving mechanisms for moving the horn; Nail-cutting apparatus connected with the horn

75/00 Nailing devices on pulling-over or lasting machines

79/00 Combined heel-pressing and nailing machines

81/00 Machines for attaching top-lifts

83/00 Heel-presses without nailing apparatus; **Machines for pressing single lifts or punching holes for nailing**

85/00 Machines or apparatus for turning, e.g. for making turn-shoes

86/00 Machines for assembling soles or heels onto uppers, not provided for in groups A43D 25/00 to A43D 83/00, e.g. by welding [6]

Performing finishing operations upon uppers, soles, or heels on soled shoes; **Making shoe appurtenances**

87/00 Edge or heel cutters; **Machines for trimming the heel breast** (trimming machines for wooden heels B27M; copying machines B44B)

89/00 Sole-levelling machines with rolls

91/00 Stitch-separating or seam-indenting machines

93/00 Edge-indenting machines

95/00 Shoe-finishing machines

95/02 . Machines for treating or smoothing shoe uppers to remove wrinkles, folds, or the like

95/04 . Machines for laying channel-flaps

95/06 . Machines for colouring or chemical treatment; Ornamenting the sole bottoms (burnishing A43D 95/20)

95/08 . Machines or tools for scouring, abrading, or finishing, with or without dust-separating (suction cleaners for removing dust A47L 5/00; domestic cleaning of footwear A47L 23/00)

95/10 . Drying or heating devices for shoes

95/12 . Devices for conditioning, tempering, or moistening (preparatory to pulling-over or lasting A43D 11/14)

95/14 . incorporating marking, printing, or embossing apparatus (ornamentation of shoe part blanks A43D 8/16; printing per se, stamping per se B41)

95/16 . Burnishing tools for shoemaking (in general B24D)

95/18 . . Devices for heating the burnishing tools for shoemaking

95/20 . Machines for burnishing soles or heels

95/22 . Machines for burnishing the edges of soles, with or without devices for edge-indenting

95/24 . Machines for buffing soles

95/26 . Devices for applying wax

95/28 . Machines for attaching protectors to soles or heels

97/00 Machines for making pulling-on pieces

98/00 Machines for making laces (of leather C14B; braidings in general D04C); **Applying fibre or celluloid to ends of laces** (making tags from metal sheet B21D; from wire B21F) **[8]**

100/00 Setting or removing eyelets, buttons, lacing-hooks, or elastic gussets in shoes

100/02 . Punching and eyelet-setting machines or tools (for garments in general A41H 37/02)

100/04 . . inserting invisible eyelets

100/06 . . inserting two eyelets simultaneously

100/08 . Setting buttons on footwear (for garments A41H 37/00)

100/10 . Machines or tools for setting lacing-hooks in shoes

100/12 . Machines for inserting elastic gussets in shoes

100/14 . Devices for removing buttons, lacing-hooks, or the like from shoes

Other mechanisms for shoemaking or repairing

111/00 Shoe machines with conveyers for jacked shoes

113/00 Machines for making shoes with out-turned flanges of the uppers or for making moccasins

115/00 Machines for skiving or removing heel lifts, heels, or soles, or for removing stitches, preparatory to repair

117/00 Racks for receiving or transporting shoes or shoe parts; **Other conveying means**

119/00 Driving or controlling mechanisms of shoe machines; **Frames for shoe machines**

999/00 Subject matter not provided for in other groups of this subclass [8]

A44 HABERDASHERY; JEWELLERY

A44B BUTTONS, PINS, BUCKLES, SLIDE FASTENERS, OR THE LIKE (fastenings specially adapted for footwear A43C)

Note

This subclass covers buckles or slide fasteners whether used as haberdashery or otherwise.

Subclass index

1/00 Buttons
1/02 . characterised by their material
1/04 . Ornamental buttons
1/06 . Assembling of buttons
1/08 . Constructional characteristics
1/10 . . washable
1/12 . . covered by fabric
1/14 . . with replaceable coverings
1/16 . . with protective coverings
1/18 . adapted for special ways of fastening
1/20 . . attached by thread visible to the front
1/22 . . attached by thread not visible to the front
1/24 . . . Eye-buttons
1/26 . . with resilient shank
1/28 . . with shank and counterpiece
1/30 . . . Screw-buttons
1/32 . . . Shank inserted into counterpiece and locked by sliding or rotating
1/34 . . . with snap-action counterpiece
1/36 . . . with counterpiece in the form of cotter, split-pin, or the like
1/38 . . Clamping by spring action
1/40 . . with helical wire-shank screwed into material
1/42 . . with deformable prongs
1/44 . . with deformable counterpiece

3/00 Collar-studs
3/02 . completely rigid
3/04 . with head tiltable as a whole
3/06 . with head formed as two tiltable flaps
3/08 . with head and base separable

5/00 Sleeve-links
5/02 . with separable parts

6/00 Retainers or tethers for neckties, cravats, neckerchiefs, or the like, e.g. tie-clips, spring clips with attached tie-tethers, woggles, pins with associated sheathing members tetherable to clothing (tie-pins A44B 9/08; decorative or ornamental aspects A44C) **[3]**

7/00 Cards for buttons, collar-studs, or sleeve-links

9/00 Hat, scarf, or safety pins or the like (decorative or ornamental aspect A44C; hair pins A45D 8/02)
9/02 . Simple pins
9/04 . . Ordinary pins
9/06 . . Hat-pins
9/08 . . Tie-pins (pins with associated sheathing members tetherable to clothing A44B 6/00)
9/10 . . Safety devices
9/12 . Safety-pins
9/14 . . Ordinary safety-pins
9/16 . . Brooches; Breast-pins
9/18 . . Hinges; Locking devices
9/20 . Attaching heads of glass or the like to pin shafts

11/00 Buckles; Similar fasteners for interconnecting straps or the like, e.g. for safety belts
11/02 . frictionally engaging surface of straps
11/04 . . without movable parts
11/06 . . with clamping devices
11/08 . . . roller displaceable in wedge-shaped slot
11/10 . . . sliding wedge
11/12 . . . turnable clamp
11/14 . . . . with snap-action
11/16 . . Strap held by spring action
11/18 . . Strap held by threading through linked rings
11/20 . engaging holes or the like in strap
11/22 . . Buckle with fixed prong
11/24 . . Buckle with movable prong
11/25 . with two or more separable parts
11/26 . . with push-button fastenings
11/28 . . with hooks engaging end-pieces on the strap

13/00 Hook or eye fasteners
13/02 . with spring closure of hook

15/00 Key-rings

17/00 Press-button or snap fasteners

18/00 Fasteners of the touch-and-close type; Making such fasteners [3]

19/00 Slide fasteners
19/02 . with a series of separate interlocking members secured to each stringer tape
19/04 . . Stringers arranged edge-to-edge when fastened
19/06 . . . with substantially rectangular members having interlocking projections and pieces
19/08 . . Stringers arranged side-by-side when fastened
19/10 . with a one-piece interlocking member on each stringer tape
19/12 . . Interlocking member in the shape of a continuous helix
19/14 . . Interlocking member formed by a profiled or castellated edge

19/16 . . Interlocking member having uniform section throughout the length of the stringer **[3]**
19/18 . with a third member or members, other than the slider, connected to the edges of adjacent stringers when closed, e.g. third member moved into position by a slider **[3]**
19/20 . . the third member being embraced by the stringers **[3]**
19/22 . . the third member embracing the stringers **[3]**
19/24 . Details
19/26 . . Sliders
19/28 . . . constructed to be removable from at least one stringer **[3]**
19/30 . . . with means for locking in position
19/32 . . Means for making slide fasteners gas- or watertight
19/34 . . Stringer tapes (A44B 19/40 takes precedence); Flaps secured to stringers for covering the interlocking members (A44B 19/32 takes precedence) **[3]**
19/36 . . Means for permanently uniting the stringers at the end; Means for stopping movement of slider at the end
19/38 . . Means at the end of stringer by which the slider can be freed from one stringer, e.g. stringers can be completely separated from each other
19/40 . . Connection of separate, or one-piece, interlocking members to stringer tapes; Reinforcing such connections, e.g. by stitching
19/42 . Making by processes not fully provided for in one other class, e.g. B21D 53/50, B21F 45/18, B22D 17/16, B29D 5/00
19/44 . . Securing metal interlocking members to ready-made stringer tapes (making metal slide fastener parts combined with attaching B21D 53/52) **[3]**
19/46 . . . Securing separate interlocking members **[3]**
19/48 . . . . Arranging interlocking members before securing **[3]**
19/50 . . . Securing one-piece interlocking members **[3]**
19/52 . . Securing the interlocking members to stringer tapes while making the latter **[3]**
19/54 . . . while weaving the stringer tapes **[3]**
19/56 . . . while knitting the stringer tapes **[3]**
19/58 . . Removing interlocking members to produce gaps **[3]**
19/60 . . Applying end stops upon stringer tapes **[3]**
19/62 . . Assembling sliders in position on stringer tapes **[3]**
19/64 . . . Slider holders for assemblage of slide fasteners **[3]**

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

A44C JEWELLERY; BRACELETS; OTHER PERSONAL ADORNMENTS; COINS (jewel boxes A45C 11/16)

Subclass index

1/00 Brooches or clips in their decorative or ornamental aspect

3/00 Medals; **Badges** (frames or housings for storing same A47G 1/12)

5/00 Bracelets; **Wrist-watch straps**; **Fastenings for bracelets or wrist-watch straps**
5/02 . Link constructions
5/04 . . extensible
5/06 . . . having lazy-tongs
5/08 . . . having separate links
5/10 . . not extensible
5/12 . C-spring-type bracelets or wrist-watch holders
5/14 . characterised by the way of fastening to a wrist-watch or the like
5/16 . . by folding the strap
5/18 . Fasteners for straps (buckles A44B 11/00)
5/20 . . for open straps
5/22 . . for closed straps
5/24 . . . with folding devices

7/00 Ear-rings; **Devices for piercing the ear-lobes**

9/00 Finger-rings
9/02 . adjustable

11/00 Watch chains; **Ornamental chains**
11/02 . Fastening devices

13/00 Connectible jewellery

15/00 Other forms of jewellery

17/00 Gems or the like
17/02 . Settings for holding gems
17/04 . Setting gems in jewellery; Setting-tools

19/00 Devices for preventing pilfering of watches or jewellery

21/00 Coins (coins specially adapted to operate coin-freed mechanisms G07F 1/06); **Emergency money**; **Beer or gambling coins or tokens, or the like**

23/00 Rosaries

25/00 Fancy ware for personal wear, not provided for in groups A44C 1/00 to A44C 19/00 or A44C 23/00, e.g. crosses, crucifixes, charms

27/00 Making jewellery or other personal adornments (single step processes, see the relevant places, e.g. making rings from wire B21F 37/00) **[2]**

A45 HAND OR TRAVELLING ARTICLES

A45B **WALKING STICKS** (walking aids, e.g. sticks, for blind persons A61H 3/06; walking sticks formed as supports or tripod stands F16M 13/08); **UMBRELLAS**; **LADIES' OR LIKE FANS** (cane or umbrella stands or holders A47G 25/12)

Note

In this subclass, the following terms are used with the meaning indicated:
– "umbrellas" also covers sunshades similar in construction to umbrellas;
– "sticks" covers walking sticks and sticks for umbrellas. **[2009.01]**

Subclass index

Walking sticks; **Sticks for umbrellas**

1/00 **Sticks with supporting, hanging or carrying means**
1/02 . Walking sticks with rollers for carrying parcels or the like
1/04 . Walking sticks with means for hanging-up or with locks (carriers for walking sticks or umbrellas A45F 5/00)

3/00 **Sticks combined with other objects**
3/02 . with illuminating devices
3/04 . . electrical
3/06 . with coat-hangers
3/08 . with measuring or weighing appliances
3/10 . with purses
3/12 . with telescopes
3/14 . with weapons
3/16 . with smoking appliances

5/00 **Walking sticks or umbrellas convertible into seats**; **Hunting sticks**

7/00 **Other sticks, e.g. of cranked shape**

9/00 **Details**
9/02 . Handles or heads
9/04 . Ferrules or tips
9/06 . Sticks with name-plates or the like

Umbrellas

11/00 **Umbrellas characterised by their shape or attachment**
11/02 . attached to the body of the user
11/04 . mounted on the head of the user

13/00 **Umbrellas made of paper**

15/00 **Umbrellas with detachable covers**

17/00 **Tiltable umbrellas**

19/00 **Special folding or telescoping of umbrellas**
19/02 . Inflatable umbrellas; Umbrellas without ribs
19/04 . with telescopic sticks
19/06 . with telescopic ribs
19/08 . with collapsible sticks
19/10 . with collapsible ribs
19/12 . . in the form of lazy-tongs

21/00 **Umbrellas convertible into walking sticks**

23/00 **Other umbrellas**

25/00 **Details of umbrellas** (sticks for umbrellas A45B 1/00 to A45B 9/00; illuminating devices for umbrellas A45B 3/02)
25/02 . Umbrella frames
25/04 . . Devices for making or repairing
25/06 . Umbrella runners
25/08 . . Devices for fastening or locking
25/10 . Umbrella crowns
25/12 . Devices for holding umbrellas closed, e.g. magnetic devices
25/14 . Devices for opening and for closing umbrellas
25/16 . Automatic openers, e.g. frames with spring mechanisms
25/18 . Covers (detachable A45B 15/00); Means for fastening same
25/20 . . Windows in covers
25/22 . Devices for increasing the resistance of umbrellas to wind
25/24 . Protective coverings for umbrellas when closed
25/26 . . Ventilated coverings
25/28 . Drip receptacles for umbrellas; Attaching devices therefor
25/30 . Name-plates; Badges; Labelling or marking devices; Means for attaching same (attached to the umbrella stick A45B 9/06)

27/00 **Ladies' or like fans**
27/02 . with mechanical hand-drive

A45C **PURSES**; **LUGGAGE**; **HAND CARRIED BAGS** (sacks or packs carried on the body A45F; containers in general B65D, e.g. portable flexible containers, B65D 27/00 to B65D 37/00; making leather, canvas, or like articles B68F)

Note

In this subclass, the following term is used with the meaning indicated: **[8]**
– "luggage" means containers for personal belongings for a journey, e.g. travelling bags, suitcases, trunks. **[8]**

Subclass index

1/00 **Purses**; **Money-bags**; **Wallets** (for holding keys A45C 11/32)
1/02 . Purses
1/04 . . Purses to be worn at the belt or bracelet; Money-belts
1/06 . Wallets; Notecases
1/08 . Combinations of purses and wallets
1/10 . Money-bags for conductors or like people; Money-bags with rigid coin-holders (sorting, testing, changing, delivering, or otherwise handling coins G07D)
1/12 . Savings boxes (safes E05G 1/00)

3/00 **Flexible luggage**; **Hand bags** (collapsible or extensible luggage, bags or the like A45C 7/00; handbag mirrors A45D 42/04)
3/02 . Briefcases or the like
3/04 . Shopping bags; Shopping nets
3/06 . Ladies' handbags
3/08 . . Handbags provided with removable or washable covers
3/10 . Beach-bags; Watertight beach-bags
3/12 . Bags for shoes
3/14 . Bags combined with hand-muffs

5/00 **Rigid or semi-rigid luggage** (collapsible or extensible luggage, bags or the like A45C 7/00)
5/02 . Materials therefor (making luggage of leather, canvas, or the like B68F) **[1,8]**
5/03 . Suitcases **[8]**
5/04 . Trunks; Travelling baskets
5/06 . with outside compartments **[1,8]**
5/08 . of round or oval shape **[1,8]**
5/14 . with built-in rolling means **[1,8]**

7/00 **Collapsible or extensible luggage, bags or the like**
7/02 . with lazy-tongs framework

9/00 **Luggage or bags convertible into objects for other use** (trunk-wardrobes A47B 61/06; trunks convertible into tables A47B 85/00; trunk-beds A47C 17/82)

11/00 **Receptacles for purposes not provided for in groups A45C 1/00 to A45C 9/00** (specially adapted for toilet or cosmetic equipment A45D; travelling sewing kits A45F 3/48)
11/02 . Hat boxes
11/04 . Spectacle cases; Pince-nez cases
11/06 . . Making of spectacle or pince-nez cases (of a single specified material, see the relevant class, e.g. B31)
11/08 . Cases for telescopes or binoculars
11/10 . Watch cases or guards, with or without windows
11/12 . . Transparent watch-protectors
11/14 . Pocket holders for postage stamps
11/16 . Jewel boxes
11/18 . Ticket-holders or the like
11/20 . Lunch or picnic boxes or the like
11/22 . Watertight containers for use while swimming
11/24 . Etuis for purposes not covered by a single one of groups A45C 11/02 to A45C 11/22, A45C 11/26, A45C 11/32 to A45C 11/38
11/26 . Roll-up holders with pockets for separate articles
11/32 . Bags or wallets for holding keys
11/34 . Pencil boxes; Pencil etuis or the like (functioning as, or combined with, writing or drawing implements B43K 31/00)
11/36 . Cases for drawing or like instruments (functioning as, or combined with, writing or drawing implements B43K 31/00)
11/38 . Camera cases, e.g. of ever-ready type

13/00 **Details**; **Accessories** (haberdashery A44; hinged lids for containers B65D 43/16; hinges E05D) **[1,8]**
13/02 . Interior fittings; Means for holding or packing articles **[1,8]**
13/03 . . Means for holding garments **[8]**
13/04 . Frames
13/06 . . Frame closures
13/08 . Decorative devices for handbags or purses
13/10 . Arrangement of fasteners (fastening devices for containers B65D, e.g. B65D 43/14; locks E05B)
13/12 . . of press-button or turn-button fasteners
13/14 . . of bar fastenings
13/16 . Closures of the roller-blind type
13/18 . Devices to prevent theft or loss of luggage or bags
13/20 . . Chains or bands
13/22 . . Detachable handles; Handles foldable into the luggage (separate handles for carrying means A45F 5/10)
13/24 . . Devices for sound-producing, piercing, gas-discharging, or the like
13/26 . Special adaptations of handles (A45C 13/22 takes precedence; handles for containers in general B65D 25/28)
13/28 . . Combinations of handles with other devices
13/30 . Straps; Bands
13/34 . Stays or supports for holding lids or covers open
13/36 . Reinforcements for edges, corners, or other parts
13/38 . Luggage carriers

13/40 . Umbrella, stick, or glove holders attached to a bag
13/42 . Devices for identifying luggage; Means for attaching same

15/00 Purses, bags, luggage or other receptacles covered by groups A45C 1/00 to A45C 11/00, combined with other articles (A45C 1/08, A45C 3/14 take precedence)
15/02 . with memorandum tablets
15/04 . with mirrors
15/06 . with illuminating devices
15/08 . with watches

A45D HAIRDRESSING OR SHAVING EQUIPMENT; **MANICURING OR OTHER COSMETIC TREATMENT** (wigs, toupees, or the like A41G 3/00, A41G 5/00; hairdressers' chairs A47C 1/04; hair cutting appliances, razors B26B)

Subclass index

Curling or holding the hair

1/00 Curling-tongs, i.e. tongs for use when hot; **Curling-irons, i.e. irons for use when hot**; **Accessories therefor**
1/02 . with means for internal heating, e.g. by liquid fuel
1/04 . . by electricity
1/06 . with two or more jaws (A45D 1/02 takes precedence)
1/08 . . the jaws remaining parallel to each other during use, e.g. the jaws sliding parallel to each other
1/10 . . with a rotatable handle sleeve
1/12 . . of helical or zig-zag shape
1/14 . . the jaws being separable from each other
1/16 . with a single heated member (A45D 1/02 takes precedence)
1/18 . with combs (A45D 1/02 takes precedence)
1/20 . External heating means for curling-tongs or curling-irons
1/28 . with temperature-regulating or -indicating means

2/00 Hair-curling or hair-waving appliances (heated curling-tongs, curling-irons A45D 1/00)
2/02 . Hair winders or hair curlers for use substantially perpendicular to the scalp, i.e. steep-curlers (A45D 6/14, A45D 6/16 take precedence; with incorporated heating or drying means A45D 2/36; heating devices designed for use external to and in connection with, hair curlers or hair wavers A45D 4/02)
2/04 . . in the form of rods with jaw devices
2/06 . . in the form of rods with base plate or base clamp
2/08 . . of hollow type (A45D 2/10 takes precedence)
2/10 . . in the form of spools or bobbins
2/12 . Hair winders or hair curlers for use parallel to the scalp, i.e. flat-curlers (A45D 6/14, A45D 6/16 take precedence; with internal electric heating means A45D 2/36; heating devices designed for use external to, and in connection with, hair curlers or hair winders A45D 4/08)
2/14 . . of single-piece type, e.g. stiff rods or tubes with or without cord, band, or the like as hair-fastening means
2/16 . . . in the form of forked rods or tubes
2/18 . . . Flexible curlers (A45D 2/20 takes precedence)
2/20 . . . Elastic curlers
2/22 . . . with means for applying liquids therethrough
2/24 . . of multi-part type, e.g. with sliding parts other than for fastening
2/26 . . . forked
2/28 . . . with clamping bow as fastening means
2/30 . . . with slide as fastening means
2/32 . . . with positive non-return means, e.g. ratchet
2/34 . . . with base clamp
2/36 . Hair curlers or hair winders with incorporated heating or drying means, e.g. electric, using chemical reaction
2/38 . Surface-wave devices
2/40 . . as hair-pressing tongs
2/42 . Clamps or clasps with teeth or combs
2/44 . using two or more combs one upon the other or one in distance to the other, e.g. using slidable combs
2/46 . Hair-waving caps
2/48 . Eyelash curlers; Eyebrow curlers
2/50 . Beard binders; Like means for the care of the beard

4/00 Separate devices designed for heating hair curlers or hair-wavers (hair-drying devices without connection to hair curlers or hair-wavers A45D 20/00)
4/02 . for steep curling, e.g. with means for decreasing the heat (A45D 4/14, A45D 4/16 take precedence)
4/04 . . heated by steam or hot air
4/06 . . heated by electricity
4/08 . for flat curling, e.g. with means for decreasing the heat (A45D 4/14, A45D 4/16 take precedence)
4/10 . . heated by steam or hot air
4/12 . . heated by electricity
4/14 . with chemical heat reaction and heat storage
4/16 . Independent devices characterised by heating the hair-curling or hair-waving means before use (A45D 1/20 takes precedence)
4/18 . Supports or suspending means for devices heating hair-curling or hair-waving means while in use

6/00 Details of, or accessories for, hair-curling or hair-waving devices
6/02 . Devices for winding the hair upon steep-curlers
6/04 . Devices for winding the hair on flat-curlers
6/06 . Devices for pneumatic waving in form boxes
6/08 . Base-clamps, e.g. for steep-curlers
6/10 . . for flat-curlers
6/12 . . with cooling means
6/14 . Simple clamps for hair curlers
6/16 . Curler pins
6/18 . Protecting devices or packages for hair curlers or the like while in use
6/20 . Temperature-regulating devices for hair curlers

7/00 Processes of waving, straightening or curling hair [2]
7/02 . thermal
7/04 . chemical
7/06 . combined chemical and thermal

8/00 Hair-holding devices; **Accessories therefor**
8/02 . Hair pins
8/04 . . single-limbed
8/06 . . two-limbed, e.g. U-shaped
8/08 . . . with zig-zag limb
8/10 . . . with teeth
8/12 . High combs or dress combs
8/14 . Hair grips, i.e. elastic single-piece two-limbed grips
8/16 . . with additional fastener
8/18 . Grip openers; Grip boxes
8/20 . Hair clamps, i.e. elastic multi-part clamps the parts of which are pivotally connected between their ends
8/22 . . with additional fastener
8/24 . Hair clasps, i.e. multi-part clasps with pivotal connection of parts at their ends
8/26 . . with snap fastener
8/28 . . with other fastener
8/30 . . with comb-like prongs
8/32 . . with double-bow; with U-shaped limbs
8/34 . Hair-braid holders; Hair-plait holders
8/36 . Hair straps; Hair rings
8/38 . Hair fillers, e.g. wire gratings
8/40 . Hair-nets; Hair-protecting caps

Devices for cleaning the hair or the scalp, drying the hair or colouring the hair

19/00 Devices for washing the hair or the scalp; **Similar devices for colouring the hair**
19/02 . Hand-actuated implements, e.g. hand-actuated spray heads
19/04 . Portable wash stands
19/06 . in the form of bowls or similar open containers
19/08 . . Adaptations of wash-basins
19/10 . . . Backward lavabos
19/12 . . Water catch bowls
19/14 . Closed washing devices, e.g. washing caps (A45D 19/18 takes precedence)
19/16 . Surface treatment of hair by steam, oil, or the like
19/18 . Hair-colouring caps

20/00 Hair drying devices; **Accessories therefor** (A45D 2/00 takes precedence)
20/02 . Lay frames for long open hair
20/04 . Hot-air producers (A45D 20/20, A45D 20/22 take precedence)
20/06 . . heated otherwise than electrically; ventilated by muscle power
20/08 . . heated electrically
20/10 . . . Hand-held drying devices, e.g. air douches
20/12 . . . . Details thereof or accessories therefor, e.g. nozzles, stands
20/14 . . . Portable drying stands
20/16 . . . Fixed installed drying devices
20/18 . Flexible caps with provision for hot air supply
20/20 . Helmets without hot air supply or other ventilation, e.g. electrically heated
20/22 . Helmets with hot air supply or ventilating means, e.g. electrically heated air current
20/24 . . Shape or structure of the helmet body (A45D 20/26 takes precedence)
20/26 . . Guiding the air; Regulating the air quantity
20/28 . . Drying the air by incorporated heating elements
20/30 . . Electric circuitry specially adapted for hair drying devices
20/32 . . Supporting or fastening of the helmets
20/34 . . Arrangements of the ventilating means
20/36 . . Suspension of the motor
20/38 . . Arrangement of the electric heating means
20/40 . . . for use of infra-red rays
20/42 . . Additional devices or measures, e.g. for noise damping, for musical entertainment
20/44 . Hair-drying helmets whereon the ventilating means and the heating means are apart from the helmet
20/46 . . provided with tubes for exhausting the hot air
20/48 . Hair-drying combs or hair-drying brushes, with internal heating means
20/50 . . and provision for an air stream
20/52 . Hair-drying combs or hair-drying brushes, adapted for heating by an external heating source

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24/00 Hair combs for care of the hair; **Accessories therefor** (high combs or dress combs A45D 8/12; hair-drying combs A45D 20/48 to A45D 20/52; hair-trimming devices, using a razor blade, integral or combined with combs B26B 21/00, e.g. B26B 21/12)
24/02 . Single-piece combs
24/04 . Multi-part combs
24/06 . . the combs being foldable (A45D 24/08 takes precedence)
24/08 . . with protective sheath
24/10 . . combined with additional devices
24/12 . . . with suspending means
24/14 . . . with handle designed to be attached to the hand of the user
24/16 . . . with brushes, pads, or the like whereon the additional devices are operable without more ado
24/18 . . . the additional devices being only operable when the comb-part is in a non-operable position
24/20 . . . . the additional devices being nail cleaners or nail files
24/22 . Combs with dispensing devices for liquids, pastes or powders
24/24 . . with provision for free supply; using wicks
24/26 . . with flexible walls of the liquid, paste, or powder storing device
24/28 . . with piston pump
24/30 . Combs specially adapted for removing dirt or grease (A45D 24/32 takes precedence)

24/32 . Combs with suction appliance
24/34 . Crown parting devices
24/36 . Combs, stencils, or guides, specially adapted for hair trimming devices
24/38 . Comb supports
24/40 . Comb cleaners
24/42 . . detachable from, or fixed to, the comb
24/44 . . as separate apparatus
24/46 . . . with roller brushes

26/00 Hair-singeing apparatus; **Apparatus for removing superfluous hair, e.g. tweezers** (removing hair using electrosurgical instruments A61B 18/04, A61B 18/18)

27/00 Shaving accessories (containers for handling shaving soap A45D 40/00; shaving mirrors A45D 42/08)
27/02 . Lathering the body; Producing lather (shaving-brushes A46B)
27/04 . . Hand implement for lathering, e.g. using brush
27/06 . . Motor-driven devices for lathering
27/08 . . Gloves or cloths for lathering
27/10 . . Lather-producing devices operated by compressed air or by swirling water
27/12 . . Lather-producing devices having stirring means (A45D 27/10 takes precedence)
27/14 . Shaving mugs
27/16 . . with soap holders
27/18 . . with brush supports
27/22 . Containers or carriers for storing shaving appliances
27/24 . . for storing razor blades, e.g. after use (devices for collecting used scalpel blades A61B 17/3217; devices for dispensing new razor-blades B65D 83/10)
27/26 . . for styptic pencils, styptic cotton-wool or the like
27/28 . . for storing one shaving appliance within another (means integral with, or attached to, the razor for storing shaving cream, styptic, or the like B26B 21/44)
27/29 . . Stands for shavers or razors (A45D 27/46 takes precedence)
27/38 . Skin stretchers for shaving
27/40 . Breath deflectors
27/42 . Shaving masks
27/44 . Lather removing devices
27/46 . Devices specially adapted for cleaning or disinfecting shavers or razors
27/48 . . Drying devices therefor

Manicuring or pedicuring

29/00 Manicuring or pedicuring implements
29/02 . Nail clippers or cutters
29/04 . Nail files, e.g. manually operated
29/05 . . motor-driven
29/06 . Nail-tip shapers
29/11 . Polishing devices for nails
29/12 . . manually operated
29/14 . . motor-driven
29/16 . Cuticle sticks
29/17 . Nail cleaners, e.g. scrapers
29/18 . Manicure or pedicure sets, e.g. combinations without case, etui, or the like (combined with or on sheath of scissors B26B 13/22, B26B 29/04)
29/20 . . Boxes, cases, etuis or the like specially adapted therefor
29/22 . Finger-supports

31/00 Artificial nails

Containers or accessories specially adapted for handling toilet or cosmetic substances

33/00 Containers or accessories specially adapted for handling toilet or cosmetic powder
33/02 . with dispensing means, e.g. sprinkling means
33/04 . . with spring bottoms
33/06 . . with diaphragm bases
33/08 . . operated by rotary vanes
33/10 . . with closures in form of iris diaphragms
33/12 . . with rollers
33/14 . . with screws
33/16 . . with openings in the lid, able to be opened or closed by displacing or rotating a covering part
33/18 . with special decorative arrangements or form
33/20 . Containers with movably mounted drawers
33/22 . Containers with lids or covers at the top and the bottom
33/24 . Containers with two lids on one side; Containers with several covers
33/26 . combined with other objects
33/28 . . with lipstick holders or with other toilet articles
33/30 . . with watches or other mechanically-driven articles
33/32 . . with illuminating means
33/33 . . with bracelet or garter holder; as pendant
33/34 . Powder-puffs, e.g. with installed container
33/36 . . with handle
33/38 . Papers containing powder or other toilet substances

34/00 Containers or accessories specially adapted for handling liquid toilet or cosmetic substances, e.g. perfumes
34/02 . Scent flasks, e.g. with evaporator
34/04 . Appliances specially adapted for applying liquid, e.g. using roller or ball
34/06 . in combination with other toilet articles, e.g. lipstick

37/00 Sachet pads specially adapted for liquid toilet or cosmetic substances

40/00 Casings or accessories specially adapted for storing or handling solid or pasty toilet or cosmetic substances, e.g. shaving soap, lipstick or make-up (features common to containers for handling powdery or liquid toilet or cosmetic substances A45D 33/00 to A45D 37/00; cosmetic or like preparations A61K 8/00, A61Q; sample tables or the like G09F 5/00)
40/02 . Casings wherein movement of the lipstick or like solid is a sliding movement (A45D 40/06 takes precedence)
40/04 . . effected by a screw
40/06 . Casings wherein movement of the lipstick or like solid is a screwing movement
40/08 . with provision for sieves or shaping parts for stick ends
40/10 . Casings wherein a spring presses the lipstick or like solid into the position for use or into the retracted position
40/12 . Casings with provision for preventing undesired movement of the stick (A45D 40/10 takes precedence)
40/14 . Casings with ejector for waste stick or the like
40/16 . Refill sticks; Moulding devices for producing sticks
40/18 . Casings combined with other objects (A45D 40/24, A45D 42/02 take precedence)

40/20 . Pencil-like cosmetics; Simple holders for handling stick-shaped cosmetics or shaving soap while in use
40/22 . Casings characterised by a hinged cover
40/24 . Casings for two or more cosmetics
40/26 . Appliances specially adapted for applying pasty paint, e.g. using roller, using a ball
40/28 . . Appliances specially adapted for spreading already applied paint
40/30 . Masks for marking lips or eyelashes

Other toilet or cosmetic equipment

42/00 Hand, pocket, or shaving mirrors
42/02 . Mirrors with lipstick or powder-pads
42/04 . Pocket or handbag mirrors
42/06 . Wrist mirrors; Mirrors with means for attaching to fingers
42/08 . Shaving mirrors
42/10 . . illuminated
42/12 . . able to be suspended on a person's body
42/14 . . with vacuum cups
42/16 . . with other suspending or supporting means
42/18 . Manifold reflecting mirrors
42/20 . . with lazy-tongs connection
42/22 . Metal mirrors
42/24 . Flexible mirrors

44/00 Other toilet or cosmetic equipment, e.g. for hairdressers' rooms
44/02 . Furniture or other equipment specially adapted for hairdressers' rooms and not covered elsewhere (hairdressers' chairs A47C 1/04)
44/04 . . Special adaptations of portable frames or racks
44/06 . Means specially adapted for suspending hairdressers' machines, e.g. trolleys for electro-motors
44/08 . Protecting mantles; Shoulder-shields; Collars; Bibs
44/10 . Head-rests; Neck-rests
44/12 . Ear, face, or lip protectors (shaving masks A45D 27/42)
44/14 . Stands for performing hairdressing work; Postiche heads
44/16 . Hair-collecting boxes or containers for the same purpose
44/18 . Receptacles for hair brushes or tooth brushes as travelling equipment
44/20 . Containers for storing artificial teeth
44/22 . Face shaping devices, e.g. chin straps; Wrinkle removers, e.g. stretching the skin (skin stretchers for shaving A45D 27/38)

97/00 Hairdressing equipment or cosmetic treatment not provided for in other groups of this subclass **[2011.01]**

A45F TRAVELLING OR CAMP EQUIPMENT; **SACKS OR PACKS CARRIED ON THE BODY** (hand carried bags or luggage A45C) **[1,8]**

Note

This subclass covers only the equipment specified in its subdivisions. Travelling or camp equipment is normally classified in the classes for the equipment concerned, e.g. camp furniture in class A47.

3/00 Travelling or camp articles (travelling rugs A47G 9/06); **Sacks or packs carried on the body** (convertible into other articles A45F 4/00) **[1,8]**
3/02 . Sacks or packs carried on the body by means of one strap passing over the shoulder
3/04 . Sacks or packs carried on the body by means of two straps passing over the two shoulders
3/06 . . specially adapted for military purposes
3/08 . . Carrying-frames; Frames combined with sacks (wheeled carriers A45C 13/38)
3/10 . Pack-frames carried on the body
3/12 . Shoulder-pads
3/14 . Carrying-straps; Pack-carrying harnesses
3/15 . . Harnesses specially adapted for carrying small boats
3/16 . Water-bottles; Mess-tins; Cups
3/18 . . of rigid material
3/20 . . of flexible material; Collapsible or stackable cups
3/22 . Hammocks; Hammock spreaders
3/24 . . Stands; Supports
3/26 . Hanging seats
3/44 . Article supports adapted to be stuck into the ground
3/46 . Picnic sets (lunch or picnic boxes A45C 11/20)
3/48 . Sewing kits
3/50 . Map-cases used as travelling equipment (holders or cabinets for maps A47B 97/02)
3/52 . Nets affording protection against insects

4/00 Travelling or camp articles which may be converted into articles for other use; **Sacks or packs carried on the body and convertible into other articles [1,8]**
4/02 . Sacks or packs convertible into other articles
4/04 . . into tents
4/06 . . into beds or mattresses
4/08 . . into hammocks, litters or sleeping-bags
4/10 . . into boats or sledges
4/12 . . into coats or capes
4/14 . Coats or capes convertible into tent coverings

5/00 Holders or carriers for hand articles; **Holders or carriers for use while travelling or camping**
5/02 . Fastening articles to the garment
5/04 . . Holding handkerchiefs, napkins, or the like
5/06 . . Holding hats or other garments
5/08 . . Holding flowers
5/10 . Handles for carrying purposes (handles for suitcases or bags A45C 13/26)
5/12 . Book-carriers
5/14 . Holders for spades, hatchets, or the like implements

A46 BRUSHWARE

A46B BRUSHES (handles not integral with brushware B25G)

Subclass index

1/00 Brush bodies and bristles moulded as a unit

3/00 Brushes characterised by the way in which the bristles are fixed or joined in or on the brush body or carrier (machines or appliances therefor A46D)

3/02 . by pitch, resin, cement, or other adhesives
3/04 . by mouldable materials, e.g. metals, cellulose derivatives, plastics (A46B 1/00 takes precedence)
3/06 . by welding together bristles made of metal wires or plastic materials
3/08 . by clamping
3/10 . . into rings or the like
3/12 . . . specially adapted for paint-brushes
3/14 . . . specially adapted for street-cleaning or rail-cleaning brooms
3/16 . by wires or other anchoring means, specially for U-shaped bristle tufts
3/18 . the bristles being fixed on or between belts or wires
3/20 . the bristles being fixed or joined in rubber bodies, e.g. in soft rubber
3/22 . rubber bristles being fixed in or on brush bodies

5/00 Brush bodies; **Handles integral with brushware**

5/02 . specially shaped for holding by the hand
5/04 . shaped as gloves or finger-stalls
5/06 . in the form of tapes, chains, flexible shafts, springs, or the like

7/00 Bristle carriers arranged in the brush body

7/02 . in an expanding or articulating manner
7/04 . interchangeably
7/06 . movably during use
7/08 . . as a rotating disc
7/10 . . as a rotating cylinder

9/00 Arrangements of the bristles in the brush body

9/02 . Position or arrangement of bristles in relation to surface of the brush body, e.g. inclined, in rows, in groups
9/04 . . for toothbrushes
9/06 . Arrangement of mixed bristles or tufts of bristles, e.g. wire, fibre, rubber
9/08 . Supports or guides for bristles
9/10 . . Adjustable supports
9/12 . . Non-adjustable supports

11/00 Brushes with reservoir or other means for applying substances, e.g. paints, pastes, water (driven brush bodies A46B 13/00; applying liquids or other fluent materials to surfaces by liquid carrying members in general, e.g. by pads, B05C 1/00, B05D 1/28)

11/02 . with substance discharged from reservoir by pressure
11/04 . with substance discharged from reservoir otherwise than by pressure
11/06 . connected to supply pipe
11/08 . with heating means

13/00 Brushes with driven brush bodies (power-driven toothbrushes A61C 17/16) **[5]**

13/02 . power-driven
13/04 . . with reservoir or other means for supplying substances
13/06 . . . with brush driven by the supplied medium
13/08 . hand-driven

15/00 Other brushes; **Brushes with additional arrangements**

17/00 Accessories for brushes

17/02 . Devices for holding brushes in use
17/04 . Protective covers for the bristles
17/06 . Devices for cleaning brushes after use
17/08 . Other accessories, e.g. scrapers, rubber buffers for preventing damage to furniture

A46D MANUFACTURE OF BRUSHES

1/00 Bristles; **Selection of materials for bristles** (making artificial bristles D01D, D01F)

1/04 . Preparing bristles
1/045 . . Cleaning, e.g. washing, drying
1/05 . . Splitting; Pointing
1/055 . . Combing; Mixing; Sorting
1/06 . . Machines or apparatus for cutting bristles
1/08 . Preparing uniform tufts of bristles
1/10 . Vibrating devices for arranging bristles

3/00 Preparing brush bodies

3/02 . Machines for drilling bodies
3/04 . Machines for inserting or fixing bristles in bodies
3/05 . . for fixing the bristles between wires, tapes, or the like
3/06 . Machines for both drilling bodies and inserting bristles
3/08 . Parts of brush-making machines

5/00 Devices for preparing quills for use as carriers for bristles

7/00 Pressing devices for making brooms composed of brushwood or the like

9/00 Machines for finishing brushes

9/02 . Cutting; Trimming

9/04 . Cleaning

9/06 . Impregnating

99/00 Subject matter not provided for in other groups of this subclass [8]

A47 FURNITURE; DOMESTIC ARTICLES OR APPLIANCES; COFFEE MILLS; SPICE MILLS; SUCTION CLEANERS IN GENERAL

Note

In this class, the following term is used with the meaning indicated:
– "furniture" covers also easels or stands, e.g. for blackboards or drawing tables.

A47B TABLES; DESKS; OFFICE FURNITURE; CABINETS; DRAWERS; GENERAL DETAILS OF FURNITURE (jointing of furniture F16B 12/00)

Note

In this subclass, the following terms are used with the meanings indicated:
– "tables" covers also tables or underframes therefor for other than domestic use;
– "cabinets" or "racks" cover also cabinets or racks for storage in general.

Subclass index

Tables or desks characterised by structural features

1/00 **Extensible tables** (extensible shelf units A47B 46/00)
1/02 . with insertable leaves and fixed frames
1/03 . . the leaves being foldable or revolvable
1/04 . with supplementary leaves or drop-leaves
1/05 . . the leaves being extensible by drawing-out
1/06 . with flexible roll-tops
1/08 . with extensible frames
1/10 . Slide mechanisms

3/00 **Folding or stowable tables** (folded and suspended or hinged, or wall tables A47B 5/04; with tops of variable height A47B 9/00; foldable service or tea tables A47B 31/04)
3/02 . with foldable cross legs (adjustable for varying height of tops A47B 9/16)
3/04 . with flexible roll-tops
3/06 . with separable parts
3/08 . with legs pivoted to top or underframe
3/083 . . with foldable top leaves
3/087 . . . with struts supporting the legs
3/091 . . with struts supporting the legs (in combination with foldable top leaves A47B 3/087)
3/10 . Travelling or trunk tables
3/12 . Stowable tables with detachable top leaves
3/14 . Foldable table and seat units

5/00 **Suspended or hinged panels forming a table**; **Wall tables** (bed tables A47B 23/00; in combination with other furniture A47B 83/00; arm-rest tables for chairs A47C)
5/02 . detachable
5/04 . foldable
5/06 . with legs for supporting the table on the floor

7/00 **Tables of rigid construction**
7/02 . Stackable tables; Nesting tables

9/00 **Tables with tops of variable height** (seats with variable height A47C 3/20)
9/02 . with balancing device, e.g. by spring, by weight
9/04 . with vertical spindle
9/06 . with vertical toothed rack
9/08 . with clamps acting on vertical rods

9/10 . with vertically-acting fluid cylinder
9/12 . with flexible height-adjusting means, e.g. rope, chain
9/14 . with pins coacting with holes
9/16 . with means for, or adapted for, inclining the legs of the table for varying the height of the top, e.g. with adjustable cross legs
9/18 . with additional top or additional legs for varying the height of the top
9/20 . Telescopic guides

11/00 **Tables with tops revolvable on vertical spindles**

13/00 **Details of tables or desks** (drawers A47B 88/00; feet for furniture in general A47B 91/00)
13/02 . Underframes
13/04 . . of wood
13/06 . . of metal
13/08 . Table tops; Rims therefor (not restricted to table tops A47B 95/04)
13/10 . . Tops characterised by shape, other than circular or rectangular
13/12 . . Transparent tops
13/14 . . Detachable serving plates
13/16 . . Holders for glasses, ashtrays, lamps, candles or the like forming part of tables

Tables or desks characterised by adaptation for particular purposes

17/00 **Writing-tables** (A47B 21/00 takes precedence) **[1,8]**
17/02 . with vertically-adjustable parts
17/03 . with substantially horizontally extensible or adjustable parts other than drawers, e.g. leaves
17/04 . with secret or fireproof compartments
17/06 . with parts, e.g. trays, movable on a pivot or by chains or belts

19/00 **Reading-desks**; **Lecterns**; **Pulpits**
19/02 . Church pulpits
19/04 . Telephone desks, e.g. with book clamps, with shelves
19/06 . with adjustable top leaf
19/08 . Foldable reading desks
19/10 . characterised by association with auxiliary devices, e.g. paper clamps, line indicators (spot indicators per se B42D 9/00)

21/00 **Tables or desks specially adapted for use at individual computer workstations, e.g. for word processing or other manual data entry**; **Tables or desks specially adapted for typing**; **Auxiliary devices for attachment to such tables or desks** (mouse pads per se G06F 3/039) **[1,8]**
21/007 . with under-desk displays, e.g. displays being viewable through a transparent working surface of the table or desk **[8]**
21/013 . characterised by adjustable parts, e.g. universally adjustable leaves, arm rests, wrist supports or mouse platforms (A47B 21/007 takes precedence) **[8]**
21/02 . . the parts being vertically-adjustable only **[1,8]**
21/03 . . the parts being horizontally adjustable, e.g. extensible, only (drawers A47B 88/00) **[1,8]**
21/04 . characterised by means for holding or fastening typewriters or computer equipment **[1,8]**
21/06 . characterised by means for holding, fastening or concealing cables **[8]**

23/00 **Bed-tables** (operating tables A61G 13/00); **Trays**; **Reading-racks**; **Book-rests**
23/02 . releasably mounted on the bedstead
23/04 . supported from table, floor or wall
23/06 . characterised by association with auxiliary devices, e.g. line indicators, leaf turners, lampholders (spot indicators, leaf turners, per se B42D 9/00)

25/00 **Card tables**; **Tables for other games** (billiard tables A63D 15/00)

27/00 **Drawing desks or tables**; **Carriers for drawing-boards** (tables convertible to drawing desks A47B 85/02; easels or stands for blackboards or the like A47B 97/04; drawing-boards B43L 5/00)
27/02 . Adjustable drawing tables without balancing means
27/04 . Adjustable drawing-board carriers with balancing means for the board
27/06 . . balancing by means of springs
27/08 . . . with parallel-link guiding
27/10 . . balancing by means of weights
27/12 . . . with parallel-link guiding
27/14 . Adjustable underframes
27/16 . . hydraulically adjustable
27/18 . Locking means, e.g. for locking inclination of board (A47B 27/14 takes precedence)

29/00 **Sewing-tables** (for industrial use D05B 75/00)

31/00 **Service or tea tables, trolleys, or wagons** (features relating to running gear or to movement by hand B62B)
31/02 . with heating, cooling or ventilating means
31/04 . foldable
31/06 . adapted to the use in vehicles

33/00 **Kitchen or dish-washing tables**

35/00 **Tables combined with ironing-boards, washers, wringers, or the like** (washing machines, ironing boards, wringers per se D06F)

37/00 **Tables adapted for other particular purposes** (flower tables A47G 7/04; operating tables A61G 13/00; laboratory tables B01L 9/02; work tables B25H 1/02)
37/02 . Tables specially adapted to be used with domestic photographic projectors, e.g. tables with levelling arrangements (tables with adjustable height A47B 9/00; tables with adjustable inclination of the top A47B 13/00, A47B 19/06, A47B 23/00, A47B 27/00)
37/04 . Tables specially adapted for use in the garden or otherwise in the open air, e.g. with means for holding umbrellas or umbrella-like sunshades

School benches or desks

39/00 **School forms**; **Benches or forms combined with desks** (attaching to floor A47B 91/08)
39/02 . Adjustable forms
39/04 . Collapsible or tip-up forms
39/06 . Folding forms
39/08 . Seats or backs for forms
39/10 . Devices for holding pupils upright, i.e. body supports
39/12 . Equipment for forms not provided for in groups A47B 39/02 to A47B 39/10

41/00 **School desks or tables** (attaching to floor A47B 91/08)
41/02 . Desk tops

41/04 . Drawing or model stands
41/06 . Holders or supports for guiding copy-books, slates, or the like

Structural features of cabinets, racks, shelf units or similar furniture; **Similar features of built-in cupboards [3]**

43/00 Cabinets, racks or shelf units, characterised by features enabling folding of the cabinet or the like
43/02 . made of cardboard or the like
43/04 . made of a rigid frame with walls or door-leaves of textile or the like

45/00 Cabinets, racks or shelf units, characterised by features enabling enlarging in height, length, or depth (sectional furniture A47B 87/00)

46/00 Cabinets, racks or shelf units, having one or more surfaces adapted to be brought into position for use by extending or pivoting (A47B 63/04, A47B 77/10 take precedence; writing tables with extensible leaves A47B 17/03, A47B 21/013; with extensible garment holders A47B 61/02)

47/00 Cabinets, racks or shelf units, characterised by features related to dismountability or building-up from elements (A47B 43/00, A47B 45/00 take precedence; features for adjusting shelves or partitions A47B 57/00) **[3]**
47/02 . made of metal only **[2]**
47/03 . . with panels separate from the frame **[2]**
47/04 . made mainly of wood or plastics
47/05 . . with panels on a separate frame, e.g. a metal frame **[2]**
47/06 . made mainly of cardboard, textile, paper, or the like, e.g. with separate frame of other materials

49/00 Revolving cabinets or racks; **Cabinets or racks with revolving parts**

51/00 Cabinets with means for moving compartments up and down

53/00 Cabinets or racks having several sections one behind the other; **Cabinet or rack systems** (revolving cabinets or racks A47B 49/00)
53/02 . Cabinet systems, e.g. consisting of cabinets arranged in a row with means to open or close passages between adjacent cabinets

55/00 Cabinets, racks or shelf units, having essential features of rigid construction (safes E05G)
55/02 . made of wire
55/04 . made of concrete or the like
55/06 . made of cardboard, paper, or the like

57/00 Cabinets, racks or shelf units, characterised by features for adjusting shelves or partitions (details of cabinets, racks or shelf units in general A47B 96/00; brackets adjustable in themselves A47B 96/07) **[3]**
57/04 . with means for adjusting the inclination of the shelves
57/06 . with means for adjusting the height of the shelves (A47B 57/04, A47B 57/30 take precedence) **[3]**
57/08 . . consisting of grooved or notched ledges, uprights or side walls
57/10 . . . the grooved or notched parts being the side walls or uprights themselves
57/12 . . consisting of side walls of the ladder type
57/14 . . . with hooks on the shelves to engage the rungs of the ladder
57/16 . . consisting of hooks coacting with openings (ladder type A47B 57/12)
57/18 . . consisting of screwbolts as connecting members
57/20 . . consisting of tongues, pins or similar projecting means coacting with openings (A47B 57/08, A47B 57/16 take precedence) **[3]**
57/22 . . . characterised by shape or orientation of opening, e.g. keyhole-shaped
57/26 . . consisting of clamping means, e.g. with sliding bolts or sliding wedges
57/30 . with means for adjusting the height of detachable shelf supports **[3]**
57/32 . . consisting of grooved or notched ledges, uprights or side walls **[3]**
57/34 . . . the grooved or notched parts being the side walls or uprights themselves **[3]**
57/36 . . consisting of side walls of the ladder type **[3]**
57/38 . . . with hooks on the shelf supports to engage the rungs of the ladder **[3]**
57/40 . . consisting of hooks coacting with openings (ladder type A47B 57/36) **[3]**
57/42 . . . the shelf supports being cantilever brackets **[3]**
57/44 . . consisting of screwbolts as connecting members **[3]**
57/46 . . . the shelf supports being cantilever brackets **[3]**
57/48 . . consisting of tongues, pins or similar projecting means coacting with openings (A47B 57/32, A47B 57/40 take precedence) **[3]**
57/50 . . . characterised by shape or orientation of opening, e.g. keyhole-shaped **[3]**
57/52 . . . . the shelf supports being cantilever brackets **[3]**
57/54 . . consisting of clamping means, e.g. with sliding bolts or sliding wedges **[3]**
57/56 . . . the shelf supports being cantilever brackets **[3]**
57/58 . with means for adjusting partitions horizontally (book-ends A47B 65/00) **[3]**

Special adaptations of cabinets racks, shelf units or similar furniture; **Similar features of built-in cupboards [2009.01]**

61/00 Wardrobes
61/02 . with extensible garment-holders
61/04 . for shoes, hats, umbrellas, or the like
61/06 . Travelling or trunk wardrobes

63/00 Cabinets, racks or shelf units, specially adapted for storing books, documents, forms, or the like
63/02 . specially adapted for storing drawings or the like (filing of suspended drawings B42F 15/00)
63/04 . with a writing surface (surfaces adapted to be brought into position for use by extension or pivoting in general A47B 46/00)
63/06 . with parts, e.g. trays, movable on pivots, or on chains or belts (revolving cabinets in general, cabinets with revolving parts in general A47B 49/00; cabinets with means for moving compartments up and down in general A47B 51/00)

65/00 Book-troughs; **Accessories specially adapted for book-storing, e.g. book-ends**

67/00 **Chests**; **Dressing-tables**; **Medicine cabinets or the like**; **Cabinets characterised by the arrangement of drawers**

67/02 . Cabinets for shaving tackle, medicines, or the like

67/04 . Chests of drawers; Cabinets characterised by the arrangement of drawers (A47B 67/02 takes precedence; drawers, guides for drawers, per se A47B 88/00)

69/00 **Cocktail cabinets** (cabinets or racks for bottles only A47B 73/00)

71/00 **Cabinets for perishable goods, e.g. meat safes, fly-proof cabinets** (fruit or potato storage cabinets, racks or trays A47B 75/00; ice-boxes, refrigerators F25D)

73/00 **Bottle cupboards**; **Bottle racks**

75/00 **Fruit or potato storage cabinets, racks or trays for domestic use**

77/00 **Kitchen cabinets** (tops specially designed for working on A47B 96/18)

77/02 . General layout, e.g. relative arrangement of compartments, working surface or surfaces, supports for apparatus (A47B 77/08 takes precedence)

77/04 . Provision for particular uses of compartments or other parts

77/06 . . for incorporating sinks, with or without draining boards, splash-backs, or the like (constructional features of draining boards A47L 19/02; sinks E03C 1/18)

77/08 . . for incorporating apparatus operated by power, including water power; for incorporating apparatus for cooking, cooling, or laundry purposes

77/10 . . with members movable outwards to a position of use, e.g. tables, ironing boards (A47B 77/16 takes precedence; surfaces adapted to be brought into position for use by extension or pivoting in general A47B 46/00)

77/12 . . . for attachment of portable kitchen machines

77/14 . . by incorporation of racks or supports, other than shelves, for household utensils

77/16 . . by adaptation of compartments or drawers for receiving or holding foodstuffs; by provision of rotatable or extendible containers for foodstuffs

77/18 . . by special arrangements for accommodating removable containers

79/00 **Bedside cabinets**

81/00 **Cabinets, racks or shelf units specially adapted for other particular purposes, e.g. for storing guns or skis** (racks for dispensing merchandise A47F 1/00; showcases or show cabinets A47F 3/00; racks specially adapted for workshops B25H 3/04; peculiar to housing recording apparatus or records therefor G11B 33/02; peculiar to housing electrical apparatus or installations H05K)

81/02 . specially adapted for storing cleaning utensils

81/04 . specially adapted for storing dishware

81/06 . Furniture aspects of radio, television, gramophone, or record cabinets

Combined or convertible furniture [5]

83/00 **Combinations comprising two or more pieces of furniture of different kinds** (foldable table and seat units A47B 3/14)

83/02 . Tables combined with seats

83/04 . Tables combined with other pieces of furniture

85/00 **Furniture convertible into other kinds of furniture** (convertible chairs, stools or benches A47C 13/00; into beds A47C 17/52; into billiard tables A63D 15/04)

85/02 . Tables convertible into drawing-desks

85/04 . Tables convertible into chairs

85/06 . Tables convertible otherwise

85/08 . Convertible cupboards

87/00 **Sectional furniture, i.e. combinations of complete furniture units**

87/02 . stackable **[3]**

88/00 **Drawers for tables, cabinets or like furniture**; **Guides for drawers** (A47B 63/02 takes precedence; drawers coupled to doors A47B 96/16)

88/02 . Coupled drawers

88/04 . Sliding drawers; Slides or guides therefor

88/06 . . Drawers which can be rotated while or after sliding out

88/08 . . with double extensible guides or parts

88/10 . . . with rollers, ball bearings, wheels, or the like

88/12 . . with other guiding mechanisms

88/14 . . . with rollers, ball bearings, wheels, or the like

88/16 . . with devices to prevent complete withdrawal

88/18 . Drawers tiltably or pivotally arranged

88/20 . Drawers with compartments

88/22 . Concealed drawers

91/00 **Feet for furniture in general** (castors B60B 33/00)

91/02 . Adjustable feet (self-levelling A47B 91/16)

91/04 . Elastic supports

91/06 . Gliders or the like

91/08 . connected to the floor

91/10 . . adapted to mounting on inclined floor

91/12 . Leg supports, e.g. cup-shaped

91/14 . Devices on legs preventing ascent of insects

91/16 . Self-levelling legs

95/00 **Fittings for furniture**

95/02 . Handles

95/04 . Keyplates; Ornaments or the like (rims specially adapted for table tops A47B 13/08; keyplates in general E05B 17/14)

96/00 **Details of cabinets, racks or shelf units not covered by a single one of groups A47B 43/00 to A47B 95/00**; **General details of furniture** (doors E06B)

96/02 . Shelves (movable shelves coupled to doors A47B 96/16)

96/04 . Partition walls

96/06 . Brackets or similar supporting means for cabinets, racks or shelves (aspects of adjusting height or inclination A47B 57/00)

96/07 . . adjustable in themselves **[3]**

96/14 . Bars, uprights, struts, or like supports, for cabinets, brackets, or the like (aspects of adjusting height or inclination of shelves or brackets A47B 57/00)

96/16 . Drawers or movable shelves coupled to doors

96/18 . Tops specially designed for working on (table tops A47B 13/08)

96/20 . Furniture panels or like furniture elements

97/00 **Furniture or accessories for furniture, not provided for in other groups of this subclass**

97/02 . Devices for holding or supporting maps, drawings, or the like, including means for preventing rolling-up

97/04 . Easels or stands for blackboards or the like
97/06 . . with means for balancing weight of blackboards or the like, e.g. connected to wall (means for balancing weight of drawing-boards A47B 27/00)
97/08 . . foldable

A47C **CHAIRS** (seats specially adapted for vehicles B60N 2/00); **SOFAS**; **BEDS** (upholstery in general B68G)

Subclass index

Chairs; **Stools, Benches**

1/00 **Chairs adapted for special purposes** (features relating to vertical adjustability A47C 3/20; convertible chairs A47C 13/00; chairs or personal conveyances specially adapted for patients or disabled persons A61G 3/00, A61G 5/00; operating chairs, dental chairs A61G 15/00)
1/02 . Reclining or easy chairs (supports for parts of body A47C 7/36, A47C 7/50, A47C 7/54)
1/022 . . having independently-adjustable supporting parts
1/023 . . . the parts being horizontally-adjustable seats
1/024 . . . the parts, being the back-rest, or the back-rest and seat unit, having adjustable inclination
1/025 . . . . by means of a toothed rack or like gearing mechanism
1/026 . . . . by means of a peg-and-notch or pawl-and-cam mechanism
1/027 . . . . by means of clamps or friction locking members
1/028 . . . for changing a straight chair into an easy chair
1/029 . . . . by changing the length or the inclination of the legs
1/03 . . . the parts being arm-rests
1/031 . . having coupled adjustable supporting parts
1/032 . . . the parts being movably-coupled seat and back-rest (A47C 1/035 takes precedence)
1/033 . . . . the coupling member being a flexible strip
1/034 . . . the parts including a leg-rest or foot-rest (A47C 1/037, A47C 1/038 take precedence)
1/035 . . . . in combination with movably-coupled seat and back-rest
1/036 . . . the parts including a head-rest
1/037 . . . . the combination with a leg-rest or foot-rest
1/038 . . . with movably-coupled seat and back-rest, actuated by lazy tongs (A47C 1/032, A47C 1/036 take precedence) **[2]**
1/04 . Hairdressers' or similar chairs
1/06 . . adjustable
1/08 . . with auxiliary seats (insertable seats for children A47C 1/11)
1/10 . . with head-rests; with paper holders
1/11 . . Accessories not otherwise provided for, e.g. seats for children
1/12 . Theatre, auditorium, or similar chairs (seats for stadium benches A47C 1/16)
1/121 . . having tipping-up seats **[3]**
1/122 . . . tipping-up sideways **[3]**
1/124 . . Separate chairs, connectible together into a row
1/126 . . stowable in floor or wall
1/13 . . Indicators; Devices for reserving or the like
1/14 . Beach chairs
1/16 . Seats detachably mounted on stadium benches (detachably mounted children's chairs A47D 1/10)

3/00 **Chairs characterised by structural features**; **Chairs or stools with rotatable or vertically-adjustable seats** (A47C 1/00, A47C 4/00 take precedence)
3/02 . Rocking chairs (specially for children A47D 13/10)
3/021 . . having elastic frames
3/023 . . . made of tubular material
3/025 . . with seat, or seat and back-rest unit, elastically mounted in a rigid frame
3/026 . . . with a central column, e.g. rocking office chairs; Tilting chairs
3/027 . . . with curved rocking members between seat and frame
3/029 . . with curved rocking members resting on the floor
3/03 . . Locking members (A47C 3/027 takes precedence)
3/04 . Stackable chairs; Nesting chairs
3/12 . with shell-shaped seat and back-rest unit, e.g. having arm-rests
3/14 . of asymmetrical shape
3/16 . of legless type, e.g. with seat directly resting on the floor (A47C 3/14 takes precedence; detachably mounted on stadium benches A47C 1/16; children's chairs mounted on back-rest of chair A47D 1/10); Hassocks; Pouffes
3/18 . Chairs or stools with rotatable seat (adjustable in height by rotation A47C 3/24)
3/20 . Chairs or stools with vertically-adjustable seats (tables with variable height A47B 9/00)
3/22 . . with balancing device, e.g. by spring, by weight
3/24 . . with vertical spindle
3/26 . . with vertical toothed rack
3/28 . . with clamps acting on vertical rods
3/30 . . with vertically-acting fluid cylinder
3/32 . . with flexible height-adjusting means, e.g. rope, chain
3/34 . . with pins coacting with holes

3/36 . . with means, or adapted, for inclining the legs of the chair or stool for varying height of seat
3/38 . . with additional seat or additional legs for varying height of seat
3/40 . . Telescopic guides

4/00 Foldable, collapsible or dismountable chairs (of tubular metal type A47C 5/10; children's foldable chairs A47D 1/02)
4/02 . Dismountable chairs
4/03 . . Non-upholstered wooden chairs **[2]**
4/04 . Folding chairs with inflexible seats
4/06 . . Attachment of upholstery or fabric to frames (in general A47C 31/02)
4/08 . . having a frame made of wood or plastics
4/10 . . . with legs pivotably connected to seat or underframe
4/12 . . . . of adjustable type (A47C 4/14 takes precedence)
4/14 . . . . with cross legs
4/16 . . . . . of adjustable type
4/18 . . having a frame made of metal
4/20 . . . with legs pivotably connected to seat or underframe
4/22 . . . . of adjustable type (A47C 4/24 takes precedence)
4/24 . . . . with cross legs
4/26 . . . . . of adjustable type
4/28 . Folding chairs with flexible coverings for the seat or back elements
4/30 . . Attachment of upholstery or fabric to frames (in general A47C 31/02)
4/32 . . having a frame made of wood or plastics
4/34 . . . with legs pivotably connected to seat or underframe
4/36 . . . . of adjustable type (A47C 4/38 takes precedence)
4/38 . . . . with cross legs
4/40 . . . . . of adjustable type
4/42 . . having a frame made of metal
4/44 . . . with legs pivotably connected to seat or underframe
4/46 . . . . of adjustable type (A47C 4/48 takes precedence)
4/48 . . . . with cross legs
4/50 . . . . . of adjustable type
4/52 . Trunk chairs, i.e. chairs collapsible to trunk shape (trunk tables A47B 3/10)
4/54 . Inflatable chairs (connection of valves to inflatable elastic bodies B60C 29/00)

5/00 Chairs of special materials
5/02 . Basket chairs
5/04 . Metal chairs, e.g. tubular (of rocking type A47C 3/023; of non-tubular folding, collapsible, or dismountable type A47C 4/00)
5/06 . . Special adaptation of seat upholstery or fabric for attachment to tubular chairs
5/08 . . Tubular chairs having sheathed tubes; Adaptation of sheathed tubes thereto
5/10 . . Tubular chairs of foldable, collapsible, or dismountable type
5/12 . of plastics, with or without reinforcement
5/14 . characterised by the use of laminated wood

7/00 Parts, details, or accessories of chairs or stools (attaching to floor A47B 91/08)
7/02 . Seat parts (adaptation of seats to mounting in tubular chairs A47C 5/06; such parts not restricted to chairs A47C 23/00; removable upholstered units or cushions A47C 27/00)
7/14 . . of adjustable shape; elastically mounted
7/16 . . Seats made of wooden, plastics, or metal sheet material; Panel seats
7/18 . . having foamed material included in cushioning part (foamed material mattresses A47C 27/14)
7/20 . . . with reinforcement
7/22 . . Straps or the like for carrying upholstery
7/24 . . Upholstered seats (A47C 7/18 takes precedence)
7/26 . . . with reinforcement
7/28 . . with tensioned springs, e.g. of flat type
7/30 . . . with springs meandering in a flat plane
7/32 . . . with tensioned cords, e.g. of elastic type, in a flat plane
7/34 . . with springs in compression, e.g. coiled
7/35 . . Combinations of different types of springs; Adjustable springs; Attachment of springs to other springs or to frame **[2]**
7/36 . Support for the head or the back (for operating or dental chairs A61G 15/00)
7/38 . . for the head, e.g. detachable
7/40 . . for the back
7/42 . . . of detachable type
7/44 . . . with elastically-mounted frame
7/46 . . . with special, e.g. adjustable, profile; "Ackerblom" profile chairs
7/48 . . . of freely-rotatable type
7/50 . Supports for the feet or the legs (coupled to other adjustable parts A47C 1/034, A47C 1/037; footstools A47C 16/02)
7/52 . . of detachable type
7/54 . Supports for the arms
7/56 . Parts or details of tipping-up chairs, e.g. of theatre chairs
7/58 . . Hinges, e.g. for mounting chairs in a curved row (hinges for wings in general E05D)
7/60 . . Use of locks or ledges for limiting the seat movement
7/62 . Accessories for chairs
7/64 . . Hat or coat holders
7/66 . . Means to protect against weather
7/68 . . Arm-rest tables
7/70 . . . of foldable type
7/72 . . Adaptations for incorporating lamps, radio sets, bars, telephones, ventilation, heating or cooling arrangements or the like
7/74 . . . for ventilation, heating or cooling

9/00 Stools for specified purposes (with rotatable seats A47C 3/18; with vertically adjustable seats A47C 3/20; step-stools A47C 12/00; footstools A47C 16/02; prayer stools A47C 16/04; platforms or seat-boxes specially adapted for angling A01K 97/22; walking sticks or umbrellas convertible into seats A45B 5/00) **[5]**
9/02 . Office stools; Workshop stools
9/04 . Milking stools
9/06 . Wall stools
9/08 . Music stools
9/10 . Camp, travelling, or sports stools

11/00 **Benches not otherwise provided for** (school forms A47B 39/00)

11/02 . Church benches; Confessionals

12/00 **Step-stools [5]**

Note

Folding or collapsing actions, of interest apart from any conversion between the step and seat functions, are classified in group A47C 4/00. **[5]**

12/02 . requiring conversion between the step and seat functions **[5]**

13/00 **Convertible chairs, stools, or benches** (step-stools requiring conversion between the step and seat functions A47C 12/02; stretchers, for patients or invalids, convertible into chairs A61G 1/017) **[5]**

15/00 **Other seating furniture** (school forms A47B 39/00)

16/00 **Rests or supports for feet, legs, arms, back or head** (associated with chairs A47C 7/00; associated with beds or sofas A47C 20/00) **[2]**

16/02 . Footstools; Foot-rests; Leg-rests **[2]**

16/04 . Prayer stools; Kneeling stools; Kneeling supports (hassocks or pouffes A47C 3/16) **[2]**

Sofas; **Beds**

Note

In groups A47C 17/00 to A47C 27/00, the following terms or expressions are used with the meanings indicated:
- "bedstead" is used only for the frame of a bed;
- "bed" includes bedsteads combined with spring mattresses, stuffed mattresses, or similar means to enable the lying of persons thereon;
- "spring mattresses" do not include any stuffed material;
- "stuffed mattresses" may include metal springs.

17/00 **Sofas**; **Couches**; **Beds** (bedsteads A47C 19/00; spring mattresses A47C 23/00; divan bases A47C 23/00; stuffed mattresses A47C 27/00; beds with special provisions for nursing A61G 7/00)

17/02 . Sofas, couches, settees, or the like, without movable parts

17/04 . Sofas, couches, settees, or the like, with movable parts; Chair beds

17/12 . . changeable to beds by tilting or extending the arm-rests

17/13 . . changeable by increasing the available part, e.g. by drawing forward

17/14 . . changeable to beds by removing parts only

17/16 . . changeable to beds by tilting or pivoting the back-rest

17/165 . . . with forward tiltable back-rest, e.g. back cushion **[2]**

17/17 . . . with coupled movement of back-rest and seat **[2]**

17/175 . . . . with tilting or lifting seat-back-rest pivot **[2]**

17/18 . . . and tilting or pivoting the arm-rest

17/20 . . . thereby uncovering one or more auxiliary parts previously hidden (A47C 17/22 takes precedence)

17/207 . . . . with seat cushion consisting of superposed parts, at least one lower part being used to form part of the surface **[2]**

17/213 . . . . the surface, when used for lying down, consisting of one side of the seat frame and the back-rest frame **[2]**

17/22 . . with means for uncovering a previously hidden mattress or similar bed part

17/23 . . . the lying down surface partly consisting of one side of the seat **[2]**

17/24 . . . with only one movable part being tiltable about a horizontal axis

17/26 . . . . tiltable to an overturned position

17/28 . . . . having means to lift the tilting axis

17/30 . . . two or more parts being rotatable about a vertical axis

17/32 . . Changing a single bed into a double bed by extending, pivoting, or tilting a previously hidden second mattress or other bed part

17/34 . . Joining seats, chairs, or couches to form beds

17/36 . . . Changing corner couches into a double bed

17/37 . . Changing sofas or the like into beds by means of furniture other than seats or chairs

17/38 . Wall beds

17/40 . . having balancing members, e.g. weights, springs

17/42 . . having supporting legs with fixed position on the floor, e.g. attached thereto

17/44 . . . having means on the supporting legs facilitating the removal of the bed from its place

17/46 . . characterised by a rigid mattress-supporting member

17/48 . . characterised by two or more relatively-movable parts

17/50 . . characterised by their shape, e.g. multiple-wall beds

17/52 . Cabinet beds; Table beds, or like beds; Wardrobe beds

17/54 . . in which the cabinet or the like is tilted with the bed

17/56 . . pivotable on both horizontal and vertical axis

17/58 . . with extensible mattress support

17/60 . . the cabinet being essentially changed in shape in sleeping position of the bed

17/62 . . Table beds; Billiard table beds, or like beds

17/64 . Travelling or camp beds (adjusting members for rests A47C 20/00; travelling or camp sacks or packs convertible into beds or mattresses A45F 4/06; stretchers A61G 1/00)

17/66 . . having specially-adapted body-carrying surfaces

17/68 . . only the legs being foldable

17/70 . . the bed frame being foldable about a horizontal axis

17/72 . . . having cross legs (A47C 17/82 takes precedence)

17/74 . . the bed being foldable about a vertical axis

17/76 . . having extensible, e.g. telescopic parts

17/78 . . held in shape by stressed cords

17/80 . . adapted to be used in or connected to vehicles

17/82 . . Trunk beds; Travelling-case or like beds

17/84 . Suspended beds, e.g. suspended from ceiling (hammocks A45F 3/22)

17/86 . Parts or details for beds, sofas or couches only not fully covered in a single one of the groups A47C 17/02, A47C 17/04, A47C 17/38, A47C 17/52, A47C 17/64, or A47C 17/84

19/00 **Bedsteads** (spring mattresses with rigid frame or forming part of the bedstead A47C 23/00; for children's beds A47D 7/00; bed jointing members or fittings for bedsteads F16B)

19/02 . Parts or details of bedsteads not fully covered in a single one of the following subgroups, e.g. bed rails, post rails

19/04 . Extensible bedsteads, e.g. with adjustment of length, width, height

19/12 . Folding bedsteads (travelling or camp beds A47C 17/64)

19/14 . . of the lazy-tongs type

19/20 . Multi-stage bedsteads (multiple-wall beds A47C 17/50; suspended beds A47C 17/84); Bedsteads stackable to multi-stage bedsteads

19/22 . Combinations of bedsteads with other furniture or with accessories, e.g. with bedside cabinets (bed-tables A47B 23/00)

20/00 **Head-, foot- or like rests for beds, sofas or the like** (book-rests or bed tables A47B 23/00; bed-rests specially adapted for nursing A61G 7/065) **[2]**

20/02 . of detachable type (A47C 20/04, A47C 20/08 take precedence) **[2]**

20/04 . with adjustable inclination (A47C 20/08 takes precedence) **[2]**

20/06 . . the adjustable part immobilising foldable legs **[2]**

20/08 . with means for adjusting two or more rests together **[2]**

20/10 . . using rods **[2]**

20/12 . . . using telescopic rods **[2]**

20/14 . . using plate and catch **[2]**

20/16 . . using toothed parts, e.g. racks **[2]**

20/18 . . using friction gearing **[2]**

21/00 **Attachments for beds, e.g. sheet holders, bed-cover holders** (bed tables supported on the bedstead A47B 23/02; for children's beds A47D 15/00); **Ventilating, cooling or heating means in connection with bedsteads or mattresses [5]**

21/02 . Sheet holders; Bed-cover holders

21/04 . Devices for ventilating, cooling or heating

21/06 . Mattress underlays

21/08 . Devices for prevention against falling-out, e.g. detachable side walls (for children's beds A47D 7/00)

23/00 **Spring mattresses with rigid frame or forming part of the bedstead**; **Divan bases** (unframed spring units A47C 25/00; spring units forming part of stuffed mattresses A47C 27/00; bed-rests specially adapted for nursing A61G 7/065)

23/02 . using leaf springs, e.g. metal strips (wooden springs A47C 23/06) **[2]**

23/04 . using springs in compression, e.g. coiled

23/043 . . using wound springs **[2]**

23/047 . . incorporating inflatable elements **[2]**

23/05 . . Frames therefor; Connecting the springs to the frame

23/053 . . . Attachment or interconnection of springs in frames or in spring units **[2]**

23/055 . . . using cords; using textile or rubber bands **[2]**

23/057 . . . Hangers or supports for fastening spring units to frame **[2]**

23/06 . using wooden springs, e.g. of slat type

23/12 . using tensioned springs, e.g. of flat type (A47C 23/02 takes precedence) **[2]**

23/14 . . forming nets; combined with nets

23/145 . . . with horizontal interlocking wound springs; Attachment thereof to the frame **[2]**

23/15 . . . with braided or crossed flat springs or cords; with horizontal wound springs (A47C 23/145 takes precedence) **[2]**

23/155 . . . with combinations of flat springs or link chains with wound springs **[2]**

23/16 . . of plane meandering type

23/18 . . of resilient webbing

23/20 . . of resilient sheet form

23/22 . . of tensioned rubber cords or like cords

23/24 . . using tensioned textile or other non-resilient strips

23/26 . . Frames therefor; Connecting the springs to the frame

23/28 . . Tensioning devices therefor

23/30 . using combinations of springs covered by more than one of the groups A47C 23/02, A47C 23/04, A47C 23/06 and A47C 23/12; Frames therefor

23/32 . . Combinations of nets with springs in compression; Frames therefor

23/34 . with provisions for giving extra support for the head or the legs

25/00 **Unframed spring units specially adapted for sofas or beds**

25/02 . without additional connecting means between the springs

27/00 **Stuffed or fluid mattresses specially adapted for chairs, beds or sofas** (arrangements for preventing bed-sores or for supporting patients with burns, e.g. mattresses specially adapted therefor, A61G 7/057; ready-made upholstery pads in general B68G 5/00; making mattresses B68G 7/00) **[5]**

27/04 . with spring inlays (A47C 27/20 takes precedence)

27/045 . . Attachment of spring inlays to coverings (upholstery attaching means A47C 31/02); Use of stiffening sheets, lattices or grids under spring inlays **[2]**

27/05 . . with foamed material in top, bottom, or side layers

27/06 . . Spring inlays

27/07 . . . Attaching, or interconnecting of, springs in spring inlays **[2]**

27/08 . Fluid mattresses (connecting valves to inflatable elastic bodies B60C 29/00) **[5]**

27/10 . . with two or more independently-fillable chambers **[5]**

27/12 . with fibrous inlays, e.g. made of wool, of cotton

27/14 . with foamed material inlays

27/15 . . consisting of two or more layers (A47C 27/16 takes precedence) **[2]**

27/16 . . reinforced with sheet-like elements, e.g. profiled

27/18 . . in combination with inflatable bodies

27/20 . . with springs moulded in, or situated in openings in foamed material

27/22 . with both fibrous and foamed material inlays

29/00 **Nets for protection against insects in connection with chairs or beds** (insect nets for animals A01K 13/00; insect nets as travelling equipment A45F 3/52); **Bed canopies**

31/00 **Details or accessories for chairs, beds, or the like, not provided for in other groups of this subclass, e.g. upholstery fasteners, mattress protectors, stretching devices for mattress nets**

31/02 . Upholstery attaching means (quilting, quilting means, fastening, fixing or finishing upholstery B68G 7/00)

31/04 . . Clamps for attaching flat elastic strips or flat meandering springs to frames

31/06 . . . for attaching flat meandering springs

31/08 . Mattress hand-straps

31/10 . Loose furniture covers

31/11 . . for chairs **[2]**

31/12 . Means, e.g. measuring means, for adapting chairs, beds or mattresses to the shape or weight of persons (body measuring means for clothing manufacture A41H 1/00) **[4]**

A47D **FURNITURE SPECIALLY ADAPTED FOR CHILDREN** (school benches or desks A47B 39/00, A47B 41/00)

Subclass index

1/00 **Children's chairs** (chairs generally A47C; vehicle seats for children B60N 2/26)

1/02 . Foldable chairs

1/04 . convertible from a high chair to a low one by reversing

1/06 . convertible to a push chair

1/08 . convertible to a rocking chair

1/10 . capable of being suspended from, or attached to, tables or other articles

3/00 **Children's tables**

5/00 **Dressing-tables for children** (chests of drawers A47B 67/00)

7/00 **Children's beds** (beds in general A47C)

7/01 . with adjustable parts, e.g. for adapting the length to the growth of the children

7/02 . . with side wall that can be lowered

7/03 . . with adjustably-mounted mattresses

7/04 . capable of being suspended from, or attached to, window frames or other articles

9/00 **Cradles**

9/02 . with rocking mechanisms (devices for moving perambulators to and fro B62B 9/22)

9/04 . . with disconnectable rockers

11/00 **Children's furniture convertible into other kinds of furniture, e.g. children's chairs or benches convertible into beds** (convertible furniture in general A47B 85/00)

11/02 . Chairs convertible into children's chairs

13/00 **Other nursery furniture** (auxiliary or portable toilet seats for children A47K 13/06)

13/02 . Baby-carriers; Carry-cots

13/04 . Apparatus for helping babies to walk; Baby walkers or strollers (wheeled walking aids for patients or disabled persons A61H 3/04)

13/06 . Children's pens

13/08 . Devices for use in guiding or supporting children, e.g. safety harness

13/10 . Rocking-chairs (in general A47C 3/02; rocking horses A63G 15/00); Swings (in general A63G 9/00)

15/00 **Accessories for children's furniture, e.g. safety belts, baby-bottle holders** (holders for bottles for medicinal feeding A61J 9/06; safety belts or body harnesses, in general A62B 35/00; safety belts or body harnesses in land vehicles B60R 22/00; harnessing in aircraft B64D 25/06) **[4]**

15/02 . Bed-cover holders preventing babies from throwing-off the bed covers

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A47F **SPECIAL FURNITURE, FITTINGS, OR ACCESSORIES FOR SHOPS, STOREHOUSES, BARS, RESTAURANTS, OR THE LIKE**; **PAYING COUNTERS**

Subclass index

1/00 **Racks for dispensing merchandise** (racks in general A47B; storing means for workshops B25H); **Containers for dispensing merchandise** (show or display aspects A47F 3/00; for workshop fittings B25H 3/00; containers in general B65D; coin-freed dispensers G07F)

1/02 . for granulated or powdered materials

1/03 . . Dispensing means

1/035 . . . having measuring devices

1/04 . Containers with arrangements for dispensing articles

1/06 . . dispensing from top

1/08 . . dispensing from bottom

1/10 . . . having mechanical dispensing means

1/12 . . dispensing from the side of an approximately horizontal stack

1/14 . Containers adapted to stacking or to be combined with, or combined to form, a stand

1/16 . Containers characterised by being rotatable

1/18 . Combinations of racks and shop vending jars

3/00 **Showcases or show cabinets**

3/02 . with dispensing arrangements (coin-freed G07F)

3/022 . . dispensing from top

3/024 . . dispensing from bottom

3/026 . . . having mechanical dispensing means

3/04 . air-conditioned, refrigerated (refrigerators F25D; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84)

3/06 . with movable or removable shelves

3/08 . with arrangements for continuously or intermittently moving the merchandise

3/10 . Rotary showcases or show cabinets

3/11 . . having mechanical drive

3/12 . Clamps or other devices for supporting, fastening, or connecting glass plates

3/14 . Display trays (packing boxes used subsequently as display trays B65D)

5/00 **Show stands, hangers, or shelves characterised by their constructional features**

5/01 . made of tubes or wire (foldable or adjustable A47F 5/13)

5/02 . Rotary display stands

5/025 . . having mechanical drive, e.g. turntables (A47F 5/03 takes precedence)

5/03 . . with horizontal rotation axis

5/04 . Stands with a central pillar, e.g. tree type

5/05 . . with separate containers rotatable around the pillar

5/06 . . adjustable

5/08 . secured to the wall, ceiling, or the like; Wall-bracket display devices

5/10 . Adjustable or foldable display stands

5/11 . . made of cardboard, paper, or the like (A47F 5/12 takes precedence)

5/12 . . Tiltable stands

5/13 . . made of tubes or wire (A47F 5/12 takes precedence)

5/14 . Tubular connecting elements for wire stands

5/16 . Platform type show stands with flat, inclined, or curved upper surface

7/00 **Show stands, hangers, or shelves, adapted for particular articles or materials**

7/02 . for jewellery, dentures, watches, eye-glasses, lenses, or the like

7/024 . . with provisions for preventing unauthorised removal

7/03 . . of box shape; Adaptations of boxes to display purposes

7/04 . for tyres; for wheels

7/06 . for hats

7/08 . for shoes

7/10 . for hosiery

7/12 . for ties (household necktie holders A47G 25/74); for collars

7/14 . for pictures, e.g. in combination with books or seed-bags

7/16 . for carpets; for wallpaper; for textile materials

7/17 . . in rolls or rolled tapes

7/18 . . for clothing materials (A47F 7/17 takes precedence) **[3]**

7/19 . for garments (for hosiery A47F 7/10; for ties or collars A47F 7/12; dummies, busts, or the like A47F 8/00; wardrobes with garment-holders A47B 61/00; household implements used in connection with wearing apparel or dress holders A47G 25/00)

7/22 . . for shirts

7/24 . . Clothes racks

7/26 . . . extensible from a showcase

7/28 . for containers, e.g. flasks, bottles

7/30 . for furniture, e.g. beds, mattresses

8/00 **Dummies, busts, or the like, e.g. for displaying garments** (tailors' dummies A41H 5/00)

8/02 . Wire figures; Contour figures for displaying garments

9/00 **Shop, bar, bank or like counters** (showcases or show cabinets A47F 3/00; safety transaction partitions, e.g. movable pay plates, E05G 7/00)

9/02 . Paying counters

9/04 . . Check-out counters, e.g. for self-service stores **[3]**

10/00 **Furniture or installations specially adapted to particular types of service systems, not otherwise provided for** (conveyer aspects B65G; building aspects E04H; coin-freed apparatus G07F) **[3]**

10/02 . for self-service type systems, e.g. supermarkets (A47F 10/06 takes precedence; hand-carts B62B; baskets B65D) **[3]**

10/04 . . for storing or handling self-service hand-carts or baskets **[3]**

10/06 . for restaurant service systems (table equipment A47G) **[3]**

11/00 **Arrangements in shop windows or showcases**

11/02 . Removable walls; Pillars; Special curtains or the like

11/04 . Special arrangements of mirrors or the like

11/06 . Means for bringing about special optical effects

11/08 . . Non-reflecting shop-windows

11/10 . . Arrangements of light sources

13/00 **Shop or like accessories** (devices for drawing-off and cutting paper from a roll B65H; movably-mounted ladders E06C 9/06)

13/04 . Twine holders or cutters

13/06 . Reaching devices (having gripping means B25J)

13/08 . Hand implements, e.g. grocers' scoops, ladles, paper-bag holders

A47G HOUSEHOLD OR TABLE EQUIPMENT (book-ends A47B 65/00; knives B26B)

Note

This subclass covers equipment for similar use in hotels, dressing rooms, vehicles, or the like, not otherwise provided for.

Subclass index

1/00 Mirrors (hand, pocket, or shaving mirrors A45D 42/00; as optical elements G02B 5/08); **Picture frames or the like**

1/02 . Mirrors used as equipment
1/04 . . Multi-part mirrors
1/06 . Picture frames (making from paper B31D)
1/08 . . adjustable
1/10 . . Corner clips or corner-connecting appliances for frames
1/12 . Frames or housings for storing medals, badges, or the like
1/14 . Photograph stands
1/16 . Devices for hanging or supporting pictures, mirrors, or the like
1/17 . . using adhesives, suction or magnetism
1/18 . . Picture loops or the like
1/20 . . Picture hooks; X-hooks (plugs or hooks for general use F16B 13/00, F16B 45/00)
1/21 . . . with clamping action (in general F16B 2/00)
1/22 . . Pin plates
1/24 . . Appliances for adjusting pictures, mirrors, or the like, into a desired position, especially inclined

3/00 Removable ornamental heads for nails, screws, or the like (specially shaped, non-removable heads for nails F16B 15/02, for screws F16B 23/00)

5/00 Screens (shower screens A47K 3/30; shutters closing an opening E06B 9/02; fly-screens E06B 9/52); **Draught-deflectors**

5/02 . Roll-up screens
5/04 . Fire screens

7/00 Flower holders or the like (flower holders worn on garments A45F 5/08)

7/02 . Devices for supporting flower-pots or cut flowers (flower-pots, holders for flower-pots in greenhouses A01G)
7/03 . . Needle cushions or needle plates for supporting flowers in pots or vases
7/04 . . Flower tables; Stands or hangers, e.g. baskets, for flowers (stands for use during growing of flowers A01G)
7/06 . . Flower vases
7/07 . . . Guiding means for flowers in vases, e.g. perforated covers
7/08 . . Covers for flower-pots

9/00 Bed-covers; **Counterpanes**; **Travelling rugs**; **Sleeping rugs**; **Sleeping bags**; **Pillows** (pillows specially adapted for preventing snoring A61F 5/56)

9/02 . Bed linen; Blankets; Counterpanes (sheets specially adapted for use as or with stretchers for patients or invalids A61G 1/01) **[5]**
9/04 . . with fastening strips (haberdashery in general A44B)
9/06 . Travelling rugs; Sleeping rugs
9/08 . Sleeping bags
9/10 . Pillows (pillow holders A47C 21/00) **[7]**

11/00 Table linen

Table devices or equipment

19/00 Table service

19/02 . Plates, dishes or the like
19/03 . . for using only once, e.g. made of paper
19/04 . . Plates with detachable waste receptacles
19/06 . . Plates with integral holders for spoons, glasses, or the like
19/08 . . Plate-holders (holders for kitchen pots A47J 45/10)
19/10 . . . Devices for securing plates to the table
19/12 . Vessels or pots for table use
19/14 . . Coffee or tea pots (filters, strainers A47J 31/06)
19/16 . . Tea infusers, e.g. infusing bags, egg-shaped infusers (for using only once, e.g. made of paper, B65D, e.g. disposable containers or packages B65D 85/804)
19/18 . . Containers for delivering jam, mustard, or the like (soap deliverers A47K 5/06)
19/20 . Tea or coffee pot cosies
19/22 . Drinking vessels or saucers used for table service (glass or drinking-vessel underlays A47G 23/03)
19/23 . . of stackable type
19/24 . Shakers for salt, pepper, sugar, or the like
19/26 . Butter or cheese dishes or covers, with or without cooling or heating devices; Protective covers for food containers
19/28 . Egg-cups; Openers for boiled eggs (egg-openers as domestic appliances A47J 43/14)
19/30 . Other containers or devices used as table equipment
19/32 . . Food containers with dispensing devices for bread, rolls, sugar, or the like; Food containers with movable covers (used as shop fittings A47F)
19/34 . . . dispensing a certain quantity of powdered or granulated foodstuffs, e.g. sugar **[2]**

21/00 **Table-ware** (crumb trays A47L 13/52; table knives B26B)
21/02 . Forks; Forks with ejectors; Combined forks and spoons; Salad servers
21/04 . Spoons; Pastry servers
21/06 . Combined or separable sets of table-service utensils; Oyster knives with openers; Fish servers with means for removing bones (kitchen equipment A47J)
21/08 . Serving devices for one-handed persons
21/10 . Sugar tongs; Asparagus tongs; Other food tongs
21/12 . Toothpick holders
21/14 . Knife racks or stands; Holders for table utensils attachable to plates
21/16 . Table-cloth or napkin holders
21/18 . Drinking straws or the like (for therapeutic purposes A61J 15/00)

23/00 **Other table equipment**
23/02 . Glass or bottle holders
23/03 . Underlays for glasses or drinking-vessels **[2]**
23/032 . . made of paper, board, or the like, e.g. beermats
23/04 . Containers with means for keeping food cool or hot (for butter or cheese A47G 19/26)
23/06 . Serving trays (service tables A47B 31/00)
23/08 . Food-conveying devices for tables; Movable or rotary food-serving devices
23/10 . Devices for counting or marking the number of consumptions (on beverage-dispensing apparatus B65D, B67D; counting in general G06M)
23/12 . . Consumption counters combined with table-ware
23/14 . . . combined with underlays, e.g. for glasses
23/16 . . . combined with drinking vessels or with lids therefor

Dwelling equipment

25/00 **Household implements used in connection with wearing apparel**; **Dress, hat or umbrella holders** (wardrobes A47B 61/00) **[4]**
25/02 . Dress holders; Dress suspending devices; Clothes-hanger assemblies; Clothing lifters (clothing or suit hangers A47G 25/14; clothing holders with locking devices E05B 69/00) **[4]**
25/06 . . Clothes hooks; Clothes racks; Garment-supporting stands with swingable or extending arms (with lockable hooks E05B 69/02)
25/08 . . Portable pocket clothes-holders attachable to trees, walls, tables, or the like
25/10 . Hat holders; Hat racks
25/12 . Cane or umbrella stands or holders
25/14 . Clothing hangers, e.g. suit hangers (A47G 25/60 takes precedence; wardrobes with extensible garment holders A47B 61/02) **[4]**
25/16 . . for complete outfits (A47G 25/40, A47G 25/44 take precedence) **[4]**
25/18 . . for two or more similar garments, e.g. constructed to connect to, or support, a similar hanger **[4]**
25/20 . . with devices for preserving the shape of the clothes **[4]**
25/22 . . specially adapted for furs **[4]**
25/24 . . made of wire (A47G 25/42, A47G 25/46, A47G 25/52, A47G 25/64, A47G 25/70 take precedence) **[4]**
25/26 . . . specially adapted to prevent slipping-off of the clothes. e.g. with non-slip surfaces (A47G 25/30 takes precedence) **[4]**
25/28 . . Hangers characterised by their shape **[4]**
25/30 . . . to prevent slipping-off of the clothes **[4]**
25/32 . . . involving details of the hook (A47G 25/34, A47G 25/38 take precedence) **[4]**
25/34 . . . with hook and hanger made in one piece (A47G 25/36 takes precedence) **[4]**
25/36 . . . characterised by the selection of the material, e.g. paper, board, plastics, glass **[4]**
25/38 . . . . Hook mountings therefor **[4]**
25/40 . . Collapsible hangers **[4]**
25/42 . . . made of wire **[4]**
25/44 . . Slidable hangers **[4]**
25/46 . . . made of wire **[4]**
25/48 . . Hangers with clamps or the like, e.g. for trousers or skirts **[4]**
25/50 . . . Hooks on hangers for supporting trousers or skirts **[4]**
25/52 . . . made of wire **[4]**
25/54 . Dust- or moth-proof garment bags, e.g. with suit hangers **[4]**
25/56 . . Devices for inserting clothes **[4]**
25/58 . . Moth-proof bags with provisions for pesticides or pest repellants **[4]**
25/60 . Hangers having provision for perfumes or for pesticides or pest repellants, e.g. for storing in moth-proof bags **[4]**
25/62 . Trouser or skirt stretchers or tensioners of the hanger type (with application of heat or steam D06F) **[4]**
25/64 . . made of wire **[4]**
25/66 . Trouser-stretchers with creasing or expanding devices (with application of heat or steam D06F) **[4]**
25/68 . . stretching in longitudinal direction **[4]**
25/70 . . made of wire **[4]**
25/72 . Garment-pressing devices (hot pressing apparatus or machines D06F) **[4]**
25/74 . Necktie holders **[4]**
25/76 . Necktie-stretching devices (with application of heat or steam D06F) **[4]**
25/78 . Necktie-pressing devices, e.g. combined with holding devices (hot-pressing apparatus D06F) **[4]**
25/80 . Devices for putting-on or removing boots or shoes, e.g. boot-hooks, boot-jacks (shoe buttoners A47G 25/92) **[4]**
25/82 . . Shoe horns **[4]**
25/84 . . Shoe benches **[4]**
25/86 . . . with boot-pulling devices **[4]**
25/88 . . Devices for tucking ends of laces inside shoes or boots **[4]**
25/90 . Devices for domestic use for assisting in putting-on or pulling-off clothing, e.g. stockings or trousers **[4]**
25/92 . . Shoe or collar buttoners; Bodkins; Glove hooks **[4]**

27/00 **Floor fabrics**; **Fastenings therefor** (woven fabrics D03D; non-woven fabrics D04H)
27/02 . Carpets; Stair runners; Bedside rugs; Foot mats (mat-like foot scrapers A47L 23/22)
27/04 . Carpet fasteners; Carpet-expanding devices
27/06 . Stair rods; Stair-rod fasteners (curtain rods A47H 1/02)

29/00 **Supports, holders, or containers for household use, not provided for in groups A47G 1/00 to A47G 27/00 or A47G 33/00** (for fastening kitchen utensils A47J 45/00; for drying towels A47K 10/04; stands, racks, or the like for airing beds, garments, or the like, clothes, drying devices D06F 57/00)

29/02 . Wall boards (shelves A47B); Supporting brackets or clamps therefor

29/06 . Paper baskets (refuse receptacles B65F 1/00)

29/08 . Holders for articles of personal use in general, e.g. brushes

29/087 . Devices for fastening household utensils, or the like, to tables, walls, or the like **[4]**

29/093 . Devices for securing receptacles to tables, or the like **[4]**

29/10 . Key holders; Key boards (key cases A45C 11/32)

29/12 . Mail or newspaper receptacles, e.g. letter-boxes; Openings in doors or the like for delivering mail or newspapers (A47G 29/14 takes precedence; chutes for mail in buildings B65G 11/04) **[1,8]**

29/122 . . Parts, details, or accessories, e.g. signalling devices, lamps, devices for leaving messages

29/124 . . . Appliances to prevent unauthorised removal of contents

29/126 . . . Lids for access slits

29/14 . Deposit receptacles for food, e.g. breakfast, milk; Similar receptacles for large parcels with appliances for preventing unauthorised removal of the deposited articles **[1,8]**

29/16 . . Combinations with letter-boxes

29/18 . . Clamping devices for holding bottles near doors or windows (preventing unauthorised removal A47G 29/24)

29/20 . . with appliances for preventing unauthorised removal of the deposited articles

29/22 . . . having rotatable or reciprocable parts

29/24 . . . Clamping devices for holding bottles near doors or windows

29/26 . . . . freeing the bottle only on opening door or window

29/28 . . . having a receptacle inside the house and a delivery pipe or the like passing through a door, wall, or the like, e.g. for delivering milk

29/30 . . Accessories, e.g. signalling devices, lamps, means for leaving messages

33/00 **Religious or ritual equipment in dwelling or for general use**

33/02 . Altars; Religious shrines; Fonts for holy water; Crucifixes

33/04 . Christmas trees (lighting devices therefor F21S; candle holders F21V 35/00) **[1,7]**

33/06 . . Artificial Christmas trees

33/08 . . Christmas tree decorations

33/10 . . Fastening devices or clamps for Christmas tree decorations

33/12 . . Christmas tree stands

35/00 **Other dwelling equipment**

A47H **FURNISHINGS FOR WINDOWS OR DOORS** (concerned with the functioning of the door or window E05; roller blinds E06B; special arrangements or measures in connection with doors or windows, e.g. for ventilation or sealing, E06B 7/00)

Subclass index

Curtains; **Draperies**

1/00 **Curtain suspension devices**

1/02 . Curtain rods

1/022 . . extensible

1/03 . . pivotably mounted for rotation with doors or windows

1/04 . Curtain rails

1/06 . . fixed

1/08 . . extensible

1/10 . Means for mounting curtain rods or rails

1/102 . . for mounting curtain rods (A47H 1/12, A47H 1/14 take precedence)

1/104 . . for mounting curtain rails (A47H 1/12, A47H 1/14 take precedence)

1/12 . . Adjustable mountings

1/122 . . . for curtain rods

1/124 . . . for curtain rails

1/13 . . Brackets or adjustable mountings for both roller blinds and drawable curtains

1/14 . . Brackets for supporting rods or rails

1/142 . . . for supporting rods

1/144 . . . for supporting rails

1/16 . . Holders made of wire for curtain rods

1/18 . Other curtain suspension devices, e.g. wire, cord

1/19 . . Devices for mounting the wire, cord, or the like

2/00 **Pelmets or the like**

2/02 . extensible

3/00 **Fastening, clamping, or guiding devices for the bands or cords of curtains or the like**

3/02 . Fastening, clamping, or guiding devices for bands or cords

3/04 . . Automatic cord clamps

3/06 . . Non-automatic cord clamps

3/08 . . Cord-tensioning devices for curtains with two cords

3/10 . . Cord guides

3/12 . . Belt strap holders; Belt strap rollers; Belt strap tensioning devices

5/00 **Devices for drawing draperies, curtains, or the like**

5/02 . Devices for opening and closing curtains

5/03 . . Devices with guiding means and push or draw rods

5/032 . . Devices with guiding means and draw cords (cord pulleys A47H 11/06)
5/04 . . Devices with lazy-tongs
5/06 . . Devices with screw-threads on rods or spindles
5/08 . Devices for drawing draperies attached to the doors or windows
5/09 . . Devices for swinging the curtains away from doors or windows
5/14 . Apparatus for lowering curtains or the like

7/00 Devices for putting-up and removing curtain rods
7/02 . Curtain rods, capable of being lowered

11/00 Curtain cord appurtenances
11/02 . Engaging-pieces on curtain cords for operating curtains
11/04 . End attachment clips, e.g. for tassels
11/06 . Cord pulleys

13/00 Fastening curtains on curtain rods or rails
13/01 . by clamps; by clamps attached to hooks or rings
13/02 . by rings, e.g. with additional runners (A47H 13/12 takes precedence)
13/04 . by hooks, e.g. with additional runners (A47H 13/12 takes precedence; by hooks specially adapted to pleat belts A47H 13/16)
13/06 . by pins, e.g. with additional runners (A47H 13/12 takes precedence)
13/10 . by rail rollers
13/12 . by rail gliders
13/14 . Means for forming pleats
13/16 . . Pleat belts; Hooks specially adapted for pleat belts

15/00 Runners or gliders for supporting curtains on rails or rods
15/02 . Runners
15/04 . Gliders

19/00 Rosettes for holding curtains; **Festoon holders**

21/00 Curtain shields

23/00 Curtains; **Draperies** (shower curtain arrangements A47K 3/38)
23/01 . Bottom bars for stretching hanging curtains; Magnets, slide fasteners, or the like to improve closing of curtains
23/02 . Shapes of curtains; Selection of particular materials for curtains **[2]**
23/04 . . Shapes of curtains
23/05 . . . of chain or chain mail; of free-hanging strips or lamellae
23/06 . . . Systems consisting of two or more co-operating curtains with transparent or perforated parts behind each other
23/08 . . Selection of particular materials
23/10 . . . the material being plastics or the like
23/12 . . . the material being paper or cardboard
23/14 . . . the material being woven textile with reinforcing bars, e.g. made of wood

27/00 Boxes, shelves, holders or similar supports for holding flowers (windows adapted to carry plants E06B 7/28)

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

A47J KITCHEN EQUIPMENT; **COFFEE MILLS**; **SPICE MILLS**; **APPARATUS FOR MAKING BEVERAGES** (disintegrating, e.g. mincing, B02C; severing, e.g. cutting, slicing, B26B, B26D) **[6]**

Subclass index

9/00 Apparatus or utensils for shaping butter or the like (for use in dairies A01J 19/00, A01J 21/00; moulding plastic material in general B29C)

17/00 Household peeling, stringing, or paring implements or machines (for foodstuffs in bulk A23N)
17/02 . Hand devices for scraping or peeling vegetables or the like
17/04 . . Citrus fruit peelers
17/06 . Devices for stringing beans
17/08 . Asparagus-peelers
17/10 . Vegetable or fruit grippers or holders for use while peeling
17/14 . Machines for peeling (universal kitchen machines A47J 43/04)
17/16 . . Peeling machines with rotary fruit-holding spindles and fixed or movable peeler blades
17/18 . . with scraping discs or rotors
17/20 . . with brushes

19/00 **Household machines for straining foodstuffs**; **Household implements for mashing or straining foodstuffs** (for foodstuffs in bulk A23N)

19/02 . Citrus fruit squeezers; Other fruit juice extracting devices

19/04 . Household implements for mashing potatoes or other foodstuffs

19/06 . Juice presses for vegetables

21/00 **Devices for removing stalks from fruit** (machines A23N 15/02)

23/00 **Devices for stoning fruit** (machines for stoning fruit in bulk A23N 3/00, A23N 4/00)

25/00 **Devices for coring fruit** (machines for coring fruit in bulk A23N 3/00, A23N 4/12)

Cooking; **Apparatus for making beverages**

27/00 **Cooking-vessels** (A47J 29/00 to A47J 33/00 take precedence) **[2]**

27/02 . with enlarged heating surfaces

27/022 . . with enlarged bottom

27/024 . . with liquid-heating tubes extending outside the vessel

27/026 . . with conduits through the vessel for circulating heating gases

27/04 . for cooking food in steam; Devices for extracting fruit juice by means of steam

27/05 . . Tier steam-cookers, i.e. with steam-tight joints between cooking-vessels stacked while in use (tier cooking-vessels in general A47J 27/13)

27/06 . Steam-heated kettles for domestic use

27/08 . Pressure cookers; Lids or locking devices specially adapted therefor

27/082 . . with inserts for cooking different foods separately at the same time; Inserts therefor (inserts for cooking-vessels in general A47J 36/16)

27/084 . . with adjustable volume; Tier pressure-cookers

27/086 . . with built-in heating means (adaptations of automatic switches for the heating means A47J 27/62)

27/088 . . adapted to high-frequency heating

27/09 . . Safety devices

27/092 . . . Devices for automatically releasing pressure before opening

27/10 . Cooking-vessels with water-bath arrangements for domestic use

27/12 . Multiple-unit cooking-vessels

27/122 . . with adaptation of shape to that of adjacent vessels for forming a unit, e.g. sector-shaped

27/13 . . Tier cooking-vessels

27/14 . Cooking-vessels for use in hotels, restaurants, or canteens

27/16 . . heated by steam

27/17 . . . with steam jacket

27/18 . . heated by water-bath

27/20 . Ham-boilers

27/21 . Water-boiling vessels, e.g. kettles

27/212 . . with signalling means, e.g. whistling kettles (signalling milk-boiling vessels A47J 27/57)

27/56 . Preventing boiling over, e.g. of milk (appliances for preventing or destroying foam in dairy apparatus for treating milk A01J 11/02; preventing foaming in boiling in general B01B 1/02)

27/57 . . Milk-boiling vessels with water or steam jackets, e.g. with signalling means

27/58 . . Cooking utensils with channels or covers collecting overflowing liquid

27/60 . . Funnel-like inserts; Grooved plates to be placed on the bottom of cooking utensils

27/62 . . by devices for automatically controlling the heat supply by switching off heaters or for automatically lifting the cooking-vessels

27/64 . . . for automatically lifting the cooking-vessels (devices for automatically lifting eggs from boiling water A47J 29/04)

29/00 **Egg-cookers**

29/02 . for eggs or poached eggs; Time-controlled cookers

29/04 . . Cookers for eggs with devices for automatically lifting the eggs from the boiling water

29/06 . Grasping devices for eggs; Supporting devices for eggs during boiling

31/00 **Apparatus for making beverages** (household machines or implements for straining foodstuffs A47J 19/00; preparation of non-alcoholic beverages, e.g. by adding ingredients to fruit or vegetable juices, A23L 2/00; coffee or tea pots A47G 19/14; tea infusers A47G 19/16; dispensing beverages on draught B67D 1/00; brewing of beer C12C; preparation of wine or other alcoholic beverages C12G) **[5]**

31/02 . Coffee-making machines with removable extraction cups, to be placed on top of drinking-vessels, e.g. cafe filtre (filters A47J 31/06)

31/04 . Coffee-making apparatus with rising pipes

31/043 . . Vacuum-type coffee-making apparatus with rising pipes in which hot water is passed to the upper bowl in which the ground coffee is placed and subsequently the heat source is cut-off and the water is sucked through the filter by the vacuum in the lower bowl

31/047 . . . with automatic cut-off of heat supply

31/053 . . with repeated circulation of the extract through the filter

31/057 . . with water container separated from beverage container, the hot water passing the filter only once

31/06 . Filters or strainers for coffee or tea makers

31/08 . . Paper filter inlays therefor

31/10 . Coffee-making apparatus, in which the brewing vessel is placed above or in the upper part of the beverage containers; Drip coffee-makers (A47J 31/02 takes precedence)

31/12 . . in which the vapour from the boiling water is raised above the filter and after condensing passes through the filter

31/14 . Coffee- or tea-making apparatus with filters placed in or behind pouring spouts

31/16 . Inverting coffee-making apparatus in which water is boiled in the lower part and the apparatus is subsequently inverted to pass the water through the filter

31/18 . Apparatus in which ground coffee or tea-leaves are immersed in the hot liquid in the beverage container (infusing bags A47G 19/16)

31/20 . . having immersible, e.g. rotatable, filters

31/22 . Centrifuges for producing filtered coffee (A47J 31/20 takes precedence)

31/24 . Coffee-making apparatus in which hot water is passed through the filter under pressure (A47J 31/043 takes precedence)

31/30 . . with hot water under steam pressure

31/32 . . with hot water under air pressure

31/34 . . with hot water under liquid pressure
31/36 . . . with mechanical pressure-producing means
31/38 . . . . operated by hand
31/40 . Beverage-making apparatus with dispensing means for adding a measured quantity of ingredients, e.g. coffee, water, sugar, cocoa, milk, tea
31/41 . . of liquid ingredients **[5]**
31/42 . Beverage-making apparatus with incorporated grinding or roasting means for coffee
31/44 . Parts or details of beverage-making apparatus (filters or strainers A47J 31/06)
31/46 . . Dispensing spouts, pumps, drain valves or like liquid transporting devices
31/48 . . Clips, rings, hooks, or like devices to support filter parts while not in use
31/50 . . Urns with devices for keeping beverages hot or cool
31/52 . . Alarm-clock-controlled mechanisms for coffee- or tea-making apparatus
31/54 . . Water boiling vessels
31/56 . . . having water-level controls; having temperature controls
31/58 . . Safety devices
31/60 . . Cleaning devices

33/00 **Camp cooking devices without integral heating means** (travelling cookers with one burner A47J 36/26; other travelling cookers heated by petroleum, gasoline, spirit, or the like F24C)

36/00 **Parts, details or accessories of cooking-vessels** (A47J 27/00 to A47J 33/00 take precedence insofar as these parts, details or accessories are restricted to a particular kind of cooking-vessel provided for in a single one of those groups; heating devices for cooking-vessels in general F24) **[2]**
36/02 . Selection of specific materials, e.g. heavy bottoms with copper inlay or with insulating inlay
36/04 . . the materials being non-metallic
36/06 . Lids or covers for cooking-vessels (specially adapted for pressure cookers A47J 27/08)
36/08 . . for draining liquids from vessels
36/10 . . Lid-locking devices
36/12 . . Devices for holding lids in open position on the container
36/14 . Pouring-spouts, e.g. as parts separate from vessel (spouts in general B05B 1/22)
36/16 . Inserts
36/18 . . Boilers or utensils with sieves inserted therein, e.g. potato-cookers
36/20 . . Perforated bases or perforated containers to be placed inside a cooking utensil
36/22 . . . Wire inserts (for deep fat fryers A47J 37/12)
36/24 . Warming devices
36/26 . . Devices for warming vessels containing drinks or food, especially by means of burners; Travelling cookers, e.g. using petroleum or gasoline with one burner
36/28 . . Warming devices generating the heat by exothermic reactions, e.g. heat released by the contact of unslaked lime with water
36/30 . . Devices for warming by making use of burning cartridges or other chemical substances
36/32 . Time-controlled igniting mechanisms or alarm devices
36/34 . Supports for cooking-vessels
36/36 . Shields or jackets for cooking utensils minimising the radiation of heat, fastened or movably mounted
36/38 . for withdrawing or condensing cooking vapours from cooking utensils (removing cooking fumes from domestic stoves or ranges F24C 15/20) **[5]**
36/40 . Leak-stopping devices for repairing cooking-vessels
36/42 . Devices to prevent deposition of scale, i.e. fur, or the like

37/00 **Baking**; **Roasting**; **Grilling**; **Frying** (bakers' ovens, non-domestic baking apparatus or equipment A21B; domestic stoves or ranges F24B, F24C)
37/01 . Vessels uniquely adapted for baking (for use in bakers' ovens A21B)
37/04 . Roasting apparatus with movably-mounted food supports or with movable heating implements; Spits
37/06 . Roasters; Grills, Sandwich grills
37/07 . . Roasting devices for outdoor use; Barbecues
37/08 . . Bread-toasters (electric heating elements H05B)
37/10 . Frying-pans, including lids or basting devices
37/12 . Deep fat fryers, including apparatus specially adapted for frying fish

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39/00 **Heat-insulated warming chambers**; **Cupboards with heating arrangements for warming kitchen utensils**
39/02 . Dish-warmers; Devices to keep food hot

41/00 **Thermally-insulated vessels, e.g. flasks, jugs, jars** (containers with thermal insulation in general B65D 81/38)
41/02 . Vacuum-jacket vessels, e.g. vacuum bottles

42/00 **Coffee mills**; **Spice mills** (as part of universal or multi-purpose machines A47J 43/04, A47J 44/00; grinding or pulverising in general B02C)
42/02 . having grinding cones
42/04 . . hand driven
42/06 . . mechanically driven
42/08 . . Adjusting mechanisms
42/10 . . Grinding cones
42/12 . having grinding discs
42/14 . . hand driven
42/16 . . mechanically driven
42/18 . . Adjusting mechanisms
42/20 . . Grinding discs
42/22 . having pulverising beaters or rotary knives
42/24 . . hand driven
42/26 . . mechanically driven
42/28 . . Beaters or knives
42/30 . . having perforated container for the ground material; having sieves
42/32 . with other grinding or pulverising members
42/34 . . hand driven
42/36 . . mechanically driven
42/38 . Parts or details
42/40 . . relating to discharge, receiving container or the like; Bag clamps, e.g. with means for actuating electric switches
42/42 . . . Drawers for receiving ground material
42/44 . . Automatic starting or stopping devices (bag clamps with means for actuating switches A47J 42/40); Warning devices
42/46 . . Driving mechanisms; Coupling to drives
42/48 . . Attachment of mills to tables, walls, or the like (attachment of household machines in general to tables, walls, or the like A47J 45/02)

42/50 . . Supplying devices, e.g. funnels; Supply containers
42/52 . . Coffee mills combined with roasting devices (coffee-roasting devices per se A23N 12/00)
42/54 . . Cooling
42/56 . . Safety devices

43/00 Implements for preparing or holding food, not provided for in other groups of this subclass

43/04 . Machines for domestic use not covered elsewhere, e.g. for grinding, mixing, stirring, kneading, emulsifying, whipping or beating foodstuffs, e.g. power-driven (food straining implements A47J 19/00; devices for grating A47J 43/25; multi-purpose machines A47J 44/00)
43/042 . . Mechanically-driven liquid-shakers
43/044 . . with tools driven from the top side
43/046 . . with tools driven from the bottom side
43/06 . . with a plurality of interchangeable working units
43/07 . . Parts or details, e.g. mixing tools, whipping tools
43/08 . . . Driving mechanisms
43/09 . . . . with fluid drive, e.g. by jets
43/10 . Egg-whisks; Cream-beaters, i.e. hand implements
43/12 . Whipping by introducing a stream of gas
43/14 . Devices for opening raw eggs or separating the contents thereof
43/16 . Implements for introducing fat, bacon or the like into meat; Larding-pins
43/18 . Holding or clamping devices for supporting fowl, venison, or other meat, or vegetables, during cooking or during subsequent cutting
43/20 . Shapes for preparing foodstuffs, e.g. meat-patty moulding devices
43/22 . Kitchen sifters
43/24 . Devices for washing vegetables or the like
43/25 . Devices for grating **[2]**
43/26 . Nutcrackers (pliers B25B 7/00)
43/27 . for mixing drinks; Hand-held shakers (mechanically driven A47J 43/042)
43/28 . Other culinary hand implements, e.g. spatulas, pincers, forks or like food holders, ladles, skimming ladles, cooking spoons; Spoon-holders attached to cooking pots (calibrated capacity measures for fluids or fluent solid material G01F 19/00; weighing spoons G01G 19/56)

44/00 Multi-purpose machines for preparing food

44/02 . with provisions for drive either from top or from bottom, e.g. for separately-driven bowl

45/00 Devices for fastening or gripping kitchen utensils (kitchen cabinets with provisions for attachment of kitchen implements or utensils A47B 77/00) **[4]**

45/02 . for fastening kitchen utensils to tables, walls, or the like (for household utensils A47G 29/087) **[4]**
45/06 . Handles for hollow-ware articles
45/07 . . of detachable type (separate handles A47J 45/10)
45/08 . . Heat-insulating handles (of detachable type A47J 45/07)
45/10 . Devices for gripping or lifting hot cooking utensils, e.g. pincers, separate pot handles, fabric or like pads (egg grasping devices A47J 29/06)

47/00 Kitchen containers, stands or the like, not provided for in other groups of this subclass (containers in general B65D); **Cutting-boards, e.g. for bread** (with slicing devices B26D)

47/01 . with dispensing devices
47/02 . Closed containers for foodstuffs
47/04 . . for granulated foodstuffs
47/06 . . . with arrangements for keeping fresh
47/08 . . for non-granulated foodstuffs
47/10 . . . with arrangements for keeping fresh
47/12 . . . Bread boxes
47/14 . Carriers for prepared human food (lunch boxes, picnic boxes, or the like A45C 11/20)
47/16 . Stands, or holders for kitchen articles (racks A47B)
47/18 . Pails for kitchen use
47/19 . . Edge protectors; Floor protectors
47/20 . Grids, racks, or other supports removably mounted in, on, or over sinks; Splash guards for sinks

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A47K SANITARY EQUIPMENT NOT OTHERWISE PROVIDED FOR (connecting to water supply or waste pipe, sinks E03C; water-closets E03D); **TOILET ACCESSORIES** (cosmetic equipment A45D)

Subclass index

1/00 Wash-stands; **Appurtenances therefor** (devices for washing the hair or scalp A45D 19/00; basins used in manual washing or cleaning of crockery, table-ware, cooking-ware, or the like A47L 17/02; with appurtenances for curative purposes A61H)

1/02 . Portable toilet tables; Wash cabinets or stands (for automobiles B60R; for railway cars B61D; for ships B63B; for aircraft B64D; connected to waste pipe E03C)
1/04 . Basins (connected to waste pipe E03C 1/12); Jugs; Holding devices therefor
1/05 . . Holding devices for basins or jugs
1/06 . Replaceable hygienic linings or casings for wash-basins
1/08 . Accessories for toilet tables, e.g. glass plates, supports therefor (towel holders A47K 10/00)
1/09 . . Holders for drinking glasses, tooth brushes, hair brushes, or the like

1/10 . Detachable frames with hand basins mountable on baths
1/12 . Wash-basins attachable to sinks; Collapsible washing stands attachable to sinks (supports attachable to sinks in general A47J 47/20)
1/14 . Stoppers for wash-basins, baths, sinks, or the like

3/00 **Baths**; **Showers**; **Appurtenances therefor** (for curative purposes A61H, A61M, e.g. bathing devices for special therapeutic or hygienic purposes A61H 33/00)
3/02 . Baths (combined with showers A47K 3/20; heatable F24H) **[1,7]**
3/022 . . specially adapted for particular use, e.g. for washing the feet, for bathing in sitting position (collapsible baths A47K 3/062)
3/024 . . . specially adapted for use for children or babies
3/03 . . attachable to other baths, sinks, wash-basins, or the like (collapsible baths A47K 3/07)
3/034 . . . specially adapted for use for children or babies
3/04 . . Built-in baths
3/06 . . Collapsible baths
3/062 . . . specially adapted for particular use, e.g. for washing the feet, for bathing in sitting position
3/064 . . . . specially adapted for use for children or babies
3/07 . . . attachable to other basins, or the like
3/074 . . . . specially adapted for use for children or babies
3/08 . . Cabinet baths (shower cabinets A47K 3/30)
3/10 . Wave-producers or the like
3/12 . Separate seats or body supports (seats for chairs A47C 7/02)
3/14 . Replaceable separating walls for baths (sinks with separating walls E03C 1/18)
3/16 . Devices for fastening baths to floors or walls; Adjustable bath feet
3/162 . . Collapsible stands or supports for baths
3/164 . . . for child or baby baths
3/17 . . Adjustable bath feet
3/18 . combined with hand basins
3/20 . Baths combined with showers
3/26 . Bidets without upward spraying means (bidets with upward spraying means A61H 35/00, E03D 9/08) **[7]**
3/28 . Showers (combined with baths A47K 3/20; nozzles, spray heads B05B 1/00) **[7]**
3/30 . . Screens or cabinets **[7]**
3/32 . . . Collapsible cabinets **[7]**
3/34 . . . Slidable screens (A47K 3/36 takes precedence) **[7]**
3/36 . . . Articulated screens **[7]**
3/38 . . Curtain arrangements (curtains, curtain suspension devices A47H) **[7]**
3/40 . . Pans or trays **[7]**

4/00 **Combinations of baths, showers, sinks, wash-basins, closets, or urinals, not covered by a single other group of this subclass**

5/00 **Holders or dispensers for soap, toothpaste, or the like** (lather making devices for shaving A45D 27/02; specially adapted for shaving soap or cosmetics A45D 33/00 to A45D 40/00)
5/02 . Soap boxes or receptacles
5/03 . . separate from wall or wash-stand
5/04 . Other soap-cake holders
5/05 . . having fixing devices for cakes of soap, e.g. clamps, pins, magnets
5/06 . Dispensers for soap
5/08 . . for solid soap
5/09 . . . with means for scraping or grating
5/10 . . for powdered soap
5/12 . . for liquid or pasty soap
5/122 . . . using squeeze bottles or the like
5/13 . . . of invertible type
5/14 . Foam or lather making devices
5/16 . . with mechanical drive (food mixers A47J 43/04)
5/18 . for both soap and toothpaste or the like; in combination with holders for drinking glasses, toothbrushes, or the like

7/00 **Body washing or cleaning implements** (bathing devices for special therapeutic or hygienic purposes A61H 33/00; baths for specific parts of the body A61H 35/00)
7/02 . Bathing sponges, brushes, gloves, or similar cleaning or rubbing implements (brushes in general A46B; sponges for domestic cleaning A47L 13/16; specially for massage A61H 7/00)
7/03 . . containing soap or other cleaning ingredients, e.g. impregnated
7/04 . Washing or cleaning devices, hand or mechanically operated
7/06 . Washing devices for one-armed persons
7/08 . Devices or hand implements for cleaning the buttocks

10/00 **Body-drying implements**; **Toilet paper**; **Holders therefor**
10/02 . Towels (made of paper A47K 10/16; woven fabrics D03D; non-woven fabrics D04H)
10/04 . Towel racks; Towel rails; Towel rods; Towel rolls, e.g. rotatable
10/06 . . combined with means for drying towels (A47K 10/30 takes precedence)
10/08 . . characterised by being mounted on wash-basins, baths, or the like
10/10 . . characterised by being mounted on cabinets, walls, doors, or the like
10/12 . Grips, hooks, or the like for hanging-up towels
10/14 . . Self-holding grips
10/16 . Paper towels; Toilet paper; Holders therefor (dispensers A47K 10/32)
10/18 . . Holders; Receptacles
10/20 . . . for piled sheets
10/22 . . . for rolled-up webs (drawing-off paper from a roll in general B65H)
10/24 . Towel dispensers; Toilet-paper dispensers (sheet or web dispensers in general B65H)
10/26 . . Mechanically-driven towel dispensers (A47K 10/28 takes precedence; for paper towels A47K 10/34)
10/28 . . dispensing a clean part and taking-up a soiled part, e.g. using rolls
10/30 . . . combined with washing and drying means for the soiled parts
10/32 . . Dispensers for paper towels or toilet-paper
10/34 . . . dispensing from a web, e.g. with mechanical dispensing means
10/36 . . . . with cutting devices
10/38 . . . . the web being rolled-up
10/40 . . . . . with extensible or collapsible roll supports
10/42 . . . dispensing from a store of single sheets, e.g. stacked
10/44 . . . . with mechanical dispensing means

10/46 . . . with means for storing soiled towels
10/48 . Drying by means of hot air (hair-drying devices A45D 20/00; curative hot-air baths A61H 33/06; electric heating elements H05B)

11/00 **Closets without flushing** (closets with recirculation of bowl-cleaning fluid E03D 5/016); **Urinals without flushing** (urinals for bed-ridden persons A61G 9/00; for vehicles in general B60R; closets for railway-cars B61D; for ships B63B; for aircraft B64D; urinals with flushing arrangements E03D 13/00); **Chamber pots**; **Chairs with toilet conveniences or specially adapted for use with toilets [5]**
11/02 . Dry closets, e.g. incinerator closets
11/03 . . having means for adding powder, e.g. earth
11/04 . Room closets; Chairs with toilet conveniences or specially adapted for use with toilets, e.g. night chairs **[5]**
11/06 . Chamber-pots (bed pans or other sanitary devices for bed-ridden persons A61G 9/00)
11/08 . Night cabinets or tables with closets or bidet equipment (bedside cabinets per se A47B 79/00)
11/10 . Hand tools for cleaning the toilet bowl
11/12 . Urinals without flushing

13/00 **Seats or covers for all kinds of closets**
13/02 . of plastic materials
13/04 . Buffers for seats
13/06 . Auxiliary or portable seats for children
13/08 . Covers with urine funnels
13/10 . Devices for raising and lowering (thereby controlling flushing valves E03D 5/04)
13/12 . Hinges
13/14 . Protecting covers for closet seats
13/16 . . of single sheets of paper
13/18 . . of paper webs
13/20 . . . with cutting devices
13/22 . . . rolled-up (A47K 13/20 takes precedence)
13/24 . Parts or details not covered in, or of interest apart from, groups A47K 13/02 to A47K 13/22
13/26 . . Mounting devices for seats or covers (hinges A47K 13/12)
13/28 . . Adjustably-mounted seats or covers
13/30 . . Seats having provisions for heating, deodorising or the like

17/00 **Other equipment** (devices for receiving spittle A61J 19/00)
17/02 . Body supports, other than seats, for closets, e.g. handles, back-rests, foot-rests; Accessories for closets, e.g. reading tables

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A47L **DOMESTIC WASHING OR CLEANING** (brushes A46B; cleaning quantities of bottles or of other hollow articles of one kind B08B 9/00; laundry D06F); **SUCTION CLEANERS IN GENERAL** (cleaning in general B08)

Note

Machines or implements which can be used for cleaning windows, window shades, window screens, venetian blinds, as well as floors, carpets, furniture, walls, or wall coverings are classified in group A47L 11/00 or A47L 13/00. **[3]**

Subclass index

Cleaning windows, window shades, window screens, venetian blinds

1/00 **Cleaning windows**
1/02 . Power-driven machines or devices
1/03 . . cleaning both sides of a window simultaneously
1/05 . . Hand apparatus with built-in electric motors **[3]**
1/06 . Hand implements (with built-in electric motors A47L 1/05) **[3]**
1/08 . . with provision for supplying liquids, e.g. cleaning agents (A47L 1/095, A47L 1/13, A47L 1/15 take precedence) **[3]**
1/09 . . for cleaning one side with access from the other side only **[3]**
1/095 . . . with provision for supplying liquids, e.g. cleaning agents **[3]**
1/12 . . for cleaning both sides simultaneously **[3]**
1/13 . . . with provision for supplying liquids, e.g. cleaning agents **[3]**
1/15 . . Cloths, sponges, pads, or the like, e.g. containing cleaning agents **[3]**
1/16 . Devices for defrosting window-panes (H05B 3/84 takes precedence) **[5]**

3/00 **Safety devices for use in window-cleaning** (safety belts A62B 35/00; for scaffolding in general E04G; for ladders E06C)
3/02 . Cages; Platforms
3/04 . Safety ropes

4/00 **Cleaning window shades, window screens, venetian blinds** (A47L 1/15 takes precedence; suction cleaner nozzles A47L 9/02) **[3]**
4/02 . Hand implements for cleaning venetian blinds **[3]**
4/04 . Accessories facilitating cleaning, e.g. venetian blind separators, spreaders, or cleaning racks **[3]**

Suction cleaners [3]

5/00 Structural features of suction cleaners
5/02 . with user-driven air-pumps or compressors
5/04 . . with pistons, bellows, or diaphragms, e.g. driven by the cleaner-supporting wheels
5/05 . . . with driven dust-loosening tools
5/06 . . with rotary fans
5/08 . . . driven by cleaner-supporting wheels
5/10 . . . . with driven dust-loosening tools
5/12 . with power-driven air-pumps or air-compressors, e.g. driven by motor vehicle engine vacuum
5/14 . . cleaning by blowing-off, also combined with suction cleaning
5/16 . . with suction devices other than rotary fans
5/18 . . . with ejectors, e.g. connected to motor vehicle exhaust
5/20 . . . with bellows, diaphragms or pistons
5/22 . . with rotary fans
5/24 . . . Hand-supported suction cleaners
5/26 . . . . with driven dust-loosening tools
5/28 . . . Suction cleaners with handles and nozzles fixed on the casings, e.g. wheeled suction cleaners with steering handle (A47L 5/24 takes precedence)
5/30 . . . . with driven dust-loosening tools, e.g. rotating brushes
5/32 . . . . with means for connecting a hose (hose couplings for suction cleaners A47L 9/24)
5/34 . . . . with height adjustment of nozzles or dust-loosening tools
5/36 . . . Suction cleaners with hose between nozzle and casing; Suction cleaners for fixing on staircases; Suction cleaners for carrying on the back
5/38 . . . Built-in suction cleaner installations, i.e. with fixed tube system to which, at different stations, hoses can be connected

7/00 Suction cleaners adapted for additional purposes (with floor-polishing tools A47L 11/20; suction devices for removing ash F23J 1/02); **Tables with suction openings for cleaning purposes**; **Containers for cleaning articles by suction**; **Suction cleaners adapted to cleaning of brushes**; **Suction cleaners adapted to taking-up liquids**
7/02 . with driven tools for special purposes
7/04 . for using the exhaust air for other purposes, e.g. for distribution of chemicals in a room, for sterilisation of the air (spraying or atomising in general B05)
7/06 . . for supporting the suction cleaner on the exhaust air
7/08 . . with combustion of dust in exhaust air

9/00 Details or accessories of suction cleaners, e.g. mechanical means for controlling the suction or for effecting pulsating action; **Storing devices specially adapted to suction cleaners or parts thereof**; **Carrying-vehicles specially adapted for suction cleaners**
9/02 . Nozzles (suction nozzles for fluid transport B65G 51/00)
9/04 . . with driven brushes or agitators
9/06 . . with fixed, e.g. adjustably fixed brushes or the like
9/08 . . with means adapted for blowing
9/10 . Filters (in general B01D; cyclones B04C); Dust separators; Dust removal; Automatic exchange of filters
9/12 . . Dry filters
9/14 . . Bags or the like; Attachment of, or closures for, bags
9/16 . . Arrangement or disposition of cyclones or other devices with centrifugal action
9/18 . . Liquid filters
9/19 . . Means for monitoring filtering operation **[3]**
9/20 . Means for cleaning filters
9/22 . Mountings for motor fan assemblies
9/24 . Hoses; Hose couplings (hoses or hose joints in general F16L)
9/26 . Incorporation of winding devices for electric cables (devices specially adapted for repeatedly paying-out or re-storing cables B65H 75/34; arrangements of electrical cables or lines between relatively-movable parts H02G 11/00)
9/28 . Installation of the electric equipment, e.g. adaptation or attachment to the suction cleaner; Regulation of suction cleaners by electric means
9/30 . . Arrangement of illuminating devices
9/32 . Handles

Cleaning floors, carpets, furniture, walls, or wall coverings

11/00 Machines for cleaning floors, carpets, furniture, walls, or wall coverings
11/02 . Floor surfacing or polishing machines (polishing machines in general B24B 29/00)
11/03 . . characterised by having provisions for supplying cleaning or polishing agents
11/04 . . hand-driven
11/06 . . . with reciprocating or oscillating tools
11/08 . . . with rotating tools
11/10 . . motor-driven
11/12 . . . with reciprocating or oscillating tools
11/14 . . . with rotating tools
11/16 . . . . the tools being disc brushes
11/162 . . . . . having only a single disc brush
11/164 . . . . . Parts or details of the brushing tools
11/18 . . . . the tools being roll brushes
11/19 . . . . . Parts or details of the brushing tools
11/20 . . combined with vacuum cleaning devices
11/202 . . . having separate drive for the cleaning brushes
11/204 . . . having combined drive for brushes and for vacuum cleaning
11/205 . . . . for reciprocating brushes
11/206 . . . . for rotary disc brushes
11/22 . Floor-sweeping machines, hand-driven
11/24 . Floor-sweeping machines, motor-driven
11/26 . Floor-scrubbing machines, hand-driven (A47L 11/29 takes precedence)
11/28 . Floor-scrubbing machines, motor-driven (A47L 11/29 takes precedence)
11/282 . . having rotary tools
11/283 . . . the tools being disc brushes
11/284 . . having reciprocating tools
11/29 . Floor-scrubbing machines characterised by means for taking-up dirty liquid
11/292 . . having rotary tools (A47L 11/30 takes precedence)
11/293 . . . the tools being disc brushes
11/294 . . having reciprocating tools (A47L 11/30 takes precedence)
11/30 . . by suction
11/32 . Carpet-sweepers (combined with suction cleaners A47L 7/02)

11/33 . . having means for storing dirt
11/34 . Machines for treating carpets in position by liquid, foam, or vapour, e.g. by steam
11/36 . Machines for beating upholstery
11/38 . Machines, specially adapted for cleaning walls, ceilings, roofs, or the like
11/40 . Parts or details of machines not covered in, or of interest apart from, groups A47L 11/02 to A47L 11/38, e.g. handles, arrangement of switches, skirts, buffers, levers

13/00 Implements for cleaning floors, carpets, furniture, walls, or wall coverings (brushes, their handles or fastenings A46B, B25G; scrapers for finishing work on buildings E04F 21/00)
13/02 . Scraping
13/022 . . Scraper handles
13/03 . . Scrapers having provisions for supplying cleaning agents
13/04 . . with steel wool
13/06 . . with wire brushes or wire meshes
13/07 . . . Metal sponges (A47L 13/022, A47L 13/03 take precedence)
13/08 . . with scraping blades
13/10 . Scrubbing; Scouring; Cleaning; Polishing
13/11 . . Squeegees **[3]**
13/12 . . Implements with several different treating devices **[3]**
13/14 . . combined with squeezing or wringing devices
13/142 . . . having torsional squeezing or wringing action
13/144 . . . having squeezing rollers
13/146 . . . having pivoting squeezing plates
13/16 . . Cloths; Pads; Sponges (metal scraping sponges A47L 13/07)
13/17 . . . containing cleaning agents (A47L 13/19 takes precedence)
13/18 . . . Gloves; Glove-like cloths
13/19 . . . . containing cleaning agents
13/20 . . Mops
13/22 . . . with liquid-feeding devices
13/23 . . . . connectible to the water mains
13/24 . . . Frames for mops; Mop heads (handles B25G)
13/25 . . . . Wire frames
13/252 . . . . . for mops of textile fringes or the like
13/253 . . . . . of adjustable or foldable type
13/254 . . . . Plate frames
13/255 . . . . . for mops of textile fringes or the like
13/256 . . . . . for mops made of cloth
13/257 . . . . . for mops made of sponge material
13/258 . . . . . of adjustable or foldable type
13/26 . . Other cleaning devices with liquid supply arrangements (such arrangements on floor-polishing machines A47L 11/00, on scrapers A47L 13/03, on mops A47L 13/22; cloths, pads, or the like containing cleaning agents A47L 13/17, A47L 13/19) **[3]**
13/28 . . Polishing implements (polishing machines A47L 11/02)
13/282 . . . mounted under footwear
13/284 . . . having fixed or detachable weights
13/286 . . . having containers for storing polishing material, e.g. polishing paper
13/29 . . . having movable or detachable polishing or shining cloths
13/294 . . . having invertible head, one side being used for dispensing polishing material and the reverse side for shining
13/30 . . . Implements for polishing and waxing or oiling, with dispensers for wax or oil
13/31 . . . . having movable or detachable polishing or shining cloths
13/312 . . . . . supplied with liquid wax or oil
13/314 . . . . having invertible head, one side being used for dispensing wax or oil and the reverse side for shining
13/316 . . . . . supplied with liquid wax or oil
13/32 . . . Wax dispensers with heating arrangements
13/34 . . Scouring implements for hearths or metal objects
13/36 . . Carpet-beaters
13/38 . . Other dusting implements
13/40 . . Cleaning implements actuated by electrostatic attraction; Devices for cleaning same; Magnetic cleaning implements
13/41 . . . Magnetic cleaning implements
13/42 . . Details
13/44 . . . Securing scouring-cloths to the brush or like body of the implement
13/46 . . . Securing scouring- or polishing-cloths or sponges to the handles by gripping means, tongs, or the like
13/48 . . . Protective devices, such as bumpers or guard plates
13/50 . . Auxiliary implements (cleaning devices for brushes or the like A46B 17/06)
13/502 . . . Shakers for dust-cloths or mops; Bumpers therefor
13/51 . . . Storing of cleaning tools, e.g. containers therefor
13/512 . . . . Clamping devices for hanging the tools
13/52 . . . Dust pans; Crumb trays
13/54 . . . Racks for beating carpets
13/56 . . . Implements for applying wax or oil
13/58 . . . Wringers for scouring pads, mops, or the like, combined with buckets
13/59 . . . . with movable squeezing members
13/60 . . . . with squeezing rollers
13/62 . . . Kneeling supports, especially wheeled (kneeling cushions attachable to knees A41D 13/06)

Cleaning or polishing household articles or the like

15/00 Washing or rinsing machines for crockery or table-ware
15/02 . with circulation and agitation of the cleaning liquid in the cleaning chamber containing a stationary basket
15/04 . . by reciprocating movement of the cleaning chamber
15/06 . . by means of an impeller in the chamber
15/08 . . by application of a pressure effect produced by pumps
15/10 . . by introducing compressed air or other gas into the liquid
15/12 . . by a boiling effect
15/13 . . using sonic or ultrasonic waves **[5]**
15/14 . with stationary crockery baskets and spraying devices within the cleaning chamber
15/16 . . with rigidly-mounted spraying devices
15/18 . . with movably-mounted spraying devices
15/20 . . . Swingable spraying devices

15/22 . . . Rotary spraying devices
15/23 . . . . moved by means of the sprays
15/24 . with movement of the crockery baskets by conveyers
15/26 . with movement of the crockery baskets by other means
15/28 . . by lowering and lifting only
15/30 . . by rotating only
15/32 . . . rotated by means of spraying water
15/33 . . . with moving baskets submerged in the cleaning fluid
15/34 . . by lowering and lifting combined with a rotating movement
15/36 . . by a sideways motion
15/37 . with crockery cleaned by brushes **[3]**
15/39 . . with brushes on movable supports **[3]**
15/42 . Details
15/44 . . Devices for adding cleaning agents
15/46 . . Devices for the automatic control of the different phases of cleaning
15/48 . . Drying arrangements
15/50 . . Racks

17/00 Apparatus or implements used in manual washing or cleaning of crockery, table-ware, cooking-ware or the like (foam-making devices A47K 5/14)
17/02 . Basins (dish-washing tables A47B 33/00; sanitary basins A47K 1/04; basins connected to waste pipe E03C 1/12)
17/04 . Pan or pot cleaning utensils
17/06 . . Scrapers
17/08 . . Pads; Balls of steel wool, wire, or plastic meshes
17/10 . Tongs for crockery

19/00 Drying devices for crockery or table-ware, e.g. tea-cloths
19/02 . Draining-boards
19/04 . Crockery baskets; Draining-racks

21/00 Polishing of table-ware, e.g. knives, forks, spoons
21/02 . Machines
21/04 . Hand implements
21/06 . Supports or rests for use while polishing

23/00 Cleaning footwear
23/02 . Shoe-cleaning machines, with or without applicators for shoe polish
23/04 . Hand implements for shoe-cleaning, with or without applicators for shoe polish (ordinary brushes, with or without containers, A46B 11/00)
23/05 . . with applicators for shoe polish
23/06 . . with electric drive
23/08 . . Special hand implements for cleaning and recolouring footwear, e.g. powder pads
23/10 . . Cloth or collapsible cleaning pads; Glove-like cleaning cloths (glove-like washing cloths A47K 7/02)
23/12 . . Cleaning devices for suede
23/14 . . Implements for use during shoe-cleaning, to guard against spoiling
23/16 . Shoe-shine stands; Foot-rests with guides for the polishing cloths
23/17 . . Foot-rests with guides for the polishing cloths
23/18 . Devices for holding footwear during cleaning or shining (shoe-lasts A43D 3/00); Holding devices with stretching effect
23/20 . Devices or implements for drying footwear, also with heating arrangements (cabinets for shoes A47B 61/04)
23/22 . Devices or implements resting on the floor for removing mud, dirt, or dust from footwear (built-in gratings, e.g. foot-scrapers, E04F 19/10)
23/24 . . Rigid cleaning-gratings; Tread plates or scrapers for cleaning the soles of footwear (floor mats in general A47G 27/02)
23/26 . . Mats or gratings combined with brushes
23/28 . Receptacles for shoe-cleaning equipment

25/00 Domestic cleaning devices not provided for in other groups of this subclass (for cleaning spectacles G02C 13/00)
25/02 . for buttons, clasps, or military insignia
25/04 . for door-knobs
25/06 . Guard plates for use while cleaning butts, door-knobs or the like
25/08 . Pads or the like for cleaning clothes
25/12 . Devices or implements for cleaning lamp chimneys

HEALTH; LIFE-SAVING; AMUSEMENT

A61 MEDICAL OR VETERINARY SCIENCE; HYGIENE

A61B DIAGNOSIS; SURGERY; IDENTIFICATION (analysing biological material G01N, e.g. G01N 33/48)

Note

This subclass covers instruments, implements, and processes for diagnostic, surgical and person-identification purposes, including obstetrics, instruments for cutting corns, vaccination instruments, finger-printing, psycho-physical tests.

Subclass index

Diagnosis; **Psycho-physical tests**

1/00 Instruments for performing medical examinations of the interior of cavities or tubes of the body by visual or photographical inspection, e.g. endoscopes (examination of body cavities or body tracts using ultrasonic, sonic or infrasonic waves A61B 8/12; endoscopic instruments for taking cell samples or for biopsy A61B 10/04; for surgical purposes A61B 17/00; surgical instruments using a laser beam being directed along or through a flexible conduit A61B 18/22); **Illuminating arrangements therefor** (for the eyes A61B 3/00) **[4]**

1/002 . having rod-lens arrangements (A61B 1/055 takes precedence) **[6]**
1/005 . Flexible endoscopes **[6]**
1/008 . . Articulations **[6]**
1/01 . . Guiding arrangements therefor **[6]**
1/012 . characterised by internal passages or accessories therefor **[6]**
1/015 . . Control of fluid supply or evacuation **[6]**
1/018 . . for receiving instruments **[6]**
1/04 . combined with photographic or television appliances **[2]**
1/045 . . Control thereof **[6]**
1/05 . . characterised by the image sensor, e.g. camera, being in the distal end portion **[6]**
1/055 . . having rod-lens arrangements **[6]**
1/06 . with illuminating arrangements
1/07 . . using light-conductive means, e.g. optical fibres **[6]**
1/12 . with cooling or rinsing arrangements (A61B 1/015 takes precedence) **[6]**
1/227 . for ears, i.e. otoscopes **[6]**
1/233 . for the nose, i.e. nasoscopes **[6]**
1/24 . for the mouth, i.e. stomatoscopes, e.g. with tongue depressors (tongue depressors per se A61B 13/00); Instruments for opening or keeping open the mouth (combined with saliva removers A61C 17/10) **[5]**
1/247 . . with means for viewing areas outside the direct line of sight, e.g. dentists' mirrors **[6]**
1/253 . . . with means for preventing fogging **[6]**
1/267 . for the respiratory tract, e.g. laryngoscopes, bronchoscopes **[6]**
1/273 . for the upper alimentary canal, e.g. oesophagoscopes, gastroscopes **[6]**
1/303 . for the vagina, i.e. vaginoscopes **[6]**
1/307 . for the urinary organs, e.g. urethroscopes, cystoscopes **[6]**
1/31 . for the rectum, e.g. proctoscopes, sigmoidoscopes **[6]**
1/313 . for introducing through surgical openings, e.g. laparoscopes **[6]**
1/317 . . for bones or joints, e.g. osteoscopes, arthroscopes **[6]**
1/32 . Devices for opening or enlarging the visual field, e.g. of a tube of the body (dilators A61M 29/00)

3/00 Apparatus for testing the eyes; **Instruments for examining the eyes** (eye inspection using ultrasonic, sonic or infrasonic waves A61B 8/10) **[4,5]**

3/02 . Subjective types, i.e. testing apparatus requiring the active assistance of the patient **[5]**
3/024 . . for determining the visual field, e.g. perimeter types **[5]**
3/028 . . for testing visual acuity; for determination of refraction, e.g. phoropters **[5]**
3/032 . . . Devices for presenting test symbols or characters, e.g. test chart projectors (A61B 3/036 takes precedence) **[5]**
3/036 . . . for testing astigmatism **[5]**
3/04 . . . Trial frames; Sets of lenses for use therewith **[5]**
3/06 . . for testing light sensitivity, e.g. adaptation; for testing colour vision
3/08 . . for testing binocular or stereoscopic vision, e.g. strabismus
3/09 . . for testing accommodation

3/10 . Objective types, i.e. instruments for examining the eyes independent of the patients perceptions or reactions **[5]**

3/103 . . for determining refraction, e.g. refractometers, skiascopes **[5]**

3/107 . . for determining the shape or measuring the curvature of the cornea **[5]**

3/11 . . for measuring interpupillary distance or diameter of pupils **[5]**

3/113 . . for determining or recording eye movement **[5]**

3/117 . . for examining the anterior chamber or the anterior chamber angle, e.g. gonioscopes **[5]**

3/12 . . for looking at the eye fundus, e.g. ophthalmoscopes (A61B 3/13 takes precedence) **[5]**

3/125 . . . with contact lenses **[5]**

3/13 . . Ophthalmic microscopes **[5]**

3/135 . . . Slit-lamp microscopes **[5]**

3/14 . . Arrangements specially adapted for eye photography **[5]**

3/15 . . . with means for aligning, spacing or blocking spurious reflection **[5]**

3/16 . . for measuring intraocular pressure, e.g. tonometers **[5]**

3/18 . Arrangement of plural eye-testing or -examining apparatus **[5]**

5/00 Measuring for diagnostic purposes (radiation diagnosis A61B 6/00; diagnosis by ultrasonic, sonic or infrasonic waves A61B 8/00); **Identification of persons**

Note

In this group, the following term is used with the meaning indicated: **[7]**
– "measuring" covers also detecting or recording. **[7]**

5/01 . Measuring temperature of body parts (clinical thermometers G01K 5/22; thermometers for special purposes G01K 13/00) **[7]**

5/02 . Measuring pulse, heart rate, blood pressure or blood flow; Combined pulse/heart-rate/blood pressure determination; Evaluating a cardiovascular condition not otherwise provided for, e.g. using combinations of techniques provided for in this group with electrocardiography; Heart catheters for measuring blood pressure **[5]**

5/0205 . . Simultaneously evaluating both cardiovascular conditions and different types of body conditions, e.g. heart and respiratory condition **[5]**

5/021 . . Measuring pressure in heart or blood vessels (A61B 5/0205 takes precedence) **[5]**

5/0215 . . . by means inserted into the body **[5]**

5/022 . . . by applying pressure to close blood vessels, e.g. against the skin; Ophthaldynamometers **[5]**

5/0225 . . . . the pressure being controlled by electric signals, e.g. derived from Korotkoff sounds **[5]**

5/023 . . . . the pressure transducers comprising a liquid column **[5]**

5/0235 . . . . Valves specially adapted therefor **[5]**

5/024 . . Measuring pulse rate or heart rate (A61B 5/0205, A61B 5/021 take precedence) **[5]**

5/0245 . . . using sensing means generating electric signals **[5]**

5/025 . . . . within occluders, e.g. responsive to Korotkoff sounds **[5]**

5/0255 . . . Recording instruments specially adapted therefor **[5]**

5/026 . . Measuring blood flow **[5]**

5/0265 . . . using electromagnetic means, e.g. electromagnetic flow meter **[5]**

5/027 . . . . using catheters **[5]**

5/0275 . . . using tracers, e.g. dye dilution **[5]**

5/028 . . . . by thermo-dilution **[5]**

5/0285 . . . Measuring phase velocity of blood waves **[5]**

5/029 . . . Measuring blood output from the heart, e.g. minute volume **[5]**

5/0295 . . . using plethysmography, i.e. measuring the variations in the volume of a body part as modified by the circulation of blood therethrough, e.g. impedance plethysmography **[5]**

5/03 . Measuring fluid pressure within the body other than blood pressure, e.g. cerebral pressure **[4]**

5/04 . Measuring bioelectric signals of the body or parts thereof

5/0402 . . Electrocardiography, i.e. ECG **[5]**

5/0404 . . . Hand-held devices **[5]**

5/0408 . . . Electrodes specially adapted therefor (for foetal cardiography A61B 5/0448; for electroencephalograph signals A61B 5/0478; for electromyography A61B 5/0492) **[5]**

5/0416 . . . . connected by means of snap fasteners **[5]**

5/042 . . . . for introducing into the body **[5]**

5/0424 . . . . Protection against electrode failure **[5]**

5/0428 . . . Input circuits specially adapted therefor **[5]**

5/0432 . . . Recording apparatus specially adapted therefor **[5]**

5/0436 . . . . Magnetic recording apparatus **[5]**

5/044 . . . Displays specially adapted therefor **[5]**

5/0444 . . . Foetal cardiography **[5]**

5/0448 . . . . Electrodes specially adapted therefor, e.g. scalp electrodes **[5]**

5/0452 . . . Detecting specific parameters of the electrocardiograph cycle **[5]**

5/0456 . . . . Detecting R peaks, e.g. for synchronising diagnostic apparatus **[5]**

5/046 . . . . Detecting fibrillation **[5]**

5/0464 . . . . Detecting tachycardy or brachycardy **[5]**

5/0468 . . . . Detecting abnormal ECG interval **[5]**

5/0472 . . . . Detecting abnormal QRS complex **[5]**

5/0476 . . Electroencephalography **[5]**

5/0478 . . . Electrodes specially adapted therefor **[5]**

5/048 . . . Detecting the frequency distribution of signals **[5]**

5/0482 . . . using biofeedback **[5]**

5/0484 . . . using evoked response **[5]**

5/0488 . . Electromyography **[5]**

5/0492 . . . Electrodes specially adapted therefor, e.g. needle electrodes **[5]**

5/0496 . . Electro-oculography, e.g. detecting nystagmus **[5]**

5/05 . Measuring for diagnosis by means of electric currents or magnetic fields (A61B 5/02, A61B 5/04, A61B 5/11 take precedence) **[5]**

5/053 . . Measuring electrical impedance or conductance of a portion of the body **[7]**

5/055 . . involving electronic [EMR] or nuclear [NMR] magnetic resonance, e.g. magnetic resonance imaging **[5]**

5/06 . Devices, other than using radiation, for detecting or locating foreign bodies (for removing same A61B 17/50)

5/07 . Endoradiosondes
5/08 . Measuring devices for evaluating the respiratory organs (A61B 5/0205 takes precedence) **[5]**
5/083 . . Measuring rate of metabolism by using breath test, e.g. measuring rate of oxygen consumption **[5]**
5/085 . . Measuring impedance of respiratory organs or lung elasticity **[5]**
5/087 . . Measuring breath flow **[5]**
5/09 . . . using an element rotated by the flow **[5]**
5/091 . . Measuring volume of inspired or expired gases, e.g. to determine lung capacity **[5]**
5/093 . . . the gases being exhaled into, or inhaled from, an expansible chamber, e.g. bellows or expansible bag **[5]**
5/095 . . . . within a rigid container, e.g. the boundary being formed by a liquid surface **[5]**
5/097 . . Devices for facilitating collection of breath or for directing breath into or through measuring devices **[5]**
5/103 . Measuring devices for testing the shape, pattern, size or movement of the body or parts thereof, for diagnostic purposes (A61B 5/08 takes precedence; measuring instruments specially adapted for dentistry A61C 19/04) **[5]**
5/107 . . Measuring physical dimensions, e.g. size of the entire body or parts thereof **[5]**
5/11 . . Measuring movement of the entire body or parts thereof, e.g. head or hand tremor or mobility of a limb (for measuring pulse A61B 5/02) **[5]**
5/113 . . . occurring during breathing **[5]**
5/117 . Identification of persons, e.g. finger-printing, foot-printing or impression techniques (dental impression cups or articulators A61C 9/00, A61C 11/00; recognising fingerprints G06K 9/00; identification of persons by analysing their voice or speech G10L 17/00) **[5]**
5/12 . Audiometering
5/145 . Measuring characteristics of blood <u>in vivo</u>, e.g. gas concentration, pH-value (measuring of blood pressure or blood flow A61B 5/02; non-radiation detecting or locating of foreign bodies in blood A61B 5/06) **[7]**
5/1455 . . using optical sensors, e.g. spectral photometrical oximeters **[8]**
5/1459 . . . invasive, e.g. introduced into the body by a catheter **[8]**
5/1464 . . . specially adapted for foetal tissue **[8]**
5/1468 . . using chemical or electrochemical methods, e.g. by polarographic means **[8]**
5/1473 . . . invasive, e.g. introduced into the body by a catheter **[8]**
5/1477 . . . non-invasive **[8]**
5/1482 . . . specially adapted for foetal tissue **[8]**
5/1486 . . using enzyme electrodes, e.g. with immobilised oxidase **[8]**
5/1491 . . Heated applicators **[8]**
5/1495 . . Calibrating or testing <u>in vivo</u> probes **[8]**
5/15 . Devices for taking samples of blood (hypodermic syringes A61M 5/178) **[7]**
5/151 . . specially adapted for taking samples of capillary blood, e.g. by lancets **[8]**
5/153 . . specially adapted for taking samples of venous or arterial blood, e.g. by syringes **[8]**
5/154 . . . using pre-evacuated means **[8]**
5/155 . . specially adapted for continuous or multiple sampling, e.g. at predetermined intervals **[7]**
5/157 . . characterised by integrated means for measuring characteristics of blood **[8]**
5/16 . Devices for psychotechnics (using teaching or educational appliances G09B 1/00 to G09B 7/00); Testing reaction times
5/18 . . for vehicle drivers
5/20 . Measuring urological functions **[4]**
5/22 . Ergometry; Measuring muscular strength or the force of a muscular blow **[4]**

6/00 Apparatus for radiation diagnosis, e.g. combined with radiation therapy equipment (instruments measuring radiation intensity for application in the field of nuclear medicine, e.g. <u>in vivo</u> counting, G01T 1/161; apparatus for taking X-ray photographs G03B 42/02)
6/02 . Devices for diagnosis sequentially in different planes; Stereoscopic radiation diagnosis
6/03 . . Computerised tomographs (echo-tomography A61B 8/14) **[4]**
6/04 . Positioning of patients; Tiltable beds or the like (operating tables A61G 13/00; operating chairs A61G 15/00)
6/06 . Diaphragms
6/08 . Auxiliary means for directing the radiation beam to a particular spot, e.g. using light beams
6/10 . Application or adaptation of safety means
6/12 . Devices for detecting or locating foreign bodies (A61B 6/02 takes precedence)
6/14 . Applications or adaptations for dentistry

7/00 Instruments for auscultation
7/02 . Stethoscopes
7/04 . . Electric stethoscopes (microphones, acoustic transducers therefor H04R)

8/00 Diagnosis using ultrasonic, sonic or infrasonic waves [4]
8/02 . Measuring pulse or heart rate **[4]**
8/04 . Measuring blood pressure **[4]**
8/06 . Measuring blood flow **[4]**
8/08 . Detecting organic movements or changes, e.g. tumours, cysts, swellings (A61B 8/02 to A61B 8/06 take precedence) **[4]**
8/10 . Eye inspection **[4]**
8/12 . in body cavities or body tracts, e.g. by using catheters (catheters <u>per se</u> A61M 25/00) **[4]**
8/13 . Tomography (A61B 8/10, A61B 8/12 take precedence; tomography for radiation diagnosis A61B 6/02) **[5]**
8/14 . . Echo-tomography **[4]**
8/15 . . Transmission-tomography **[5]**

9/00 Instruments for examination by percussion; **Pleximeters**

10/00 Other methods or instruments for diagnosis, e.g. for vaccination diagnosis; **Sex determination**; **Ovulation-period determination**; **Throat striking implements [4,8]**

<u>Note</u>

Attention is drawn to group A61F 13/15 which provides for swabs. **[5]**

10/02 . Instruments for taking cell samples or for biopsy (devices for taking samples of blood A61B 5/15) **[8]**
10/04 . . Endoscopic instruments **[8]**
10/06 . . Biopsy forceps **[8]**

13/00 **Instruments for depressing the tongue** (combined with illuminating and viewing instruments A61B 1/24; combined with saliva removers A61C 17/10) **[5]**

16/00 **Devices specially adapted for vivisection or autopsy** (similar devices for medical purposes, see the relevant groups for such devices)

Surgery

17/00 **Surgical instruments, devices or methods, e.g. tourniquets** (A61B 18/00 takes precedence; contraceptive devices, pessaries, or applicators therefor A61F 6/00; eye surgery A61F 9/007; ear surgery A61F 11/00) **[3,7]**

Note

When classifying in this group, classification is also made in group A61B 17/94 if the endoscopic features of the surgical instrument are of interest. **[8]**

17/02 . for holding wounds open; Tractors
17/03 . for closing wounds, or holding wounds closed, e.g. surgical staples; Accessories for use therewith **[6]**
17/04 . . for suturing wounds; Holders or packages for needles or suture materials **[3]**
17/06 . . . Needles; Holders or packages for needles or suture materials (puncturing needles A61B 17/34; hypodermic needles A61M 5/32) **[3]**
17/062 . . . Needle manipulators **[6]**
17/064 . . Surgical staples **[5]**
17/068 . . Surgical staplers (for performing anastomosis A61B 17/115) **[5]**
17/072 . . . for applying a row of staples in a single action **[5]**
17/076 . . for removing surgical staples **[5]**
17/08 . . Wound clamps
17/10 . . for applying or removing wound clamps; Wound clamp magazines
17/11 . . for performing anastomosis; Buttons for anastomosis
17/115 . . . Staplers **[5]**
17/12 . for ligaturing or otherwise compressing tubular parts of the body, e.g. blood vessels or umbilical cord
17/122 . . Clamps or clips **[6]**
17/125 . . . combined with cutting implements **[6]**
17/128 . . for applying or removing clamps or clips **[6]**
17/132 . . Tourniquets **[6]**
17/135 . . . inflatable **[6]**
17/138 . . combined with cutting implements (A61B 17/125 takes precedence) **[6]**
17/14 . Surgical saws (tooth saws A61C 3/12)
17/15 . . Guides therefor **[6]**
17/16 . Osteoclasts; Drills or chisels for bones; Trepans
17/17 . . Guides for drills **[6]**
17/20 . for vaccinating or cleaning the skin previous to the vaccination (apparatus for injections A61M 3/00, A61M 5/00)
17/22 . Implements for squeezing-off ulcers or the like on inner organs of the body; Implements for scraping-out cavities of body organs, e.g. bones; for invasive removal or destruction of calculus using mechanical vibrations; for removing obstructions in blood vessels, not otherwise provided for **[6,8]**
17/221 . . Calculus gripping devices in the form of loops or baskets **[8]**
17/225 . for extracorporeal shock wave lithotripsy [ESWL], e.g. by using ultrasonic waves **[6]**
17/24 . for use in the oral cavity, larynx, bronchial passages or nose (for medical inspection of cavities or tubes in the body A61B 1/00); Tongue scrapers
17/26 . . Tonsillotomes, with or without means for stopping bleeding
17/28 . Surgical forceps (biopsy forceps A61B 10/06; obstetrical forceps A61B 17/44) **[1,8]**
17/285 . . combined with cutting implements **[8]**
17/29 . . Forceps for use in minimally invasive surgery **[8]**
17/295 . . . combined with cutting implements **[8]**
17/30 . Surgical pincettes (wound clamps A61B 17/08)
17/32 . Surgical cutting instruments (implements for ligaturing and cutting A61B 17/125, A61B 17/138) **[3,8]**
17/3201 . . Scissors (for biopsy A61B 10/02) **[8]**
17/3203 . . Fluid jet cutting instruments **[8]**
17/3205 . . Excision instruments **[8]**
17/3207 . . . Atherectomy devices **[8]**
17/3209 . . Incision instruments **[8]**
17/3211 . . . Surgical scalpels or knives; Accessories therefor **[8]**
17/3213 . . . . with detachable blades **[8]**
17/3215 . . . . Packages or dispensers, e.g. for scalpel blades **[8]**
17/3217 . . . . Devices for removing or collecting used scalpel blades **[8]**
17/322 . . Skin grafting apparatus **[2]**
17/326 . . Circumcision apparatus
17/34 . Trocars; Puncturing needles **[2]**
17/42 . Gynaecological or obstetrical instruments or methods
17/425 . . for reproduction or fertilisation **[5]**
17/43 . . . for artificial insemination **[5]**
17/435 . . . for embryo transplantation **[5]**
17/44 . . Obstetrical forceps
17/46 . . Embryotomes
17/48 . . Bags for midwives
17/50 . Instruments, other than pincettes or toothpicks, for removing foreign bodies from the human body
17/52 . . Magnets
17/54 . Chiropodists' instruments
17/56 . Surgical instruments or methods for treatment of bones or joints; Devices specially adapted therefor **[4]**
17/58 . . for osteosynthesis, e.g. bone plates, screws or the like (A61B 17/14, A61B 17/16 take precedence) **[4,6]**
17/60 . . . for external osteosynthesis, e.g. distractors or contractors **[4]**
17/62 . . . . Ring frames, i.e. devices extending around the bones to be positioned (A61B 17/66 takes precedence) **[6]**
17/64 . . . . Devices extending alongside the bones to be positioned (A61B 17/66 takes precedence) **[6]**
17/66 . . . . Compression or distraction mechanisms **[6]**
17/68 . . . Internal fixation devices **[6]**
17/70 . . . . Spinal positioners or stabilisers **[6]**
17/72 . . . . Intramedullary devices **[6]**
17/74 . . . . Devices for the head of the femur **[6]**
17/76 . . . . . fixed by screws **[6]**
17/78 . . . . . fixed by nails, pins or the like **[6]**
17/80 . . . . Cortical plates **[6]**
17/82 . . . . for bone cerclage **[6]**

17/84 . . . . Fasteners therefor **[6]**
17/86 . . . . . Pins or screws **[6]**
17/88 . . . Methods or means for implanting or extracting internal fixation devices **[6]**
17/90 . . . . Guides therefor **[6]**
17/92 . . . . Impactors or extractors, e.g. for removing intramedullary devices **[6]**
17/94 . Endoscopic surgical instruments (endoscopic instruments for taking cell samples or for biopsy A61B 10/04) **[8]**

18/00 Surgical instruments, devices or methods for transferring non-mechanical forms of energy to or from the body (eye surgery A61F 9/007; ear surgery A61F 11/00) **[7]**
18/02 . by cooling, e.g. cryogenic techniques (devices for cooling specific reflex points of the body within cell-life limits A61H 39/06) **[7]**
18/04 . by heating (by applying electromagnetic radiation A61B 18/18; devices for heating specific reflex points of the body within cell-life limits A61H 39/06) **[7]**
18/06 . . caused by chemical reaction **[7]**
18/08 . . by means of electrically-heated probes **[7]**
18/10 . . . Power sources therefor **[7]**
18/12 . . by passing a current through the tissue to be heated, e.g. high-frequency current **[7]**
18/14 . . . Probes or electrodes therefor **[7]**
18/16 . . . . Indifferent or passive electrodes for grounding **[7]**
18/18 . by applying electromagnetic radiation, e.g. microwaves (radiation therapy A61N 5/00) **[7]**
18/20 . . using laser **[7]**
18/22 . . . the beam being directed along or through a flexible conduit, e.g. an optical fibre; Hand-pieces therefor **[7]**
18/24 . . . . with a catheter (A61B 18/26, A61B 18/28 take precedence) **[7]**
18/26 . . . . for producing a shock wave, e.g. laser lithotripsy **[7]**
18/28 . . . . for heating a thermal probe or absorber **[7]**

19/00 Instruments, implements or accessories for surgery or diagnosis not covered by any of the groups A61B 1/00 to A61B 18/00, e.g. for stereotaxis, sterile operation, luxation treatment, wound edge protectors (protective face masks A41D 13/11; surgeons' or patients' gowns or dresses A41D 13/12; devices for carrying-off, for treatment of, or for carrying-over, body liquids A61M 1/00)
19/02 . Protective casings or covers for appliances or instruments, e.g. boxes or sterile covers; Instrument tables or cupboards; Doctors' bags
19/04 . Operating gloves; Finger-stalls for operating; Devices for treating them, e.g. cleaning or powdering
19/08 . Surgical drapes
19/10 . . with means to retain or hold surgical implements **[5]**
19/12 . . tubular, e.g. for arms or legs **[5]**

A61C DENTISTRY; **APPARATUS OR METHODS FOR ORAL OR DENTAL HYGIENE** (non-driven toothbrushes A46B; preparations for dentistry A61K 6/00; preparations for cleaning the teeth or mouth A61K 8/00, A61Q 11/00)

Subclass index

Dental surgery

1/00 Dental machines for boring or cutting
1/02 . characterised by the drive of the dental tools
1/04 . . with treadle or manual drive
1/05 . . with turbine drive
1/06 . . with electric drive
1/07 . . with vibratory drive, e.g. ultrasonic
1/08 . Machine parts specially adapted for dentistry
1/10 . . Straight hand-pieces
1/12 . . Angle hand-pieces
1/14 . . Tool-holders
1/16 . . Protecting caps for hand-pieces or angle-pieces
1/18 . . Flexible shafts; Clutches or the like

3/00 Dental tools or instruments (implanting tools A61C 8/00; tools for fastening artificial teeth A61C 13/12; visual inspection devices, e.g. dental mirrors, A61B 1/24)
3/02 . Tooth drilling or cutting instruments; Instruments acting like a sandblast machine
3/025 . . Instruments acting like a sandblast machine, e.g. for cleaning, polishing or cutting teeth **[5]**
3/03 . . Instruments operated by vibration
3/04 . Supports for holding tooth drills in order of use
3/06 . Tooth grinding or polishing discs; Holders therefor
3/08 . Tooth pluggers or hammers
3/10 . Tooth pincettes or the like
3/12 . Tooth saws
3/14 . Dentists' forceps or the like for extracting teeth
3/16 . Dentists' forceps for removing crowns

5/00 Filling or capping teeth
5/02 . Implements for surgical treatment of the roots or nerves of the teeth; Nerve needles; Methods or instruments for medication of the roots (substances for chemical treatment A61K 6/00)
5/04 . Implements for filling natural teeth; Methods or instruments for medication of tooth nerve channels (composition of the fillings A61K 6/02)
5/06 . Amalgam presses or mixers
5/08 . Tooth crowns; Making same; Securing crowns in the mouth (dental implants A61C 8/00)
5/09 . . Composite crowns **[5]**
5/10 . . Methods or devices for making crowns **[5]**
5/11 . . Securing crowns to natural teeth **[5]**
5/12 . Tooth clamps; Dam holders
5/14 . Lip or mouth protectors

7/00 Orthodontics, i.e. obtaining or maintaining the desired position of teeth, e.g. by straightening, evening, regulating, separating, or by correcting malocclusions

7/02 . Tools for manipulating or working with an orthodontic appliance **[5]**
7/04 . . plier type **[5]**
7/06 . Extra-oral force transmitting means, i.e. means worn externally of the mouth and placing a member in the mouth under tension **[5]**
7/08 . Mouthpiece-type retainers **[5]**
7/10 . Devices having means to apply outwardly directed force, e.g. expanders **[5]**
7/12 . Brackets; Arch wires; Combinations thereof; Accessories therefor (A61C 7/10 takes precedence) **[5]**
7/14 . . Brackets (A61C 7/28 takes precedence); Fixing brackets to teeth **[5]**
7/16 . . . specially adapted to be cemented to teeth **[5]**
7/18 . . . specially adapted to be fixed to teeth with a band; Bands therefor **[5]**
7/20 . . Arch wires (A61C 7/28 takes precedence) **[5]**
7/22 . . . Tension adjusting means **[5]**
7/24 . . . Arch wire-enclosing guides **[5]**
7/26 . . . Arch wire attachments **[5]**
7/28 . . Securing arch wire to bracket **[5]**
7/30 . . . by resilient means (A61C 7/34 takes precedence) **[5]**
7/32 . . . using ligature wires **[5]**
7/34 . . . using lock pins **[5]**
7/36 . Devices acting between upper and lower teeth **[5]**

8/00 Means to be fixed to the jaw-bone for consolidating natural teeth or for fixing dental prostheses thereon; **Dental implants**; **Implanting tools** (fastening of peg-teeth in the mouth A61C 13/30) **[2]**

8/02 . Means for transfixation of natural teeth **[4]**

Dental prosthetics; **Artificial teeth** **[3]**

9/00 Impression methods specially adapted for dental prosthetics; **Impression cups therefor** **[3]**

11/00 Dental articulators, i.e. for simulating movement of the temporo-mandibular joints; **Articulation forms or mouldings**

11/02 . characterised by the arrangement, location or type of the hinge means **[5]**
11/04 . . resiliently biased **[5]**
11/06 . with incisal guide **[5]**
11/08 . with means to secure dental casts to articulator **[5]**

13/00 Dental prostheses; **Making same** (tooth crowns for capping teeth A61C 5/08; dental implants A61C 8/00) **[4]**

13/003 . Prostheses without bases, e.g. dental bridges (fastening prostheses in the mouth A61C 13/225); Making same (artificial teeth A61C 13/08) **[6]**
13/007 . Prostheses with bases, e.g. palates or plates; Making same **[6]**
13/01 . . Bases **[4]**
13/02 . . . made by galvanoplastic methods; Surface treatment; Enamelling; Perfuming; Making antiseptic **[4]**
13/03 . . . of metal with a ceramic layer **[6]**
13/06 . . . made by punching **[4]**
13/07 . . Linings or cushions therefor (characterised by means to improve suction A61C 13/24) **[6]**
13/08 . Artificial teeth; Making same
13/083 . . Porcelain or ceramic teeth **[4]**
13/087 . . Artificial resin teeth **[4]**
13/09 . . Multilayer teeth **[4]**
13/093 . . characterised by a shape which improves retention **[4]**
13/097 . . characterised by occlusal profiles **[4]**
13/10 . Fastening of artificial teeth to artificial base material, e.g. to palates or to adjacent artificial tooth (A61C 13/093 takes precedence; fastening prostheses in the mouth A61C 13/225)
13/103 . . connected to base material by additional connecting member, e.g. knob or bar **[6]**
13/105 . . . with the connecting member embedded in base material **[6]**
13/107 . Prostheses for temporary restoration; Vestibular masks **[4]**
13/113 . Modular prostheses, e.g. using prefabricated bases or having prefabricated sets of teeth **[4]**
13/12 . Tools for fastening artificial teeth; Holders, clamps, or stands for artificial teeth
13/14 . Curing devices for plastics prostheses
13/15 . . for curing by the action of light **[6]**
13/16 . . Curing flasks; Holders therefor
13/18 . . Presses for flasks
13/20 . Methods or devices for soldering, casting, moulding or melting **[4]**
13/225 . Fastening prostheses in the mouth (securing tooth crowns in capping teeth A61C 5/08) **[4]**
13/23 . . using adhesive foils or adhesive compositions (A61C 13/263 takes precedence) **[4]**
13/235 . . Magnetic fastening (magnetic implants A61C 8/00) **[4]**
13/24 . . Fastening by suction
13/25 . . . including valve or air passageway leading from suction area to lingual cavity **[6]**
13/263 . . Screwing pinning or gluing of prostheses to natural teeth **[4]**
13/265 . . Sliding or snap attachments **[4]**
13/267 . . Clasp fastening **[4]**
13/271 . . resiliently engaging between, or to, natural teeth **[4]**
13/273 . . Locking prostheses to residual teeth by using rotational or sliding-locks or levers (A61C 13/265, A61C 13/277 take precedence) **[4,6]**
13/275 . . Securing prostheses by using bridging bars or rails between residual teeth **[4]**
13/277 . . Telescopic anchoring **[4]**
13/28 . . Fastening by spring action between upper and lower parts of prostheses
13/30 . . Fastening of peg-teeth in the mouth; Root pins **[4]**
13/32 . . Stress-breakers **[4]**
13/34 . Making or working of models, e.g. preliminary castings, trial dentures; Dowel pins **[4]**
13/36 . . Orienting or positioning of artificial teeth, e.g. determining precise location or attitude therefor **[6]**
13/38 . Tools not otherwise provided for, for use in connection with dental prostheses or the making thereof **[6]**

Tooth-cleaning or mouth-rinsing devices **[3,5]**

15/00 Devices for cleaning between the teeth

15/02 . Toothpicks **[4]**
15/04 . Dental floss; Floss holders **[4]**

17/00 **Devices for cleaning, polishing, rinsing or drying teeth, teeth cavities or prostheses** (instruments acting like a sandblast machine A61C 3/025; tooth polishing discs or holders therefor A61C 3/06; devices for cleaning between the teeth A61C 15/00); **Saliva removers**; **Dental appliances for receiving spittle [5]**

Note

Cleaning of prostheses using ultrasonic techniques similar to those used for natural teeth is classified in this group. Other ultrasonic cleaning of prostheses is classified in group B08B 3/12. **[5]**

17/02 . Rinsing or air-blowing devices, e.g. using fluid jets (combined with receptacles for spittle A61C 17/14; combined with power-driven cleaning or polishing devices A61C 17/16) **[5]**
17/022 . . Air-blowing devices **[5]**
17/024 . . with constant liquid flow **[4]**
17/028 . . with intermittent liquid flow **[4]**
17/032 . . using pressurised tap-water **[4]**
17/06 . Saliva removers; Accessories therefor **[5]**
17/08 . . Aspiration nozzles **[5]**
17/10 . . with mouth props, tongue guards, tongue depressors or cheek spreaders **[5]**
17/12 . . Control devices, e.g. for suction **[5]**
17/14 . Dental appliances for receiving spittle, with or without rinsing means therefor, e.g. dental basins, spittoons, cuspidors **[5]**
17/16 . Power-driven cleaning or polishing devices **[5]**
17/18 . . Chiselling scalers (A61C 17/20 takes precedence) **[5]**
17/20 . . using ultrasonics **[5]**
17/22 . . with brushes, cushions, cups or the like (brush bodies, e.g. arrangements of the bristles, A46B) **[5]**
17/24 . . . rotating continuously (A61C 17/40 takes precedence) **[5]**
17/26 . . . . driven by electric motor **[5]**
17/28 . . . . . with rinsing means **[5]**
17/30 . . . . driven by hydraulic motor, e.g. water motor **[5]**
17/32 . . . reciprocating or oscillating **[5]**
17/34 . . . . driven by electric motor **[5]**
17/36 . . . . . with rinsing means **[5]**
17/38 . . . . driven by hydraulic motor, e.g. water motor **[5]**
17/40 . . . orbiting, e.g. nutating **[5]**

19/00 **Dental auxiliary appliances** (dental chairs or accessories therefor, working stands whether or not combined with chairs A61G 15/00)
19/02 . Protective casings, e.g. boxes for instruments; Bags
19/04 . Measuring instruments specially adapted for dentistry (radiation diagnosis A61B 6/14)
19/045 . . for recording mandibular movement, e.g. face bows **[5]**
19/05 . . for determining occlusion **[5]**
19/055 . . Paralleling devices **[5]**
19/06 . Implements for therapeutic treatment (radiation therapy A61N 5/00)
19/08 . . combined with anaesthetising implements (dental hypodermic syringes A61M 5/00)
19/10 . Supports for artificial teeth for transport or for comparison of the colour

A61D VETERINARY INSTRUMENTS, IMPLEMENTS, TOOLS, OR METHODS

Note

This subclass covers only instruments, implements, tools, or methods specially adapted for use with animals.

Subclass index

1/00 **Surgical instruments for veterinary use**
1/02 . Trocars or cannulas for teats; Vaccination appliances
1/04 . Cropping devices for tails or ears
1/06 . Castrating appliances
1/08 . Veterinary obstetrical instruments or devices (devices for indicating trouble during labour of animals A61D 17/00)
1/10 . Embryotomic instruments
1/12 . Instruments for removing foreign bodies from animals' throats, oesophagus, or stomachs
1/14 . Devices for degassing animals' stomachs
1/16 . Magnets for the stomach (A61D 1/12 takes precedence)

3/00 **Appliances for supporting or fettering animals for operative purposes**

5/00 **Instruments for treating animals' teeth**

7/00 **Devices or methods for introducing solid, liquid, or gaseous remedies or other materials into or onto the bodies of animals** (for reproduction or fertilisation A61D 19/00) **[5]**
7/04 . Devices for anaesthetising animals by gases or vapours; Inhaling devices

9/00 **Bandages, poultices, compresses specially adapted to veterinary purposes**
9/02 . Prolapsus appliances

11/00 **Washing devices or gaseous curative baths specially adapted to veterinary purposes**

13/00 **Thermometer holders specially adapted to veterinary purposes**

15/00 **Mouth openers**

17/00 **Devices for indicating trouble during labour of animals**

19/00 **Instruments or methods for reproduction or fertilisation [5]**

19/02 . for artificial insemination **[5]**

19/04 . for embryo transplantation **[5]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

A61F FILTERS IMPLANTABLE INTO BLOOD VESSELS; PROSTHESES; DEVICES PROVIDING PATENCY TO, OR PREVENTING COLLAPSING OF, TUBULAR STRUCTURES OF THE BODY, E.G. STENTS; ORTHOPAEDIC, NURSING OR CONTRACEPTIVE DEVICES; FOMENTATION; TREATMENT OR PROTECTION OF EYES OR EARS; BANDAGES, DRESSINGS OR ABSORBENT PADS; FIRST-AID KITS (dental prosthetics A61C) **[6,8]**

Subclass index

Filters; **Devices providing patency to tubular structures**; **Prostheses**; **Accessories**

2/00 **Filters implantable into blood vessels**; **Prostheses, i.e. artificial substitutes or replacements for parts of the body**; **Appliances for connecting them with the body**; **Devices providing patency to, or preventing collapsing of, tubular structures of the body, e.g. stents** (as cosmetic articles, see the relevant subclasses, e.g. wigs, hair pieces, A41G 3/00, A41G 5/00, artificial nails A45D 31/00; dental prostheses A61C 13/00; materials for prostheses A61L 27/00; artificial hearts A61M 1/10; artificial kidneys A61M 1/14) **[4,6,8]**

2/01 . Filters implantable into blood vessels **[6]**

2/02 . Prostheses implantable into the body **[4]**

2/04 . . Hollow or tubular parts of organs, e.g. bladders, tracheae, bronchi, bile ducts (A61F 2/18, A61F 2/20 take precedence; devices providing patency to, or preventing collapsing of, tubular structures of the body, e.g. stents A61F 2/82) **[4,8]**

2/06 . . . Blood vessels **[4]**

2/08 . . Muscles; Tendons; Ligaments **[4]**

2/10 . . Hair or skin implants **[4]**

2/12 . . Mammary prostheses **[4]**

2/14 . . Eye parts, e.g. lenses, corneal implants (removable contact lenses G02C 7/04); Artificial eyes (making thereof from organic plastic material B29C, B29D 11/02) **[4]**

2/16 . . . Intraocular lenses **[4]**

2/18 . . Internal ear or nose parts, e.g. ear-drums **[4]**

2/20 . . Larynxes; Tracheae combined with larynxes or for use therewith (tracheae, bronchi per se A61F 2/04) **[4]**

2/24 . . Heart valves **[4]**

2/26 . . Penis implants **[4]**

2/28 . . Bones (joints A61F 2/30) **[4]**

2/30 . . Joints **[4]**

2/32 . . . for the hip **[4]**

2/34 . . . . Acetabular cups **[4]**

2/36 . . . . Femoral heads **[4]**

2/38 . . . for elbows or knees **[4]**

2/40 . . . for shoulders **[4]**

2/42 . . . for wrists or ankles; for hands, e.g. fingers; for feet, e.g. toes **[4]**

2/44 . . . for the spine, e.g. vertebrae, spinal discs **[4]**

2/46 . . . Special tools for implanting artificial joints (surgical instruments A61B 17/00) **[4]**

2/48 . . Operating or control means, e.g. from outside the body, control of sphincters **[4]**

2/50 . Prostheses not implantable in the body **[4]**

2/52 . . Mammary prostheses (brassières A41C 3/00) **[4]**

2/54 . . Artificial arms or hands or parts thereof **[4]**

2/56 . . . adjustable **[4]**

2/58 . . . Elbows; Wrists **[4]**

2/60 . . Artificial legs or feet or parts thereof **[4]**

2/62 . . . adjustable, e.g. adjustable shank, thigh, or tubular skeletal system **[4]**

2/64 . . . Knee joints **[4]**

2/66 . . . Feet; Ankle joints **[4]**

2/68 . . Operating or control means **[4]**

2/70 . . . electrical **[4]**

2/72 . . . . Bioelectric control, e.g. myoelectric **[4]**

2/74 . . . fluid **[4]**

2/76 . . Means for assembling, fitting, or testing prostheses, e.g. for measuring or balancing **[4]**

2/78 . . Means for protecting prostheses or for attaching them to the body, e.g. bandages, harnesses, straps, or stockings for the limb stump **[4]**

2/80 . . . Sockets, e.g. of suction type **[4]**

2/82 . Devices providing patency to, or preventing collapsing of, tubular structures of the body, e.g. stents (for closing wounds, or holding wounds closed A61B 17/03; dilators A61M 29/00) **[8]**

2/84 . . Instruments specially adapted for their placement or removal **[8]**

2/86 . . Stents formed from wire-like elements **[8]**

2/88 . . . formed as helical or spiral coils (nets formed from intersecting coils A61F 2/90) **[8]**

2/90 . . . the wire-like elements forming a net structure **[8]**

2/92 . . Stents in the form of a rolled-up sheet expanding after insertion into the vessel **[8]**

2/94 . . Stents retaining their form after locating in the predetermined place **[8]**

3/00 Lengthening pieces for natural legs

4/00 Methods or devices enabling patients or disabled persons to operate an apparatus or a device not forming part of the body (operating or control means for prostheses A61F 2/48, A61F 2/68) **[4]**

5/00 Orthopaedic methods or devices for non-surgical treatment of bones or joints (surgical instruments or methods for treatment of bones or joints, devices specially adapted therefor A61B 17/56); **Nursing devices** (bandages, dressings or absorbent pads A61F 13/00) **[3,4,5]**

Note

This group does not cover chiropractic methods or devices, which are covered by group A61H 1/00. **[7]**

5/01 . Orthopaedic devices, e.g. long-term immobilising or pressure directing devices for treating broken or deformed bones such as splints, casts or braces

5/02 . . Orthopaedic corsets

5/03 . . Corsets or bandages for abdomen, teat, or breast support, with or without pads (brassières A41C 3/00)

5/04 . . Devices for stretching or reducing fractured limbs; Devices for distractions; Splints **[4]**

5/042 . . . for extension or stretching **[6]**

5/045 . . . . Equipment for beds, treatment tables, floor frames or the like **[6]**

5/048 . . . . Traction splints **[6]**

5/05 . . . for immobilising (A61F 5/042 takes precedence) **[6]**

5/052 . . . . specially adapted to facilitate walking, e.g. ambulatory braces **[6]**

5/055 . . . . Cervical collars **[6]**

5/058 . . . . Splints (A61F 5/052 takes precedence) **[6]**

5/08 . . Devices for correcting deformities of the nose

5/10 . . Devices for correcting deformities of the fingers

5/11 . . Devices for correcting deformities of the nails

5/14 . . Special medical insertions for shoes for flat-feet, club-feet, or the like (ordinary arch supports A43B 7/14)

5/24 . . Trusses

5/26 . . . with belt springs

5/28 . . . Supports for trusses

5/30 . . Pressure pads (corn-pads, corn-rings A61F 13/06)

5/32 . . . Adjustable pressure pads

5/34 . . . Pressure pads filled with air or liquid (valves specially adapted for medical use A61M 39/00)

5/37 . Restraining devices for the body or for body parts; Restraining shirts

5/40 . Suspensory bandages

5/41 . Devices for promoting penis erection (penis implants A61F 2/26; massage of the genitals A61H 19/00) **[4]**

5/44 . Devices worn by the patient for reception of urine, faeces, catamenial or other discharge (absorbent pads, e.g. sanitary towels, A61F 13/15; drainage appliances for wounds A61M 27/00); Colostomy devices (adhesives for colostomy devices A61L 24/00; materials for colostomy devices A61L 28/00)

5/441 . . having deodorant means, e.g. filters **[4]**

5/442 . . having irrigation ports or means (irrigators A61M 3/02) **[4]**

5/443 . . having hydrocolloid type seals, e.g. gels, starches, karaya gums **[4]**

5/445 . . Colostomy devices (A61F 5/441, A61F 5/442, A61F 5/443 take precedence) **[4]**

5/447 . . . Bag anticollapse features **[4]**

5/448 . . . Means attaching bag to seal ring **[4]**

5/449 . . . Body securing means, e.g. belts, garments **[4]**

5/451 . . Genital receptacles (A61F 5/441, A61F 5/442, A61F 5/443 take precedence) **[4]**

5/452 . . . with separate faecal receiving compartment **[4]**

5/453 . . . for collecting urine or other discharge from male member (A61F 6/04 takes precedence) **[4]**

5/455 . . . for collecting urine or discharge from female member **[4]**

5/457 . . . Body securing means, e.g. belts, straps or harnesses **[4]**

5/458 . . . . adherent or inflatable type **[4]**

5/48 . Devices for preventing wetting or pollution of the bed

5/50 . Devices for preventing finger-sucking

5/56 . Devices for preventing snoring

5/58 . Apparatus for correcting stammering or stuttering

6/00 Contraceptive devices; **Pessaries**; **Applicators therefor** (chemical aspects of contraception A61K) **[5]**

6/02 . for use by males (A61F 6/20 takes precedence) **[5]**

6/04 . . Condoms, sheaths or the like **[5]**

6/06 . for use by females (A61F 6/20 takes precedence) **[5]**

6/08 . . Pessaries, i.e. devices worn in the vagina to support the uterus, remedy a malposition or prevent conception **[5]**

6/10 . . . Diaphragms **[5]**

6/12 . . . Inserters or removers **[5]**

6/14 . . intra-uterine type **[5]**

6/16 . . . inflatable **[5]**

6/18 . . . Inserters or removers **[5]**

6/20 . Vas deferens occluders; Fallopian occluders **[5]**

6/22 . . implantable in tubes **[5]**

6/24 . . . characterised by valve means **[5]**

7/00 Heating or cooling appliances for medical or therapeutic treatment of the human body (heating or cooling means in connection with bedsteads or mattresses A47C 21/00; hyperthermia using electric or magnetic fields or ultrasound A61N) **[5]**

7/02 . Compresses or poultices for effecting heating or cooling **[3]**

7/03 . . thermophore, i.e. self-heating **[3]**

7/08 . Warming pads, pans or mats (A61F 7/02 takes precedence); Hot-water bottles **[3]**

7/10 . Cooling bags, e.g. ice-bags

7/12 . Devices for heating or cooling internal body cavities

Treatment or protection of the eyes or ears; **Substitution by other senses**

9/00 **Methods or devices for treatment of the eyes**; **Devices for putting in contact-lenses**; **Devices to correct squinting**; **Apparatus to guide the blind**; **Protective devices for the eyes, carried on the body or in the hand** (caps with means for protecting the eyes A42B 1/06; visors for helmets A42B 3/22; eye baths A61H 35/02; sunglasses or goggles having the same features as spectacles G02C)

9/007 . Methods or devices for eye surgery **[6]**

9/008 . . using laser **[7]**

9/009 . . . Auxiliary devices for making contact with the eyeball and coupling-in laser light **[7]**

9/01 . . . Treatment of the cornea **[7]**

9/011 . . . invasive **[7]**

9/013 . . for compensation of ocular refraction (A61F 9/008 takes precedence) **[6,7]**

9/02 . Goggles (for swimming A63B 33/00)

9/04 . Eye-masks

9/06 . . Masks, shields, or hoods for welders (safety devices for welding in general F16P 1/00)

9/08 . Devices or methods enabling eye-patients to replace direct visual perception by another kind of perception

11/00 **Methods or devices for treatment of the ears, e.g. surgical**; **Protective devices for the ears, carried on the body or in the hand** (headwear, e.g. caps or helmets, with means for protecting the ears A42B 1/06, A42B 3/16)

11/04 . Devices or methods enabling ear patients to replace direct auditory perception by another kind of perception

11/06 . Protective devices for the ears **[5]**

11/08 . . internal, e.g. earplugs **[5]**

11/10 . . . inflatable or expandable **[5]**

11/12 . . . External mounting means **[5]**

11/14 . . external, e.g. earcaps or earmuffs **[5]**

Bandages, dressings or absorbent pads; **First-aid kits**

13/00 **Bandages or dressings** (suspensory bandages A61F 5/40; radioactive dressings A61M 36/14); **Absorbent pads** (chemical aspects of, or use of materials for, bandages, dressings or absorbent pads A61L 15/00, A61L 26/00)

13/02 . Adhesive plasters or dressings (A61F 13/06 to A61F 13/15 take precedence; surgical adhesives or cements A61L 24/00) **[4,5]**

13/04 . Plaster of Paris bandages; Other stiffening bandages (A61F 13/06 to A61F 13/15 take precedence; orthopaedic casts made from stiffening bandages A61F 5/01)

13/06 . specially adapted for feet or legs; Corn-pads; Corn-rings

13/08 . . Elastic stockings; for contracting aneurisms

13/10 . specially adapted for fingers, hands, or arms; Finger-stalls; Nail-protectors

13/12 . specially adapted for the head or neck

13/14 . specially adapted for the breast or abdomen (corsets or bandages for support of breast or abdomen A61F 5/03)

13/15 . Absorbent pads, e.g. sanitary towels, swabs or tampons for external or internal application to the body (non-absorbent catamenial receptacles A61F 5/44); Supporting or fastening means therefor; Tampon applicators **[5]**

13/20 . . Tampons, e.g. catamenial tampons; Accessories therefor **[5]**

13/22 . . . Tampons made of rolled-up material **[5]**

13/24 . . . Cup-shaped type tampons **[5]**

13/26 . . . Means for inserting tampons **[5]**

13/28 . . . . with lubricating means **[5]**

13/30 . . . . Distal portion of inserting means being deformed, expanded, or ruptured to permit passage of insert therethrough **[5]**

13/32 . . . . with slidable ejector, e.g. plunger or ram, inside tubular inserting means **[5]**

13/34 . . . Means for withdrawing tampons **[5]**

13/36 . . Surgical swabs, e.g. for absorbency or packing body cavities during surgery (A61F 13/38, A61F 13/40 take precedence) **[5]**

13/38 . . Swabs having a stick-type handle (A61F 13/40 takes precedence) **[5]**

13/40 . . having means integral therewith for supplying media to the absorbent material, e.g. contained in a rupturable reservoir **[5]**

13/42 . . with wetness indicator or alarm **[5]**

13/44 . . with radio-opaque material or signalling means for residual material **[5]**

13/45 . . characterised by the shape (cup-shaped type tampons A61F 13/24) **[7]**

13/47 . . . Sanitary towels, incontinence pads or napkins (A61F 13/49 takes precedence) **[7]**

13/471 . . . . specially adapted for male use **[7,8]**

13/472 . . . . specially adapted for female use **[7,8]**

13/474 . . . . adjustable **[7]**

13/475 . . . . characterised by edge leakage prevention means **[7]**

13/476 . . . . characterised by encircling the crotch region of the undergarment, e.g. with flaps **[7]**

13/49 . . . specially adapted to be worn around the waist, e.g. diapers, nappies **[7]**

13/491 . . . . specially adapted for gender distinct urine discharge pattern **[7]**

13/493 . . . . adjustable **[7]**

13/494 . . . . characterised by edge leakage prevention means **[7]**

13/495 . . . . with faecal cavity **[7]**

13/496 . . . . in the form of pants or briefs **[7]**

13/505 . . with separable parts, e.g. combination of disposable and reusable parts (A61F 13/20 takes precedence; supporting or fastening means A61F 13/56) **[7]**

13/51 . . characterised by the outer layers of the pads (A61F 13/20 takes precedence) **[7]**

13/511 . . . Topsheet, i.e. the permeable cover or layer facing the skin **[7]**

13/512 . . . . characterised by its apertures, e.g. perforations **[7]**

13/513 . . . . having areas of different permeability **[7]**

13/514 . . . Backsheet, i.e. the impermeable cover or layer furthest from the skin **[7]**

13/515 . . . characterised by the interconnection of the topsheet and the backsheet **[7]**

13/53 . . characterised by the absorbing medium (A61F 13/20 takes precedence) **[7]**

13/531 . . . having a homogeneous composition through the thickness of the pad (A61F 13/538, A61F 13/539 take precedence) **[7]**

13/532 . . . . inhomogeneous in the plane of the pad **[7]**

13/533 . . . . . having discontinuous areas of compression **[7]**

13/534 . . . having an inhomogeneous composition through the thickness of the pad (A61F 13/538, A61F 13/539 take precedence; homogeneous cores with tissue wrapping A61F 13/531) **[7]**
13/535 . . . . inhomogeneous in the plane of the pad, e.g. core absorbent layers being of different sizes (A61F 13/537 takes precedence) **[7]**
13/536 . . . . . having discontinuous areas of compression **[7]**
13/537 . . . . characterised by a layer facilitating or inhibiting flow in one direction or plane, e.g. a wicking layer **[7]**
13/538 . . . characterised by specific fibre orientation or weave **[7]**
13/539 . . . characterised by the connection of absorbent layers with each other or with the outer layers **[7]**
13/551 . . Packages or wrapping arrangements for used pads, e.g. for disposal **[7]**
13/56 . . Supporting or fastening means **[5]**
13/58 . . . Adhesive tab fastener elements (A61F 13/66 takes precedence) **[5]**
13/60 . . . . with release means associated with tab fasteners **[5]**
13/62 . . . Fabric strip fastener elements, e.g. hook and loop (A61F 13/66 takes precedence) **[5]**
13/64 . . . Straps, belts, ties or endless bands (A61F 13/66 takes precedence) **[5]**
13/66 . . . Garments, holders or supports not integral with absorbent pads **[5]**
13/68 . . . . abdominal enclosing type **[5]**
13/70 . . . . . with openable or removable crotch portion **[5]**
13/72 . . . . . with endless waist encircling band, e.g. panty type **[5]**
13/74 . . . . having means to retain absorbent pads **[5]**
13/76 . . . . . transverse to width of the pads or fastener elements, e.g. straps, end flaps or tucks **[5]**
13/78 . . . . . Button or snap fastener elements **[5]**
13/80 . . . . adjustable relative to body crotch area **[5]**
13/82 . . . . with means for attaching to the body **[5]**
13/84 . . Accessories, not otherwise provided for, for absorbent pads **[7]**

15/00 Auxiliary appliances for wound dressings; **Dispensing containers for dressings or bandages**
15/02 . Devices for cutting bandages of any kind, e.g. shears, cast-cutting saws

17/00 First-aid kits

A61G TRANSPORT, PERSONAL CONVEYANCES, OR ACCOMMODATION SPECIALLY ADAPTED FOR PATIENTS OR DISABLED PERSONS (appliances for aiding patients or disabled persons to walk A61H 3/00); **OPERATING TABLES OR CHAIRS**; **CHAIRS FOR DENTISTRY**; **FUNERAL DEVICES** (embalming corpses A01N 1/00)

Subclass index

1/00 Stretchers
1/003 . with facilities for picking up patients or disabled persons, e.g. break-away type or using endless belts **[5]**
1/007 . with skis or sled runners **[5]**
1/01 . Sheets specially adapted for use as or with stretchers **[5]**
1/013 . foldable or collapsible (A61G 1/017 takes precedence) **[5]**
1/017 . convertible into chairs **[5]**
1/02 . with wheels
1/04 . Parts, details or accessories, e.g. head-, foot-, or like rests specially adapted for stretchers **[5]**
1/044 . . Straps, bands or belts **[5]**
1/048 . . Handles **[5]**
1/052 . . Struts, spars or legs **[5]**
1/056 . . . Swivelling legs **[5]**
1/06 . Supports for stretchers, e.g. to be placed in or on vehicles

3/00 Ambulance aspects of vehicles; **Vehicles with special provisions for transporting patients or disabled persons, or their personal conveyances, e.g. for facilitating access of, or for loading, wheelchairs [5]**
3/02 . Loading or unloading personal conveyances; Facilitating access of patients or disabled persons to, or exit from, vehicles **[5]**
3/04 . . Transfer of seated patients or disabled persons by swinging about an upright axis **[5]**
3/06 . . Transfer using ramps, lifts or the like (A61G 3/04 takes precedence) **[5]**
3/08 . Accommodating or securing wheelchairs **[5]**

5/00 Chairs or personal conveyances specially adapted for patients or disabled persons, e.g. wheelchairs (devices enabling patients or disabled persons to operate an apparatus or device not forming part of the body A61F 4/00; bicycles specially adapted for disabled riders B62K 3/16) **[1,8]**

Note

Chairs for patients or disabled persons having removable seats specially adapted to be transferred with the patient or disabled person to a vehicle and support the patient or disabled person during use of the vehicle are classified in group A61G 3/00. **[5]**

5/02 . propelled by the patient or disabled person
5/04 . motor-driven (A61G 5/06 takes precedence; motor-operated rests A61G 5/12) **[5]**
5/06 . with obstacle-mounting facilities, e.g. for climbing stairs **[5]**
5/08 . foldable **[5]**
5/10 . Parts, details or accessories **[5]**
5/12 . . Rests specially adapted therefor, e.g. for the head or feet **[5]**
5/14 . . Standing-up or sitting-down aids **[5]**

Beds or accessories for patients or disabled persons; **Treatment rooms for medical purposes**; **Accommodation for nursing**

7/00 Beds specially adapted for nursing; **Devices for lifting patients or disabled persons** (equipment for beds, treatment tables, floor frames or the like for extending or stretching A61F 5/045; stretchers with facilities for picking up patients or disabled persons A61G 1/003) **[5,6]**
7/002 . having adjustable mattress frame **[5]**
7/005 . . tiltable around transverse horizontal axis, e.g. for Trendelenburg position **[5]**
7/008 . . tiltable around longitudinal axis, e.g. for rolling **[5]**
7/012 . . raising or lowering of the whole mattress frame (A61G 7/005, A61G 7/008 take precedence) **[5]**
7/015 . . divided into different adjustable sections, e.g. for Gatch position **[5]**
7/018 . . Control or drive mechanisms (A61G 7/005 to A61G 7/015 take precedence) **[5]**
7/02 . with toilet conveniences, or specially adapted for use with, toilets **[5]**
7/043 . Beds for promoting or observing sleep **[5]**
7/047 . Beds for special sanitary purposes (A61G 7/02 takes precedence) **[5]**
7/05 . Parts, details or accessories of beds (devices for prevention against falling out A47C 21/08, A47D 7/00) **[5]**
7/053 . . Aids for getting into, or out of, bed, e.g. steps or chairs **[5]**
7/057 . . Arrangements for preventing bed-sores or for supporting patients with burns, e.g. mattresses specially adapted therefor **[5]**
7/065 . . Rests specially adapted therefor **[5]**
7/07 . . . for the head or torso **[5]**
7/075 . . . for the limbs **[5]**
7/08 . Apparatus for transporting beds
7/10 . Devices for lifting patients or disabled persons, e.g. special adaptations of hoists thereto
7/12 . . for hoisting the patient or disabled person under the arms (A61G 7/14 takes precedence) **[5]**
7/14 . . facilitating both lifting and lateral movement of the patient or disabled person **[5]**
7/16 . . converting a lying surface into a chair **[5]**

9/00 Bed-pans, urinals or other sanitary devices for bed-ridden persons; **Cleaning devices therefor, e.g. combined with toilet-urinals** (urinals worn by the patient A61F 5/44)
9/02 . Cleaning devices **[5]**

10/00 Treatment rooms for medical purposes (baby incubators, couveuses A61G 11/00; devices for gas baths with ozone, hydrogen or the like A61H 33/14; containers or portable cabins for affording breathing protection in general A62B 31/00) **[4]**
10/02 . with artificial climate; with means to maintain a desired pressure, e.g. for germ-free rooms **[4]**
10/04 . Oxygen tents **[4]**

11/00 Baby-incubators; **Couveuses**

12/00 Accommodation for nursing, e.g. in hospitals, not covered by groups A61G 1/00 to A61G 11/00, e.g. trolleys for transport of medicaments or food; **Prescription lists**

Operating tables or chairs; **Dental chairs**

13/00 Operating tables; **Auxiliary appliances therefor** (illumination of operating tables F21L, F21S or F21V)
13/02 . Adjustable operating tables; Controls therefor **[5]**
13/04 . . tiltable around transverse or longitudinal axis **[5]**
13/06 . . raising or lowering of the whole table surface (A61G 13/04 takes precedence) **[5]**
13/08 . . the table being divided into different adjustable sections **[5]**
13/10 . Parts, details or accessories (surgical drape sheets A61B 19/08) **[5]**
13/12 . . Rests specially adapted therefor; Arrangements of patient-supporting surfaces **[5]**

15/00 Operating chairs; **Dental chairs**; **Accessories specially adapted therefor, e.g. work stands [5]**
15/02 . Chairs with means to adjust position of patient; Controls therefor **[5]**
15/04 . . to tilt patient **[5]**
15/06 . . to raise or lower patient (A61G 15/04 takes precedence) **[5]**
15/08 . . associated with seats for the surgeon or dentist **[5]**
15/10 . Parts, details or accessories (A61G 15/14 takes precedence; dental instruments A61C) **[5]**
15/12 . . Rests specially adapted therefor, e.g. for the head or feet **[5]**
15/14 . Dental work stands; Accessories therefor **[5]**
15/16 . . Storage, holding or carrying means for dental handpieces or the like **[5]**
15/18 . . . including retractor for storing flexible hose **[5]**

Funeral devices

17/00 Coffins; **Funeral wrappings**; **Funeral urns**
17/007 . characterised by the construction material used, e.g. biodegradable material; Use of several materials **[5]**
17/013 . Foldable coffins **[5]**
17/02 . Coffin closures; Packings therefor
17/04 . Fittings for coffins
17/06 . Sacks for corpses; Corpse wrappings **[5]**
17/08 . Urns

19/00 Hoisting or lowering devices for coffins

21/00 Funeral aspects of hearses or like vehicles [5]

99/00 Subject matter not provided for in other groups of this subclass [8]

A61H PHYSICAL THERAPY APPARATUS, E.G. DEVICES FOR LOCATING OR STIMULATING REFLEX POINTS IN THE BODY; ARTIFICIAL RESPIRATION; MASSAGE; BATHING DEVICES FOR SPECIAL THERAPEUTIC OR HYGIENIC PURPOSES OR SPECIFIC PARTS OF THE BODY (electrotherapy, magnetotherapy, radiation therapy, ultrasound therapy A61N)

Note

In this subclass, the following expression is used with the meaning indicated:
– "physical therapy" covers the treatment of disease or disability by means, e.g. mechanical means, as opposed to drugs or surgery. It includes, by way of example, massage, whirlpool baths and devices for exercising a passive body member.

Subclass index

1/00 Apparatus for passive exercising (A61H 5/00 takes precedence); **Vibrating apparatus**; **Chiropractic devices, e.g. body impacting devices, external devices for briefly extending or aligning unbroken bones [2]**

Note

This group does not cover orthopaedic methods or devices, which are covered by group A61F 5/00 **[7]**

1/02 . Stretching or bending apparatus for exercising

3/00 Appliances for aiding patients or disabled persons to walk about (apparatus for helping babies to walk A47D 13/04)

3/02 . Crutches

3/04 . Wheeled walking aids for patients or disabled persons

3/06 . Walking aids for blind persons (replacing direct visual perception by another kind of perception A61F 9/08)

5/00 Exercisers for the eyes

7/00 Devices for suction-kneading massage; **Devices for massaging the skin by rubbing or brushing not otherwise provided for** (electro-medical massage devices applying electric current by contact A61N 1/18)

9/00 Pneumatic or hydraulic massage

11/00 Belts, strips, or combs for massage purposes

11/02 . Massage devices with strips oscillating lengthwise

13/00 Gum massage

15/00 Massage by means of rollers, balls, e.g. inflatable, chains, or roller chains

15/02 . adapted for simultaneous treatment with light, heat, or drugs

19/00 Massage of the genitals

21/00 Massage devices for cavities of the body

23/00 Percussion or vibration massage, e.g. using supersonic vibration; **Suction-vibration massage**; **Massage with moving diaphragms**

23/02 . with electric or magnetic drive **[2]**

23/04 . with hydraulic or pneumatic drive

23/06 . Hand percussion

31/00 Artificial respiration or heart stimulation, e.g. heart massage (artificial respiration by treatment with gas or air, e.g. mouth-to-mouth respiration, A61M 16/00; applying electric currents by contact electrodes for stimulation, e.g. heart pace-makers, A61N 1/36)

31/02 . "Iron-lungs", whether or not combined with gas breathing means

33/00 Bathing devices for special therapeutic or hygienic purposes (A61H 35/00 takes precedence; for subaquatic intestinal cleaning A61M 9/00; electric or magnetic baths, applying ionised fluids A61N 1/44) **[6]**

33/02 . Bathing devices for use with gas-containing liquid, or liquid in which gas is led or generated, e.g. carbon dioxide baths

33/04 . Appliances for sand, mud, or foam baths; Appliances for metal baths, e.g. using metal salt solutions **[6]**

33/06 . Artificial hot-air or cold-air baths; Steam or gas baths or douches, e.g. sauna or Finnish baths (pneumatic chambers A61G 10/00)

33/08 . . Air douches for hygienic purposes

33/10 . . Devices on tubs for steam baths

33/12 . . Steam baths for the face
33/14 . Devices for gas baths with ozone, hydrogen, or the like

35/00 Baths for specific parts of the body, e.g. breast douches (bidets without upward-spraying means A47K 3/26; devices for cleaning the buttocks A47K 7/08; for subaquatic intestinal cleaning A61M 9/00) **[6]**
35/02 . for the eyes **[6]**
35/04 . for the nose **[6]**

36/00 Sweating suits

37/00 Accessories for massage [6]

39/00 Devices for locating or stimulating specific reflex points of the body for physical therapy, e.g. acupuncture (locating by bioelectric signal detection A61B 5/04; locating by using electric currents or magnetic fields A61B 5/05) **[2]**
39/02 . Devices for locating such points **[2]**
39/04 . Devices for pressing such points, e.g. shiatsu **[2]**
39/06 . Devices for heating or cooling such points within cell-life limits **[2]**
39/08 . Devices for applying needles to such points, i.e. for acupuncture **[2]**

99/00 Subject matter not provided for in other groups of this subclass [8]

A61J CONTAINERS SPECIALLY ADAPTED FOR MEDICAL OR PHARMACEUTICAL PURPOSES; DEVICES OR METHODS SPECIALLY ADAPTED FOR BRINGING PHARMACEUTICAL PRODUCTS INTO PARTICULAR PHYSICAL OR ADMINISTERING FORMS; DEVICES FOR ADMINISTERING FOOD OR MEDICINES ORALLY; BABY COMFORTERS; DEVICES FOR RECEIVING SPITTLE

Subclass index

1/00 Containers specially adapted for medical or pharmaceutical purposes (capsules or the like for oral use A61J 3/07; boxes for medical appliances, doctors' bags A61B 19/02; containers for radioactive substances G21F 5/00) **[4,5]**
1/03 . for pills or tablets (containers for pills or tablets with special dispensing means therefor B65D 83/04) **[5]**
1/05 . for collecting, storing or administering blood, plasma or medical fluids **[5]**
1/06 . . Ampoules or cartridges (syringe ampoules or cartridges A61M 5/28)
1/10 . . Bag-type containers **[5]**
1/12 . . . with means for holding samples of contents **[5]**
1/14 . . Details; Accessories therefor (A61J 7/00 takes precedence; openers B65D, B67B 7/00) **[5]**
1/16 . . . Holders for containers **[5]**
1/18 . . . Arrangements for indicating condition of container contents, e.g. sterile condition **[5]**
1/20 . . . Arrangements for transferring fluids, e.g. from vial to syringe **[5]**
1/22 . . . . with means for metering the amount of fluid **[5]**

3/00 Devices or methods specially adapted for bringing pharmaceutical products into particular physical or administering forms (chemical aspects, see the relevant classes)
3/02 . into the form of powders
3/04 . into the form of ointments
3/06 . into the form of pills, lozenges or dragees
3/07 . into the form of capsules or similar small containers for oral use
3/08 . into the form of suppositories or sticks
3/10 . into the form of compressed tablets (tablet presses B30B 11/00)

Administering medicines orally; **Feeding-bottles in general**; **Teats**; **Devices for receiving spittle**

7/00 Devices for administering medicines orally, e.g. spoons (weighing spoons G01G 19/56); **Pill counting devices**; **Arrangements for time indication or reminder for taking medicine**
7/02 . Pill counting devices **[5]**
7/04 . Arrangements for time indication or reminder for taking medicine, e.g. programmed dispensers **[5]**

9/00 Feeding-bottles in general
9/02 . with thermometers
9/04 . with means for supplying air
9/06 . Holders for bottles
9/08 . Protective covers for bottles

11/00 Teats
11/02 . with means for supplying air
11/04 . with means for fastening to bottles

13/00 Breast-nipple shields

15/00 Feeding-tubes for therapeutic purposes

17/00 Baby comforters; **Teething rings**
17/02 . Teething rings **[5]**

19/00 **Devices for receiving spittle, e.g. spittoons** (for dentists A61C 17/14; on invalid beds A61G 7/05)
19/02 . Sputum flasks
19/04 . Spittoons with water supply
19/06 . Combustible sputum cups

A61K **PREPARATIONS FOR MEDICAL, DENTAL, OR TOILET PURPOSES** (devices or methods specially adapted for bringing pharmaceutical products into particular physical or administering forms A61J 3/00; chemical aspects of, or use of materials for deodorisation of air, for disinfection or sterilisation, or for bandages, dressings, absorbent pads or surgical articles A61L; soap compositions C11D)

(1) This subclass covers the following subject matter, whether set forth as a composition (mixture), process of preparing the composition or process of treating using the composition:
  (a) Drug or other biological compositions which are capable of:
    – preventing, alleviating, treating or curing abnormal or pathological conditions of the living body by such means as destroying a parasitic organism, or limiting the effect of the disease or abnormality by chemically altering the physiology of the host or parasite (biocides A01N 25/00 to A01N 65/00);
    – maintaining, increasing, decreasing, limiting, or destroying a physiological body function, e.g. vitamin compositions, sex sterilants, fertility inhibitors, growth promotors, or the like (sex sterilants for invertebrates, e.g. insects, A01N; plant growth regulators A01N 25/00 to A01N 65/00); **[1,7]**
    – diagnosing a physiological condition or state by an in vivo test, e.g. X-ray contrast or skin patch test compositions (measuring or testing processes involving enzymes or micro-organisms C12Q; in vitro testing of biological material, e.g. blood, urine, G01N, e.g. G01N 33/48);
  (b) Body treating compositions generally intended for deodorising, protecting, adorning or grooming a body, e.g. cosmetics, dentifrices, tooth filling materials.

(2) Attention is drawn to the definitions of groups of chemical elements following the title of section C.

(3) Attention is drawn to the notes in class C07, for example the notes following the title of the subclass C07D, setting forth the rules for classifying organic compounds in that class, which rules are also applicable, if not otherwise indicated, to the classification of organic compounds in A61K. **[8]**

(4) In this subclass, with the exception of group A61K 8/00, in the absence of an indication to the contrary, classification is made in the last appropriate place.

(5) Therapeutic activity of medicinal preparations is further classified in subclass A61P. **[7]**

Subclass index

6/00 **Preparations for dentistry** (teeth cleaning preparations A61K 8/00, A61Q 11/00; fastening dental prostheses in the mouth using adhesive foils or adhesive compositions A61C 13/23) **[3]**
6/02 . Use of preparations for artificial teeth, for filling or for capping teeth **[3]**
6/027 . . Use of non-metallic elements or compounds thereof, e.g. carbon **[5]**
6/033 . . . Phosphorus compounds, e.g. apatite **[5]**
6/04 . . Use of metals or alloys **[3]**
6/05 . . . Amalgams **[5]**
6/06 . . Use of inorganic cements **[3]**
6/08 . . Use of natural or synthetic resins **[3]**
6/083 . . . Compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
6/087 . . . Compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
6/09 . . . . Polyurethanes **[5]**
6/093 . . . . Polyorganosilicon compounds **[5]**
6/097 . . . Polysaccharides **[5]**
6/10 . Compositions for taking dental impressions **[3]**

8/00 **Cosmetics or similar toilet preparations [8]**

Note

Use of cosmetics or similar toilet preparations is further classified in subclass A61Q. **[8]**

8/02 . characterised by special physical form **[8]**

Note

In this group, in the absence of an indication of the contrary, classification is made in the last appropriate place. **[8]**

8/03 . . Liquid compositions with two or more distinct layers **[8]**
8/04 . . Dispersions; Emulsions **[8]**
8/06 . . . Emulsions **[8]**
8/11 . . Encapsulated compositions **[8]**
8/14 . . Liposomes **[8]**
8/18 . characterised by the composition **[8]**

Note

In this group, in the absence of an indication of the contrary, classification is made in the last appropriate place. **[8]**

8/19 . . containing inorganic ingredients **[8]**
8/20 . . . Halogens; Compounds thereof **[8]**
8/21 . . . . Fluorides; Derivatives thereof **[8]**
8/22 . . . Peroxides; Oxygen; Ozone **[8]**
8/23 . . . Sulfur; Selenium; Tellurium; Compounds thereof **[8]**
8/24 . . . Phosphorus; Compounds thereof **[8]**
8/25 . . . Silicon; Compounds thereof **[8]**
8/26 . . . Aluminium; Compounds thereof **[8]**
8/27 . . . Zinc; Compounds thereof **[8]**
8/28 . . . Zirconium; Compounds thereof **[8]**
8/29 . . . Titanium; Compounds thereof **[8]**
8/30 . . containing organic compounds **[8]**
8/31 . . . Hydrocarbons **[8]**
8/33 . . . containing oxygen **[8]**
8/34 . . . . Alcohols **[8]**
8/35 . . . . Ketones, e.g. quinones, benzophenone **[8]**
8/36 . . . . Carboxylic acids; Salts or anhydrides thereof **[8]**
8/362 . . . . . Polycarboxylic acids **[8]**
8/365 . . . . . Hydroxycarboxylic acids; Ketocarboxylic acids **[8]**
8/368 . . . . . with carboxyl groups directly bound to carbon atoms of aromatic rings **[8]**
8/37 . . . . Esters of carboxylic acids **[8]**
8/38 . . . . Percompounds, e.g. peracids **[8]**
8/39 . . . . Derivatives containing from 2 to 10 oxyalkylene groups **[8]**
8/40 . . . containing nitrogen (quinones containing nitrogen A61K 8/35) **[8]**
8/41 . . . . Amines **[8]**
8/42 . . . . Amides **[8]**
8/43 . . . . Guanidines **[8]**
8/44 . . . . Aminocarboxylic acids or derivatives thereof, e.g. aminocarboxylic acids containing sulfur; Salts, esters or N-acylated derivatives thereof **[8]**
8/45 . . . . Derivatives containing from 2 to 10 oxyalkylene groups **[8]**
8/46 . . . containing sulfur (A61K 8/44 takes precedence) **[8]**
8/49 . . . containing heterocyclic compounds **[8]**
8/55 . . . containing phosphorus **[8]**
8/58 . . . containing atoms other than carbon, hydrogen, halogen, oxygen, nitrogen, sulfur or phosphorus **[8]**
8/60 . . . Sugars; Derivatives thereof **[8]**
8/63 . . . Steroids; Derivatives thereof **[8]**

Note

This group covers steroids, as defined in Note (1) after the title of subclass C07J. **[8]**

8/64 . . . Proteins; Peptides; Derivatives or degradation products thereof **[8]**
8/65 . . . . Collagen; Gelatin; Keratin; Derivatives or degradation products thereof **[8]**
8/66 . . . . Enzymes **[8]**
8/67 . . . Vitamins **[8]**
8/68 . . . Sphingolipids, e.g. ceramides, cerebrosides, gangliosides **[8]**
8/69 . . . containing fluorine **[8]**
8/70 . . . . containing perfluoro groups, e.g. perfluoroethers **[8]**
8/72 . . containing organic macromolecular compounds **[8]**
8/73 . . . Polysaccharides **[8]**
8/81 . . . obtained by reactions involving only carbon-to-carbon unsaturated bonds **[8]**
8/84 . . . obtained by reactions other than those involving only carbon-to-carbon unsaturated bonds **[8]**
8/85 . . . . Polyesters **[8]**
8/86 . . . . Polyethers **[8]**
8/87 . . . . Polyurethanes **[8]**
8/88 . . . . Polyamides **[8]**
8/89 . . . . Polysiloxanes **[8]**
8/891 . . . . . saturated, e.g. dimethicone, phenyl trimethicone, C24-C28 methicone or stearyl dimethicone **[8]**
8/892 . . . . . modified by a hydroxy group, e.g. dimethiconol **[8]**
8/893 . . . . . modified by an alkoxy or aryloxy group, e.g. behenoxy dimethicone or stearoxy dimethicone **[8]**
8/894 . . . . . modified by a polyoxyalkylene group, e.g. cetyl dimethicone copolyol **[8]**
8/895 . . . . . containing silicon bound to unsaturated aliphatic groups, e.g. vinyl dimethicone **[8]**
8/896 . . . . . containing atoms other than silicon, carbon, oxygen and hydrogen, e.g. dimethicone copolyol phosphate **[8]**
8/897 . . . . . containing halogen, e.g. fluorosilicones **[8]**
8/898 . . . . . containing nitrogen, e.g. amodimethicone, trimethyl silyl amodimethicone or dimethicone propyl PG-betaine **[8]**
8/899 . . . . . containing sulfur, e.g. sodium PG-propyldimethicone thiosulfate copolyol **[8]**
8/90 . . . Block copolymers (A61K 8/89 takes precedence) **[8]**

8/91 . . . Graft copolymers (A61K 8/89 takes precedence) **[8]**
8/92 . . Oils, fats or waxes; Derivatives thereof, e.g. hydrogenation products **[8]**
8/96 . . containing materials, or derivatives thereof, of undetermined constitution **[8]**
8/97 . . . of vegetable origin, e.g. plant extracts **[8]**
8/98 . . . of animal origin **[8]**
8/99 . . . from micro-organisms **[8]**

9/00 Medicinal preparations characterised by special physical form

9/02 . Suppositories; Bougies; Bases for suppositories or bougies (apparatus for making A61J 3/08; devices for introducing into the body A61M 31/00)
9/06 . Ointments; Bases therefor (apparatus for making A61J 3/04)
9/08 . Solutions **[2,3]**
9/10 . Dispersions; Emulsions **[2,3]**
9/107 . . Emulsions **[5]**
9/113 . . . Multiple emulsions, e.g. oil-in-water-in-oil **[5]**
9/12 . . Aerosols; Foams **[2,3]**
9/127 . . Liposomes **[5]**
9/133 . . . Unilamellar vesicles **[5]**
9/14 . Particulate form, e.g. powders (microcapsules A61K 9/50) **[2]**
9/16 . . Agglomerates; Granulates; Microbeadlets **[2]**
9/18 . . Adsorbates **[2]**
9/19 . . lyophilised **[6]**
9/20 . Pills, lozenges or tablets **[2]**
9/22 . . Sustained or differential release type **[2]**
9/24 . . . Layered or laminated unitary dosage forms **[2]**
9/26 . . . Discrete particles in supporting matrix **[2]**
9/28 . . Dragees; Coated pills or tablets **[2]**
9/30 . . . Organic coatings **[2]**
9/32 . . . . containing solid synthetic polymers **[2]**
9/34 . . . . containing natural gums or resins **[2]**
9/36 . . . . containing carbohydrates or derivatives thereof (A61K 9/34 takes precedence) **[2]**
9/38 . . . . containing proteins or derivatives thereof **[2]**
9/40 . . . . . Gelatin containing **[2]**
9/42 . . . . containing waxes, higher fatty acids, higher fatty alcohols, or derivatives thereof, e.g. chocolate **[2]**
9/44 . . printed, embossed, grooved, or perforated **[2]**
9/46 . . effervescent **[2]**
9/48 . Preparations in capsules, e.g. of gelatin, of chocolate **[2]**
9/50 . . Microcapsules (A61K 9/52 takes precedence) **[2]**
9/51 . . . Nanocapsules **[5]**
9/52 . . Sustained or differential release type **[2]**
9/54 . . . containing discrete particles with coatings of different thicknesses or different materials **[2]**
9/56 . . . . Organic coatings **[2]**
9/58 . . . . . containing solid synthetic polymers **[2]**
9/60 . . . . . containing natural gums or resins **[2]**
9/62 . . . . . containing carbohydrates or derivatives thereof (A61K 9/60 takes precedence) **[2]**
9/64 . . . . . containing proteins or derivatives thereof **[2]**
9/66 . . . containing emulsions, dispersions or solutions **[2]**
9/68 . chewing gum type **[2]**
9/70 . Web, sheet or filament bases **[2]**
9/72 . for smoking or inhaling **[2]**

(1) A composition, i.e. a mixture of two or more components, is classified in the last of groups A61K 31/00 to A61K 47/00 that provides for at least one of these components. The components may be single compounds or other single ingredients. **[8]**

(2) Any part of a composition which is not identified by the classification according to Note (1), and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups A61K 31/00 to A61K 47/00. The part can be either a single component or a composition in itself. **[8]**

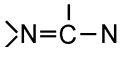
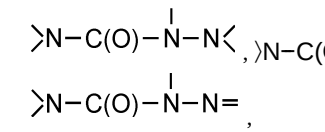
(3) Any part of a composition which is not identified by the classification according to Note (1) or (2), and which is considered to represent information of interest for search, may also be classified in the last appropriate place in groups A61K 31/00 to A61K 47/00. This can for example be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

31/00 Medicinal preparations containing organic active ingredients [2]

(1) Organic active compounds forming salts or complexes with heavy metals are not classified in groups A61K 31/28, A61K 31/555 or A61K 31/7135, unless explicit indication to the contrary is made, e.g. hemin A61K 31/555. **[7]**

(2) In this group, the expressions "containing further heterocyclic rings" and "condensed with heterocyclic rings" also cover compounds having two or more identical heterocyclic rings. **[7]**

31/01 . Hydrocarbons **[2]**
31/015 . . carbocyclic **[2]**
31/02 . Halogenated hydrocarbons **[2]**
31/025 . . carbocyclic **[2]**
31/03 . . . aromatic **[2]**
31/035 . . having aliphatic unsaturation **[2]**
31/04 . Nitro compounds **[2]**
31/045 . Hydroxy compounds, e.g. alcohols; Salts thereof, e.g. alcoholates (hydroperoxides A61K 31/327) **[2,7]**
31/047 . . having two or more hydroxy groups, e.g. sorbitol **[7]**
31/05 . . Phenols **[2]**
31/055 . . . the aromatic ring being substituted by halogen **[2]**
31/06 . . . the aromatic ring being substituted by nitro groups **[2]**
31/065 . . Diphenyl-substituted acyclic alcohols **[2]**
31/07 . . Retinol compounds, e.g. vitamin A (retinoic acids A61K 31/203) **[2,7]**
31/075 . Ethers or acetals **[2]**
31/08 . . acyclic, e.g. paraformaldehyde **[2]**
31/085 . . having an ether linkage to aromatic ring nuclear carbon **[2]**
31/09 . . . having two or more such linkages **[2]**
31/095 . Sulfur, selenium or tellurium compounds, e.g. thiols **[2]**
31/10 . . Sulfides; Sulfoxides; Sulfones **[2]**
31/105 . . Persulfides (thiuram disulfides A61K 31/145; thiosulfonic acids A61K 31/185) **[2]**

31/11 . Aldehydes **[2]**
31/115 . . Formaldehyde **[2]**
31/12 . Ketones **[2]**
31/121 . . acyclic **[7]**
31/122 . . having the oxygen atom directly attached to a ring, e.g. quinones, vitamin K_1, anthralin **[7]**
31/125 . . . Camphor; Nuclear substituted derivatives thereof **[2]**
31/13 . Amines, e.g. amantadine (A61K 31/04 takes precedence) **[2]**
31/131 . . acyclic **[7]**
31/132 . . having two or more amino groups, e.g. spermidine, putrescine **[7]**
31/133 . . having hydroxy groups, e.g. sphingosine **[7]**
31/135 . . having aromatic rings, e.g. methadone **[2,7]**
31/136 . . . having the amino group directly attached to the aromatic ring, e.g. benzeneamine **[7]**
31/137 . . . Arylalkylamines, e.g. amphetamine, epinephrine, salbutamol, ephedrine **[7]**
31/138 . . . Aryloxyalkylamines, e.g. propranolol, tamoxifen, phenoxybenzamine (atenolol A61K 31/165; pindolol A61K 31/404; timolol A61K 31/5377) **[7]**
31/14 . . Quaternary ammonium compounds, e.g. edrophonium, choline (betaines A61K 31/205) **[2]**
31/145 . . having sulfur atoms, e.g. thiurams $(\rangle N-C(S)-S-C(S)-N\langle$ or $\rangle N-C(S)-S-S-C(S)-N\langle)$; Sulfinylamines $(-N=SO)$; Sulfonylamines $(-N=SO_2)$ (isothioureas A61K 31/155) **[2,7]**
31/15 . . Oximes $(\rangle C=N-O-)$; Hydrazines $(\rangle N-N\langle)$; Hydrazones $(\rangle N-N=)$ **[2]**
31/155 . . Amidines (), e.g. guanidine $(H_2N-C(=NH)-NH_2)$, isourea $(HN=C(OH)NH_2)$, isothiourea $(HN=C(SH)-NH_2)$ **[2]**
31/16 . Amides, e.g. hydroxamic acids **[2]**
31/164 . . of a carboxylic acid with an aminoalcohol, e.g. ceramides **[7]**
31/165 . . having aromatic rings, e.g. colchicine, atenolol, progabide **[2]**
31/166 . . . having the carbon atom of a carboxamide group directly attached to the aromatic ring, e.g. procainamide, procarbazine, metoclopramide, labetalol **[7]**
31/167 . . . having the nitrogen atom of a carboxamide group directly attached to the aromatic ring, e.g. lidocaine, paracetamol **[7]**
31/17 . . having the group $\rangle N-C(O)-N\langle$ or $\rangle N-C(S)-N\langle$, e.g. urea, thiourea, carmustine (isoureas, isothioureas A61K 31/155; sulfonylureas A61K 31/64) **[2,7]**
31/175 . . . having the group  , $\rangle N-C(O)-N=N-$ or , e.g. carbonohydrazides, carbazones, semicarbazides, semicarbazones; Thioanalogues thereof **[2,7]**
31/18 . . Sulfonamides (compounds containing a para-N-benzene-sulfonyl-N-group A61K 31/63) **[2]**
31/185 . Acids; Anhydrides, halides or salts thereof, e.g. sulfur acids, imidic, hydrazonic or hydroximic acids (hydroxamic acids A61K 31/16; peroxy acids A61K 31/327) **[2,7]**
31/19 . . Carboxylic acids, e.g. valproic acid (salicylic acid A61K 31/60) **[2,7]**
31/191 . . . Acyclic acids having two or more hydroxy groups, e.g. gluconic acid **[7]**
31/192 . . . having aromatic groups, e.g. sulindac, 2-aryl-propionic acids, ethacrynic acid **[7]**
31/194 . . . having two or more carboxyl groups, e.g. succinic, maleic or phthalic acid **[7]**
31/195 . . . having an amino group **[2,7]**

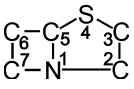
Note

In this group, the expression “amino group” also covers “acyl amino group”. **[7]**

31/196 . . . . the amino group being directly attached to a ring, e.g. anthranilic acid, mefenamic acid, diclofenac, chlorambucil **[7]**
31/197 . . . . the amino and the carboxyl groups being attached to the same acyclic carbon chain, e.g. gamma-aminobutyric acid (GABA), beta-alanine, epsilon-aminocaproic acid, pantothenic acid (carnitine A61K 31/205) **[7]**
31/198 . . . . . Alpha-amino acids, e.g. alanine, edetic acid (EDTA) (betaine A61K 31/205; proline A61K 31/401; tryptophan A61K 31/405; histidine A61K 31/4172; peptides not degraded to individual amino acids A61K 38/00) **[7]**
31/20 . . . having a carboxyl group bound to an acyclic chain of seven or more carbon atoms, e.g. stearic, palmitic or arachidic acid **[2]**
31/201 . . . . having one or two double bonds, e.g. oleic or linoleic acid **[7]**
31/202 . . . . having three or more double bonds, e.g. linolenic acid (eicosanoids, e.g. leukotrienes, A61K 31/557) **[7]**
31/203 . . . . Retinoic acids **[7]**
31/205 . . Amine addition salts of organic acids; Inner quaternary ammonium salts, e.g. betaine, carnitine **[2]**
31/21 . Esters, e.g. nitroglycerine, selenocyanates **[2]**
31/215 . . of carboxylic acids **[2]**
31/216 . . . of acids having aromatic rings, e.g. benactizyne, clofibrate **[7]**
31/22 . . . of acyclic acids, e.g. pravastatin **[2]**
31/221 . . . . with compounds having an amino group, e.g. acetylcholine, acetylcarnitine **[7]**
31/222 . . . . with compounds having aromatic groups, e.g. dipivefrine, ibopamine **[7]**
31/223 . . . . of alpha-amino acids **[7]**
31/225 . . . . Polycarboxylic acids **[2]**
31/23 . . . . of acids having a carboxyl group bound to a chain of seven or more carbon atoms **[2]**
31/231 . . . . . having one or two double bonds **[7]**
31/232 . . . . . having three or more double bonds, e.g. etretinate **[7]**
31/235 . . . having an aromatic ring attached to a carboxyl group **[2]**
31/24 . . . . having an amino or nitro group **[2]**

31/245 . . . . . Amino benzoic acid types, e.g. procaine, novocaine (salicylic acid esters A61K 31/60) **[2]**
31/25 . . . with polyoxyalkylated alcohols, e.g. esters of polyethylene glycol **[2]**
31/255 . . of sulfoxy acids or sulfur analogues thereof **[2]**
31/26 . . Cyanate or isocyanate esters; Thiocyanate or isothiocyanate esters **[2,7]**
31/265 . . of carbonic, thiocarbonic or thiocarboxylic acids, e.g. thioacetic acid, xanthogenic acid, trithiocarbonic acid **[2]**
31/27 . . of carbamic or thiocarbamic acids, e.g. meprobamate, carbachol, neostigmine **[2]**
31/275 . Nitriles; Isonitriles **[2]**
31/277 . . having a ring, e.g. verapamil **[7]**
31/28 . Compounds containing heavy metals **[2]**
31/282 . . Platinum compounds **[7]**
31/285 . . Arsenic compounds **[2]**
31/29 . . Antimony or bismuth compounds **[2]**
31/295 . . Iron group metal compounds **[2]**
31/30 . . Copper compounds **[2]**
31/305 . . Mercury compounds **[2]**
31/31 . . . containing nitrogen **[2]**
31/315 . . Zinc compounds **[2]**
31/32 . . Tin compounds **[2]**
31/325 . Carbamic acids; Thiocarbamic acids; Anhydrides or salts thereof (thiurams A61K 31/145) **[2]**
31/327 . Peroxy compounds, e.g. hydroperoxides, peroxides, peroxy acids **[7]**
31/33 . Heterocyclic compounds **[2]**
31/335 . . having oxygen as the only ring hetero atom, e.g. fungichromin **[2]**
31/336 . . . having three-membered rings, e.g. oxirane, fumagillin **[7]**
31/337 . . . having four-membered rings, e.g. taxol **[7]**
31/34 . . . having five-membered rings with one oxygen as the only ring hetero atom, e.g. isosorbide **[2]**
31/341 . . . . not condensed with another ring, e.g. ranitidine, furosemide, bufetolol, muscarine **[7]**
31/343 . . . . condensed with a carbocyclic ring, e.g. coumaran, bufuralol, befunolol, clobenfurol, amiodarone **[7]**
31/345 . . . . Nitrofurans (nitrofurantoin A61K 31/4178) **[2,7]**
31/35 . . . having six-membered rings with one oxygen as the only ring hetero atom **[2]**
31/351 . . . . not condensed with another ring **[7]**
31/352 . . . . condensed with carbocyclic rings, e.g. cannabinols, methantheline **[7]**
31/353 . . . . . 3,4-Dihydrobenzopyrans, e.g. chroman, catechin **[7]**
31/355 . . . . . Tocopherols, e.g. vitamin E **[2]**
31/357 . . . having two or more oxygen atoms in the same ring, e.g. crown ethers, guanadrel **[7]**
31/36 . . . . Compounds containing methylenedioxyphenyl groups, e.g. sesamin **[2]**
31/365 . . . Lactones **[2]**
31/366 . . . . having six-membered rings, e.g. delta-lactones **[7]**
31/37 . . . . . Coumarins, e.g. psoralen **[2]**
31/375 . . . . Ascorbic acid, i.e. vitamin C; Salts thereof **[2]**
31/38 . . having sulfur as a ring hetero atom **[2]**
31/381 . . . having five-membered rings **[7]**
31/382 . . . having six-membered rings, e.g. thioxanthenes (thiothixene A61K 31/496) **[7]**
31/385 . . . having two or more sulfur atoms in the same ring **[2]**
31/39 . . . having oxygen atoms in the same ring **[2]**
31/395 . . having nitrogen as a ring hetero atom, e.g. guanethidine, rifamycins (rifampin A61K 31/496) **[2,7]**
31/396 . . . having three-membered rings, e.g. aziridine **[7]**
31/397 . . . having four-membered rings, e.g. azetidine **[7]**
31/40 . . . having five-membered rings with one nitrogen as the only ring hetero atom, e.g. sulpiride, succinimide, tolmetin, buflomedil **[2]**
31/401 . . . . Proline; Derivatives thereof, e.g. captopril **[7]**
31/4015 . . . . having oxo groups directly attached to the heterocyclic ring, e.g. piracetam, ethosuximide **[7]**
31/402 . . . . 1-aryl-substituted, e.g. piretanide **[7]**
31/4025 . . . . not condensed and containing further heterocyclic rings, e.g. cromakalim **[7]**
31/403 . . . . condensed with carbocyclic rings, e.g. carbazole **[7]**
31/4035 . . . . . Isoindoles, e.g. phthalimide **[7]**
31/404 . . . . . Indoles, e.g. pindolol **[7]**
31/4045 . . . . . Indole-alkylamines; Amides thereof, e.g. serotonin, melatonin **[7]**
31/405 . . . . . Indole-alkanecarboxylic acids; Derivatives thereof, e.g. tryptophan, indomethacin **[2]**
31/407 . . . . condensed with heterocyclic ring systems, e.g. ketorolac, physostigmine **[7]**
31/409 . . . . having four such rings, e.g. porphine derivatives, bilirubin, biliverdine (hemin, hematin A61K 31/555) **[7]**
31/41 . . . having five-membered rings with two or more ring hetero atoms, at least one of which is nitrogen, e.g. tetrazole **[2]**
31/415 . . . . 1,2-Diazoles **[2,7]**
31/4152 . . . . . having oxo groups directly attached to the heterocyclic ring, e.g. antipyrine, phenylbutazone, sulfinpyrazone **[7]**
31/4155 . . . . . not condensed and containing further heterocyclic rings **[7]**
31/416 . . . . . condensed with carbocyclic ring systems, e.g. indazole **[7]**
31/4162 . . . . . condensed with heterocyclic ring systems **[7]**
31/4164 . . . . 1,3-Diazoles **[7]**
31/4166 . . . . . having oxo groups directly attached to the heterocyclic ring, e.g. phenytoin **[7]**
31/4168 . . . . . having a nitrogen atom attached in position 2, e.g. clonidine **[7]**
31/417 . . . . . Imidazole-alkylamines, e.g. histamine, phentolamine **[7]**
31/4172 . . . . . Imidazole-alkanecarboxylic acids, e.g. histidine **[7]**
31/4174 . . . . . Arylalkylimidazoles, e.g. oxymetazolin, naphazoline, miconazole **[7]**
31/4178 . . . . . not condensed and containing further heterocyclic rings, e.g. pilocarpine, nitrofurantoin **[7]**
31/4184 . . . . . condensed with carbocyclic rings, e.g. benzimidazoles **[7]**
31/4188 . . . . . condensed with heterocyclic ring systems, e.g. biotin, sorbinil **[7]**
31/4192 . . . . 1,2,3-Triazoles **[7]**

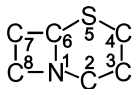
31/4196 . . . . 1,2,4-Triazoles **[7]**
31/42 . . . . Oxazoles **[2,7]**
31/421 . . . . . 1,3-Oxazoles, e.g. pemoline, trimethadione **[7]**
31/422 . . . . . not condensed and containing further heterocyclic rings **[7]**
31/423 . . . . . condensed with carbocyclic rings **[7]**
31/424 . . . . . condensed with heterocyclic ring systems, e.g. clavulanic acid **[7]**
31/4245 . . . . Oxadiazoles **[7]**
31/425 . . . . Thiazoles **[2,7]**
31/426 . . . . . 1,3-Thiazoles **[7]**
31/427 . . . . . not condensed and containing further heterocyclic rings **[7]**
31/428 . . . . . condensed with carbocyclic rings **[7]**
31/429 . . . . . condensed with heterocyclic ring systems **[7]**
31/43 . . . . . Compounds containing 4-thia-1-azabicyclo [3.2.0] heptane ring systems, i.e. compounds containing a ring system of the formula



, e.g. penicillins, penems **[2,6]**
31/431 . . . . . containing further heterocyclic ring systems, e.g. ticarcillin, azlocillin, oxacillin **[7]**
31/433 . . . . Thiadiazoles **[7]**
31/435 . . . having six-membered rings with one nitrogen as the only ring hetero atom **[2]**
31/4353 . . . . ortho- or peri-condensed with heterocyclic ring systems **[7]**
31/4355 . . . . . the heterocyclic ring system containing a five-membered ring having oxygen as a ring hetero atom **[7]**
31/436 . . . . . the heterocyclic ring system containing a six-membered ring having oxygen as a ring hetero atom, e.g. rapamycin **[7]**
31/4365 . . . . . the heterocyclic ring system having sulfur as a ring hetero atom, e.g. ticlopidine **[7]**
31/437 . . . . . the heterocyclic ring system containing a five-membered ring having nitrogen as a ring hetero atom, e.g. indolizine, beta-carboline **[7]**
31/4375 . . . . . the heterocyclic ring system containing a six-membered ring having nitrogen as a ring hetero atom, e.g. quinolizines, naphthyridines, berberine, vincamine **[7]**
31/438 . . . . the ring being spiro-condensed with carbocyclic or heterocyclic ring systems **[7]**
31/439 . . . . the ring forming part of a bridged ring system, e.g. quinuclidine (8-azabicyclo [3.2.1] octanes A61K 31/46) **[7]**
31/44 . . . . Non-condensed pyridines; Hydrogenated derivatives thereof **[2,7]**
31/4402 . . . . . only substituted in position 2, e.g. pheniramine, bisacodyl **[7]**
31/4406 . . . . . only substituted in position 3, e.g. zimeldine (nicotinic acid A61K 31/455) **[7]**
31/4409 . . . . . only substituted in position 4, e.g. isoniazid, iproniazid **[7]**
31/4412 . . . . . having oxo groups directly attached to the heterocyclic ring **[7]**
31/4415 . . . . . Pyridoxine, i.e.vitamin B_6 (pyridoxal phosphate A61K 31/675) **[7]**
31/4418 . . . . . having a carbocyclic ring directly attached to the heterocyclic ring, e.g. cyproheptadine **[7]**
31/4422 . . . . . 1,4-Dihydropyridines, e.g. nifedipine, nicardipine **[7]**
31/4425 . . . . . Pyridinium derivatives, e.g. pralidoxime, pyridostigmine **[7]**
31/4427 . . . . . containing further heterocyclic ring systems **[7]**
31/443 . . . . . containing a five-membered ring with oxygen as a ring hetero atom **[7]**
31/4433 . . . . . containing a six-membered ring with oxygen as a ring hetero atom **[7]**
31/4436 . . . . . containing a heterocyclic ring having sulfur as a ring hetero atom **[7]**
31/4439 . . . . . containing a five-membered ring with nitrogen as a ring hetero atom, e.g. omeprazole (nicotine A61K 31/465) **[7]**
31/444 . . . . . containing a six-membered ring with nitrogen as a ring hetero atom, e.g. amrinone **[7]**
31/445 . . . . . Non-condensed piperidines, e.g. piperocaine **[2,7]**
31/4453 . . . . . only substituted in position 1, e.g. propipocaine, diperodon **[7]**
31/4458 . . . . . only substituted in position 2, e.g. methylphenidate **[7]**
31/4462 . . . . . only substituted in position 3 **[7]**
31/4465 . . . . . only substituted in position 4 **[7]**
31/4468 . . . . . having a nitrogen atom directly attached in position 4, e.g. clebopride, fentanyl **[7]**
31/45 . . . . . having oxo groups directly attached to the heterocyclic ring, e.g. cycloheximide **[2,7]**
31/451 . . . . . having a carbocyclic ring directly attached to the heterocyclic ring, e.g. glutethimide, meperidine, loperamide, phencyclidine, piminodine **[7]**
31/4515 . . . . . having a butyrophenone group in position 1, e.g. haloperidol (pipamperone A61K 31/4545) **[7]**
31/452 . . . . . Piperidinium derivatives (pancuronium A61K 31/58) **[7]**
31/4523 . . . . . containing further heterocyclic ring systems **[7]**
31/4525 . . . . . containing a five-membered ring with oxygen as a ring hetero atom **[7]**
31/453 . . . . . containing a six-membered ring with oxygen as a ring hetero atom **[7]**
31/4535 . . . . . containing a heterocyclic ring having sulfur as a ring hetero atom, e.g. pizotifen **[7]**
31/454 . . . . . containing a five-membered ring with nitrogen as a ring hetero atom, e.g. pimozide, domperidone **[7]**
31/4545 . . . . . containing a six-membered ring with nitrogen as a ring hetero atom, e.g. pipamperone, anabasine **[7]**
31/455 . . . . . Nicotinic acid, i.e. niacin; Derivatives thereof, e.g. esters, amides **[2]**

31/46 . . . . 8-Azabicyclo [3.2.1] octane; Derivatives thereof, e.g. atropine, cocaine **[2]**
31/465 . . . . Nicotine; Derivatives thereof **[2]**
31/47 . . . . Quinolines; Isoquinolines **[2]**
31/4704 . . . . . 2-Quinolinones, e.g. carbostyril **[7]**
31/4706 . . . . . 4-Aminoquinolines; 8-Aminoquinolines, e.g. chloroquine, primaquine **[7]**
31/4709 . . . . . Non-condensed quinolines containing further heterocyclic rings **[7]**
31/472 . . . . . Non-condensed isoquinolines, e.g. papaverine **[7]**
31/4725 . . . . . . containing further heterocyclic rings **[7]**
31/473 . . . . . ortho- or peri-condensed with carbocyclic ring systems, e.g. acridines, phenanthridines **[7]**
31/4738 . . . . . ortho- or peri-condensed with heterocyclic ring systems **[7]**
31/4741 . . . . . . condensed with ring systems having oxygen as a ring hetero atom, e.g. tubocuraran derivatives, noscapine, bicuculline **[7]**
31/4743 . . . . . . condensed with ring systems having sulfur as a ring hetero atom **[7]**
31/4745 . . . . . . condensed with ring systems having nitrogen as a ring hetero atom, e.g. phenanthrolines (yohimbine derivatives, vinblastine A61K 31/475; ergoline derivatives A61K 31/48) **[7]**
31/4747 . . . . . spiro-condensed **[7]**
31/4748 . . . . . forming part of bridged ring systems (strychnine A61K 31/475; morphinan derivatives A61K 31/485) **[7]**
31/475 . . . . . having an indole ring, e.g. yohimbine, reserpine, strychnine, vinblastine (vincamine A61K 31/4375) **[2,7]**
31/48 . . . . . Ergoline derivatives, e.g. lysergic acid, ergotamine **[2,7]**
31/485 . . . . . Morphinan derivatives, e.g. morphine, codeine **[2,7]**
31/49 . . . . . Cinchonan derivatives, e.g. quinine **[2,7]**
31/495 . . . having six-membered rings with two nitrogen atoms as the only ring hetero atoms, e.g. piperazine (A61K 31/48 takes precedence) **[2]**
31/496 . . . . Non-condensed piperazines containing further heterocyclic rings, e.g. rifampin, thiothixene **[7]**
31/4965 . . . . Non-condensed pyrazines **[7]**
31/497 . . . . . containing further heterocyclic rings **[7]**
31/498 . . . . Pyrazines or piperazines ortho- or peri-condensed with carbocyclic ring systems, e.g. quinoxaline, phenazine **[7]**
31/4985 . . . . Pyrazines or piperazines ortho- or peri-condensed with heterocyclic ring systems **[7]**
31/499 . . . . Spiro-condensed pyrazines or piperazines **[7]**
31/4995 . . . . Pyrazines or piperazines forming part of bridged ring systems **[7]**
31/50 . . . . Pyridazines; Hydrogenated pyridazines **[2,7]**
31/501 . . . . . not condensed and containing further heterocyclic rings **[7]**
31/502 . . . . . ortho- or peri-condensed with carbocyclic ring systems, e.g. cinnoline, phthalazine **[7]**
31/5025 . . . . . ortho- or peri-condensed with heterocyclic ring systems **[7]**
31/503 . . . . . spiro-condensed **[7]**
31/504 . . . . . forming part of bridged ring systems **[7]**
31/505 . . . . Pyrimidines; Hydrogenated pyrimidines, e.g. trimethoprim **[2,7]**
31/506 . . . . . not condensed and containing further heterocyclic rings **[7]**
31/51 . . . . . Thiamines, e.g. vitamin B_1 **[2]**
31/513 . . . . . having oxo groups directly attached to the heterocyclic ring, e.g. cytosine **[7]**
31/515 . . . . . Barbituric acids; Derivatives thereof, e.g. sodium pentobarbital **[2]**
31/517 . . . . . ortho- or peri-condensed with carbocyclic ring systems, e.g. quinazoline, perimidine **[7]**
31/519 . . . . . ortho- or peri-condensed with heterocyclic rings **[7]**
31/52 . . . . . Purines, e.g. adenine **[2,7]**
31/522 . . . . . . having oxo groups directly attached to the heterocyclic ring, e.g. hypoxanthine, guanine, acyclovir **[7]**
31/525 . . . . . Isoalloxazines, e.g. riboflavins, vitamin B_2 **[2]**
31/527 . . . . . spiro-condensed **[7]**
31/529 . . . . . forming part of bridged ring systems **[7]**
31/53 . . . having six-membered rings with three nitrogens as the only ring hetero atoms, e.g. chlorazanil, melamine (melarsoprol A61K 31/555) **[2]**
31/535 . . . having six-membered rings with at least one nitrogen and at least one oxygen as the ring hetero atoms, e.g. 1,2-oxazines **[2]**
31/5355 . . . . Non-condensed oxazines containing further heterocyclic rings **[7]**
31/536 . . . . ortho- or peri-condensed with carbocyclic ring systems **[7]**
31/5365 . . . . ortho- or peri-condensed with heterocyclic ring systems **[7]**
31/537 . . . . spiro-condensed or forming part of bridged ring systems **[7]**
31/5375 . . . . 1,4-Oxazines, e.g. morpholine **[7]**
31/5377 . . . . . not condensed and containing further heterocyclic rings, e.g. timolol **[7]**
31/538 . . . . . ortho- or peri-condensed with carbocyclic ring systems **[7]**
31/5383 . . . . . ortho- or peri-condensed with heterocyclic ring systems **[7]**
31/5386 . . . . . spiro-condensed or forming part of bridged ring systems **[7]**
31/539 . . . . having two or more oxygen atoms in the same ring, e.g dioxazines **[7]**
31/5395 . . . . having two or more nitrogen atoms in the same ring, e.g. oxadiazines **[7]**
31/54 . . . having six-membered rings with at least one nitrogen and at least one sulfur as the ring hetero atoms, e.g. sulthiame **[2]**
31/541 . . . . Non-condensed thiazines containing further heterocyclic rings **[7]**
31/5415 . . . . ortho- or peri-condensed with carbocyclic ring systems, e.g. phenothiazine, chlorpromazine, piroxicam **[7]**
31/542 . . . . ortho- or peri-condensed with heterocyclic ring systems **[7]**

31/545 . . . . . Compounds containing 5-thia-1-azabicyclo [4.2.0] octane ring systems, i.e. compounds containing a ring system of the formula



, e.g. cephalosporins, cefaclor, cephalexine **[2,6]**

31/546 . . . . . containing further heterocyclic rings, e.g. cephalothin **[7]**

31/547 . . . . spiro-condensed or forming part of bridged ring systems **[7]**

31/548 . . . . having two or more sulfur atoms in the same ring **[7]**

31/549 . . . . having two or more nitrogen atoms in the same ring, e.g. hydrochlorothiazide **[7]**

31/55 . . . having seven-membered rings, e.g. azelastine, pentylenetetrazole **[2]**

31/551 . . . . having two nitrogens as ring hetero atoms, e.g. clozapine, dilazep **[7]**

31/5513 . . . . . 1,4-Benzodiazepines, e.g. diazepam **[7]**

31/5517 . . . . . condensed with five-membered rings having nitrogen as a ring hetero atom, e.g. imidazobenzodiazepines, triazolam **[7]**

31/553 . . . . having at least one nitrogen and at least one oxygen as ring hetero atoms, e.g. loxapine, staurosporine **[7]**

31/554 . . . . having at least one nitrogen and at least one sulfur as ring hetero atoms, e.g. clothiapine, diltiazem **[7]**

31/555 . . containing heavy metals, e.g. hemin, hematin, melarsoprol **[2]**

31/557 . Eicosanoids, e.g. leukotrienes **[3,7]**

31/5575 . . having a cyclopentane ring, e.g. prostaglandin E_2, prostaglandin $F_{2\text{-alpha}}$ **[7]**

31/5578 . . having a pentalene ring system, e.g. carbacyclin, iloprost **[7]**

31/558 . . having heterocyclic rings containing oxygen as the only ring hetero atom, e.g. thromboxanes **[7]**

31/5585 . . . having five-membered rings containing oxygen as the only ring hetero atom, e.g. prostacyclin **[7]**

31/559 . . having heterocyclic rings containing hetero atoms other than oxygen **[7]**

31/56 . Compounds containing cyclopenta[a]hydrophenanthrene ring systems; Derivatives thereof, e.g. steroids **[4,7]**

Note

Attention is drawn to Note (1) following the title of subclass C07J, which explains what is covered by the term “steroids”. **[7]**

31/565 . . not substituted in position 17 beta by a carbon atom, e.g. oestrane, oestradiol **[2]**

31/566 . . . having an oxo group in position 17, e.g. oestrone **[7]**

31/567 . . . substituted in position 17 alpha, e.g. mestranol, norethandrolone **[7]**

31/568 . . . substituted in positions 10 and 13 by a chain having at least one carbon atom, e.g. androstane, testosterone **[7]**

31/5685 . . . . having an oxo group in position 17, e.g. androsterone **[7]**

31/569 . . . . substituted in position 17 alpha, e.g. ethisterone **[7]**

31/57 . . substituted in position 17 beta by a chain of two carbon atoms, e.g. pregnane, progesterone **[2]**

31/573 . . . substituted in position 21, e.g. cortisone, dexamethasone, prednisone **[7]**

31/575 . . substituted in position 17 beta by a chain of three or more carbon atoms, e.g. cholane, cholestane, ergosterol, sitosterol **[2]**

31/58 . . containing heterocyclic rings, e.g. aldosterone, danazol, stanozolol, pancuronium, digitogenin (digitoxin A61K 31/704) **[2,7]**

31/585 . . . containing lactone rings, e.g. oxandrolone, bufalin **[2]**

31/59 . Compounds containing 9,10-seco-cyclopenta[a]hydro- phenanthrene ring systems **[2]**

31/592 . . 9,10-Secoergostane derivatives, e.g. ergocalciferol, vitamin D_2 **[7]**

31/593 . . 9,10-Secocholestane derivatives, e.g. cholecalciferol, vitamin D_3 **[7]**

31/60 . Salicylic acid; Derivatives thereof **[2]**

31/603 . . having further aromatic rings, e.g. diflunisal **[7]**

31/606 . . having amino groups **[7]**

31/609 . . Amides, e.g. salicylamide **[7]**

31/612 . . having the hydroxy group in position 2 esterified, e.g. salicylsulfuric acid (fosfosal A61K 31/661) **[7]**

31/616 . . . by carboxylic acids, e.g. acetylsalicylic acid **[7]**

31/618 . . having the carboxyl group in position 1 esterified, e.g. salsalate **[7]**

31/621 . . . having the hydroxy group in position 2 esterified, e.g. benorylate **[7]**

31/625 . . having heterocyclic substituents, e.g. 4-salicyloylmorpholine (sulfasalazine A61K 31/635) **[2,7]**

31/63 . Compounds containing para-N-benzene- sulfonyl-N-groups, e.g. sulfanilamide, p-nitrobenzenesulfonohydrazide **[2]**

31/635 . . having a heterocyclic ring, e.g. sulfasalazine **[2]**

31/64 . Sulfonylureas, e.g. glibenclamide, tolbutamide, chlorpropamide **[2]**

31/65 . Tetracyclines **[2]**

31/655 . Azo (−N=N−), diazo (=N_2), azoxy (〉N−O−N〈 or N(=O)−N〈), azido (−N_3) or diazoamino (−N=N−N〈) compounds **[2]**

31/66 . Phosphorus compounds **[2]**

31/661 . . Phosphorus acids or esters thereof not having P−C bonds, e.g. fosfosal, dichlorvos, malathion **[7]**

31/6615 . . . Compounds having two or more esterified phosphorus acid groups, e.g. inositol triphosphate, phytic acid **[7]**

31/662 . . Phosphorus acids or esters thereof having P−C bonds, e.g. foscarnet, trichlorfon **[7]**

31/663 . . . Compounds having two or more phosphorus acid groups or esters thereof, e.g. clodronic acid, pamidronic acid **[7]**

31/664 . . Amides of phosphorus acids **[7]**

31/665 . . having oxygen as a ring hetero atom, e.g. fosfomycin **[2]**

31/67 . . having sulfur as a ring hetero atom **[2]**

31/675 . . having nitrogen as a ring hetero atom, e.g. pyridoxal phosphate **[2]**

31/683 . . Diesters of a phosphorus acid with two hydroxy compounds, e.g. phosphatidylinositols **[7]**

31/685 . . . one of the hydroxy compounds having nitrogen atoms, e.g. phosphatidylserine, lecithin **[2,7]**

31/688 . . . both hydroxy compounds having nitrogen atoms, e.g. sphingomyelins **[7]**

31/69 . Boron compounds **[2]**

31/695 . Silicon compounds **[2]**

31/70 . Carbohydrates; Sugars; Derivatives thereof (sorbitol A61K 31/047) **[2,7]**

Note

In this group, the expressions are used with the meanings indicated in Note (3) following the title of subclass C07H. **[7]**

31/7004 . . Monosaccharides having only carbon, hydrogen and oxygen atoms **[7]**

31/7008 . . Compounds having an amino group directly attached to a carbon atom of the saccharide radical, e.g. D-galactosamine, ranimustine **[7]**

31/7012 . . Compounds having a free or esterified carboxyl group attached, directly or through a carbon chain, to a carbon atom of the saccharide radical, e.g. glucuronic acid, neuraminic acid (gluconic acid A61K 31/191; ascorbic acid A61K 31/375) **[7]**

31/7016 . . Disaccharides, e.g. lactose, lactulose (lactobionic acid A61K 31/7032) **[7]**

31/702 . . Oligosaccharides, i.e. having three to five saccharide radicals attached to each other by glycosidic linkages **[7]**

31/7024 . . Esters of saccharides **[7]**

31/7028 . . Compounds having saccharide radicals attached to non-saccharide compounds by glycosidic linkages **[7]**

31/7032 . . . attached to a polyol, i.e. compounds having two or more free or esterified hydroxy groups, including the hydroxy group involved in the glycosidic linkage, e.g. monoglucosyl-diacylglycerides, lactobionic acid, gangliosides **[7]**

31/7034 . . . attached to a carbocyclic compound, e.g. phloridzin **[7]**

31/7036 . . . . having at least one amino group directly attached to the carbocyclic ring, e.g. streptomycin, gentamycin, amikacin, validamycin, fortimicins **[7]**

31/704 . . . . attached to a condensed carbocyclic ring system, e.g. sennosides, thiocolchicosides, escin, daunorubicin, digitoxin **[7]**

31/7042 . . Compounds having saccharide radicals and heterocyclic rings **[7]**

31/7048 . . . having oxygen as a ring hetero atom, e.g. leucoglucosan, hesperidin, erythromycin, nystatin **[7]**

31/7052 . . . having nitrogen as a ring hetero atom, e.g. nucleosides, nucleotides **[7]**

31/7056 . . . . containing five-membered rings with nitrogen as a ring hetero atom **[7]**

31/706 . . . . containing six-membered rings with nitrogen as a ring hetero atom **[7]**

31/7064 . . . . . containing condensed or non-condensed pyrimidines **[7]**

31/7068 . . . . . having oxo groups directly attached to the pyrimidine ring, e.g. cytidine, cytidylic acid **[7]**

31/7072 . . . . . having two oxo groups directly attached to the pyrimidine ring, e.g. uridine, uridylic acid, thymidine, zidovudine **[7]**

31/7076 . . . . . containing purines, e.g. adenosine, adenylic acid **[7]**

31/708 . . . . . having oxo groups directly attached to the purine ring system, e.g. guanosine, guanylic acid **[7]**

31/7084 . . Compounds having two nucleosides or nucleotides, e.g. nicotinamide-adenine dinucleotide, flavine-adenine dinucleotide **[7]**

31/7088 . . Compounds having three or more nucleosides or nucleotides **[7]**

31/7105 . . . Natural ribonucleic acids, i.e. containing only riboses attached to adenine, guanine, cytosine or uracil and having 3'-5' phosphodiester links **[7]**

31/711 . . . Natural deoxyribonucleic acids, i.e. containing only 2'-deoxyriboses attached to adenine, guanine, cytosine or thymine and having 3'-5' phosphodiester links **[7]**

31/7115 . . . Nucleic acids or oligonucleotides having modified bases, i.e. other than adenine, guanine, cytosine, uracil or thymine **[7]**

31/712 . . . Nucleic acids or oligonucleotides having modified sugars, i.e. other than ribose or 2'-deoxyribose **[7]**

31/7125 . . . Nucleic acids or oligonucleotides having modified internucleoside linkage, i.e. other than 3'-5' phosphodiesters **[7]**

31/713 . . . Double-stranded nucleic acids or oligonucleotides **[7]**

31/7135 . . Compounds containing heavy metals **[7]**

31/714 . . . Cobalamins, e.g. cyanocobalamin, vitamin B_{12} **[7]**

31/715 . . Polysaccharides, i.e. having more than five saccharide radicals attached to each other by glycosidic linkages; Derivatives thereof, e.g. ethers, esters **[2]**

31/716 . . . Glucans **[7]**

31/717 . . . . Celluloses **[7]**

31/718 . . . . Starch or degraded starch, e.g. amylose, amylopectin **[7]**

31/719 . . . . Pullulans **[7]**

31/721 . . . . Dextrans **[7]**

31/722 . . . . Chitin; Chitosan **[7]**

31/723 . . . . Xanthans **[7]**

31/724 . . . . Cyclodextrins **[7]**

31/726 . . . Glycosaminoglycans, i.e. mucopolysaccharides (chondroitin sulfate, dermatan sulfate A61K 31/737) **[7]**

31/727 . . . . Heparin; Heparan **[7]**

31/728 . . . . Hyaluronic acid **[7]**

31/729 . . . Agar; Agarose; Agaropectin **[7]**

31/731 . . . Carrageenans **[7]**

31/732 . . . Pectin **[7]**

31/733 . . . Fructosans, e.g. inulin **[7]**

31/734 . . . Alginic acid **[7]**

31/736 . . . Glucomannans or galactomannans, e.g locust bean gum, guar gum **[7]**

31/737 . . . Sulfated polysaccharides, e.g. chondroitin sulfate, dermatan sulfate (A61K 31/727 takes precedence) **[7]**

31/738 . . . Cross-linked polysaccharides **[7]**

31/739 . . . Lipopolysaccharides **[7]**

31/74 . Synthetic polymeric materials **[2]**
31/745 . . Polymers of hydrocarbons **[2]**
31/75 . . . of ethene **[2]**
31/755 . . Polymers containing halogen **[2]**
31/76 . . . of vinyl chloride **[2]**
31/765 . . Polymers containing oxygen **[2]**
31/77 . . . of oxiranes **[2]**
31/775 . . . Phenolic resins **[2]**
31/78 . . . of acrylic acid or derivatives thereof **[2]**
31/785 . . Polymers containing nitrogen **[2]**
31/787 . . . containing heterocyclic rings having nitrogen as a ring hetero atom **[7]**
31/79 . . . . Polymers of vinyl pyrrolidone **[2]**
31/795 . . Polymers containing sulfur **[2]**
31/80 . . Polymers containing hetero atoms not provided for in groups A61K 31/755 to A61K 31/795 **[2]**

33/00 Medicinal preparations containing inorganic active ingredients [2]

33/02 . Ammonia; Compounds thereof **[2]**
33/04 . Sulfur, selenium or tellurium; Compounds thereof **[2]**
33/06 . Aluminium, calcium or magnesium; Compounds thereof **[2]**
33/08 . . Oxides; Hydroxides **[2]**
33/10 . . Carbonates; Bicarbonates **[2]**
33/12 . . Magnesium silicate **[2]**
33/14 . Alkali metal chlorides; Alkaline earth metal chlorides **[2]**
33/16 . Fluorine compounds **[2]**
33/18 . Iodine; Compounds thereof **[2]**
33/20 . Elemental chlorine; Inorganic compounds releasing chlorine **[2]**
33/22 . Boron compounds **[2]**
33/24 . Heavy metals; Compounds thereof **[2]**
33/26 . . Iron; Compounds thereof **[2]**
33/28 . . Mercury; Compounds thereof **[2]**
33/30 . . Zinc; Compounds thereof **[2]**
33/32 . . Manganese; Compounds thereof **[2]**
33/34 . . Copper; Compounds thereof **[2]**
33/36 . . Arsenic; Compounds thereof **[2]**
33/38 . . Silver; Compounds thereof **[2]**
33/40 . Peroxides **[2]**
33/42 . Phosphorus; Compounds thereof **[2]**
33/44 . Elemental carbon, e.g. charcoal, carbon black **[2]**

35/00 Medicinal preparations containing material or reaction products thereof with undetermined constitution [2]

Note

When classifying in this group, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

35/02 . from inanimate materials **[2]**
35/04 . . Tars; Bitumens; Mineral oils; Ammonium bituminosulfonate, e.g. Ichthyol **[2]**
35/06 . . . Mineral oils **[2]**
35/08 . . Mineral waters **[2]**
35/10 . . Peat; Amber **[2]**
35/12 . Materials from mammals or birds **[2]**
35/14 . . Blood **[2]**
35/16 . . . Plasma; Serum **[2]**
35/18 . . . Erythrocytes **[2]**
35/20 . . Milk; Colostrum **[2]**
35/22 . . Urine; Urinary system **[2]**
35/23 . . . Kidney **[3]**
35/24 . . Mucus; Mucous glands; Bursa; Arthral fluid; Excreta; Spinal fluid **[2]**
35/26 . . Lymph; Lymph-glands; Thymus **[2]**
35/28 . . Marrow; Spleen **[2]**
35/30 . . Nerves; Brain **[2]**
35/32 . . Bones; Tendons; Teeth; Cartilage (marrow A61K 35/28) **[2]**
35/34 . . Muscles; Heart **[2]**
35/36 . . Skin; Hair; Nails; Sebaceous glands; Cerumen **[4]**
35/37 . . Digestive system **[3]**
35/38 . . . Stomach; Intestine **[3]**
35/39 . . . Pancreas **[3]**
35/407 . . . Liver **[3]**
35/413 . . . Bile **[3]**
35/42 . . Lungs **[2]**
35/44 . . Eyes; Vessels; Umbilical cord **[2]**
35/48 . . Reproductive organs; Embryos **[2]**
35/50 . . . Placenta; Amniotic fluid **[2]**
35/52 . . . Sperm **[2]**
35/54 . . . Ovary; Eggs; Embryos **[2]**
35/55 . . Glands not provided for in one of the preceding subgroups of this main group **[3]**
35/56 . Materials from animals other than mammals or birds **[2]**
35/58 . . Snakes (antigens A61K 39/38) **[2]**
35/60 . . Fish (vitamin A A61K 31/07; vitamin D A61K 31/59) **[2]**
35/62 . . Leeches **[2]**
35/64 . . Insects, e.g. royal jelly **[2]**
35/66 . Materials from micro-organisms **[2]**
35/68 . . Protozoa **[2]**
35/74 . . Bacteria **[2]**
35/76 . . Viruses **[2]**

36/00 Medicinal preparations of undetermined constitution containing material from algae, lichens, fungi or plants, or derivatives thereof, e.g. traditional herbal medicines [8]

(1) In this group, common names of plants, where given, are presented in brackets following their corresponding Latin names. **[8]**
(2) In this group, it is desirable to add the indexing codes A61K 125/00 to A61K 135/00. **[8]**

36/02 . Algae **[8]**
36/03 . . Phaeophycota or phaeophyta (brown algae), e.g. Fucus **[8]**
36/04 . . Rhodophycota or rhodophyta (red algae), e.g. Porphyra **[8]**
36/05 . . Chlorophycota or chlorophyta (green algae), e.g. Chlorella **[8]**
36/06 . Fungi, e.g. yeasts **[8]**
36/062 . . Ascomycota **[8]**
36/064 . . . Saccharomycetales, e.g. baker's yeast **[8]**
36/066 . . . Clavicipitaceae **[8]**
36/068 . . . . Cordyceps **[8]**
36/07 . . Basidiomycota, e.g. Cryptococcus **[8]**
36/074 . . . Ganoderma **[8]**
36/076 . . . Poria **[8]**

36/09 . Lichens **[8]**
36/10 . Bryophyta (mosses) **[8]**
36/11 . Pteridophyta or Filicophyta (ferns) **[8]**
36/12 . . Filicopsida or Pteridopsida **[8]**
36/126 . . . Drynaria **[8]**
36/13 . Coniferophyta (gymnosperms) **[8]**
36/14 . . Cupressaceae (Cypress family), e.g. juniper or cypress **[8]**
36/15 . . Pinaceae (Pine family), e.g. pine or cedar **[8]**
36/16 . Ginkgophyta, e.g. Ginkgoaceae (Ginkgo family) **[8]**
36/17 . Gnetophyta, e.g. Ephedraceae (Mormon-tea family) **[8]**
36/18 . Magnoliophyta (angiosperms) **[8]**
36/185 . . Magnoliopsida (dicotyledons) **[8]**
36/19 . . . Acanthaceae (Acanthus family) **[8]**
36/195 . . . . Strobilanthes **[8]**
36/20 . . . Aceraceae (Maple family) **[8]**
36/21 . . . Amaranthaceae (Amaranth family), e.g. pigweed, rockwort or globe amaranth **[8]**
36/22 . . . Anacardiaceae (Sumac family), e.g. smoketree, sumac or poison oak **[8]**
36/23 . . . Apiaceae or Umbelliferae (Carrot family), e.g. dill, chervil, coriander or cumin **[8]**
36/232 . . . . Angelica **[8]**
36/233 . . . . Bupleurum **[8]**
36/234 . . . . Cnidium (snowparsley) **[8]**
36/235 . . . . Foeniculum (fennel) **[8]**
36/236 . . . . Ligusticum (licorice-root) **[8]**
36/237 . . . . Notopterygium **[8]**
36/238 . . . . Saposhnikovia **[8]**
36/24 . . . Apocynaceae (Dogbane family), e.g. plumeria or periwinkle **[8]**
36/25 . . . Araliaceae (Ginseng family), e.g. ivy, aralia, schefflera or tetrapanax **[8]**
36/254 . . . . Acanthopanax or Eleutherococcus **[8]**
36/258 . . . . Panax (ginseng) **[8]**
36/26 . . . Aristolochiaceae (Birthwort family), e.g. heartleaf **[8]**
36/264 . . . . Aristolochia (Dutchman's pipe) **[8]**
36/268 . . . . Asarum (wild ginger) **[8]**
36/27 . . . Asclepiadaceae (Milkweed family), e.g. hoya **[8]**
36/28 . . . Asteraceae or Compositae (Aster or Sunflower family), e.g. chamomile, feverfew, yarrow or echinacea **[8]**
36/282 . . . . Artemisia, e.g. wormwood or sagebrush **[8]**
36/284 . . . . Atractylodes **[8]**
36/285 . . . . Aucklandia **[8]**
36/286 . . . . Carthamus (distaff thistle) **[8]**
36/287 . . . . Chrysanthemum, e.g. daisy **[8]**
36/288 . . . . Taraxacum (dandelion) **[8]**
36/289 . . . . Vladimiria **[8]**
36/29 . . . Berberidaceae (Barberry family), e.g. barberry, cohosh or mayapple **[8]**
36/296 . . . . Epimedium **[8]**
36/30 . . . Boraginaceae (Borage family), e.g. comfrey, lungwort or forget-me-not **[8]**
36/31 . . . Brassicaceae or Cruciferae (Mustard family), e.g. broccoli, cabbage or kohlrabi **[8]**
36/315 . . . . Isatis, e.g. Dyer's woad **[8]**
36/32 . . . Burseraceae (Frankincense family) **[8]**
36/324 . . . . Boswellia, e.g. frankincense **[8]**
36/328 . . . . Commiphora, e.g. mecca myrrh or balm of Gilead **[8]**
36/33 . . . Cactaceae (Cactus family), e.g. pricklypear or Cereus **[8]**
36/34 . . . Campanulaceae (Bellflower family) **[8]**
36/342 . . . . Adenophora **[8]**
36/344 . . . . Codonopsis **[8]**
36/346 . . . . Platycodon **[8]**
36/35 . . . Caprifoliaceae (Honeysuckle family) **[8]**
36/355 . . . . Lonicera (honeysuckle) **[8]**
36/36 . . . Caryophyllaceae (Pink family), e.g. babysbreath or soapwort **[8]**
36/37 . . . Celastraceae (Staff-tree or Bittersweet family), e.g. tripterygium or spindletree **[8]**
36/38 . . . Clusiaceae, Hypericaceae or Guttiferae (Hypericum or Mangosteen family), e.g. common St. Johnswort **[8]**
36/39 . . . Convolvulaceae (Morning-glory family), e.g. bindweed **[8]**
36/40 . . . Cornaceae (Dogwood family) **[8]**
36/41 . . . Crassulaceae (Stonecrop family) **[8]**
36/42 . . . Cucurbitaceae (Cucumber family) **[8]**
36/424 . . . . Gynostemma **[8]**
36/428 . . . . Trichosanthes **[8]**
36/43 . . . Cuscutaceae (Dodder family), e.g. Cuscuta epithymum or greater dodder **[8]**
36/44 . . . Ebenaceae (Ebony family), e.g. persimmon **[8]**
36/45 . . . Ericaceae or Vacciniaceae (Heath or Blueberry family), e.g. blueberry, cranberry or bilberry **[8]**
36/46 . . . Eucommiaceae (Eucommia family), e.g. hardy rubber tree **[8]**
36/47 . . . Euphorbiaceae (Spurge family), e.g. Ricinus (castorbean) **[8]**
36/48 . . . Fabaceae or Leguminosae (Pea or Legume family); Caesalpiniaceae; Mimosaceae; Papilionaceae **[8]**
36/481 . . . . Astragalus (milkvetch) **[8]**
36/482 . . . . Cassia, e.g. golden shower tree **[8]**
36/483 . . . . Gleditsia (locust) **[8]**
36/484 . . . . Glycyrrhiza (licorice) **[8]**
36/485 . . . . Gueldenstaedtia **[8]**
36/486 . . . . Millettia **[8]**
36/487 . . . . Psoralea **[8]**
36/488 . . . . Pueraria (kudzu) **[8]**
36/489 . . . . Sophora, e.g. necklacepod or mamani **[8]**
36/49 . . . Fagaceae (Beech family), e.g. oak or chestnut **[8]**
36/50 . . . Fumariaceae (Fumitory family), e.g. bleeding heart **[8]**
36/505 . . . . Corydalis **[8]**
36/51 . . . Gentianaceae (Gentian family) **[8]**
36/515 . . . . Gentiana **[8]**
36/52 . . . Juglandaceae (Walnut family) **[8]**
36/53 . . . Lamiaceae or Labiatae (Mint family), e.g. thyme, rosemary or lavender **[8]**
36/532 . . . . Agastache, e.g. giant hyssop **[8]**
36/533 . . . . Leonurus (motherwort) **[8]**
36/534 . . . . Mentha (mint) **[8]**
36/535 . . . . Perilla (beefsteak plant) **[8]**
36/536 . . . . Prunella or Brunella (selfheal) **[8]**
36/537 . . . . Salvia (sage) **[8]**
36/538 . . . . Schizonepeta **[8]**
36/539 . . . . Scutellaria (skullcap) **[8]**
36/54 . . . Lauraceae (Laurel family), e.g. cinnamon or sassafras **[8]**
36/55 . . . Linaceae (Flax family), e.g. Linum **[8]**

36/56 . . . Loganiaceae (Logania family), e.g. trumpetflower or pinkroot **[8]**
36/57 . . . Magnoliaceae (Magnolia family) **[8]**
36/575 . . . . Magnolia **[8]**
36/58 . . . Meliaceae (Chinaberry or Mahogany family), e.g. Azadirachta (neem) **[8]**
36/59 . . . Menispermaceae (Moonseed family), e.g. hyperbaena or coralbead **[8]**
36/60 . . . Moraceae (Mulberry family), e.g. breadfruit or fig **[8]**
36/605 . . . . Morus (mulberry) **[8]**
36/61 . . . Myrtaceae (Myrtle family), e.g. teatree or eucalyptus **[8]**
36/62 . . . Nymphaeaceae (Water-lily family) **[8]**
36/63 . . . Oleaceae (Olive family), e.g. jasmine, lilac or ash tree **[8]**
36/634 . . . . Forsythia **[8]**
36/638 . . . . Ligustrum, e.g. Chinese privet **[8]**
36/64 . . . Orobanchaceae (Broom-rape family) **[8]**
36/65 . . . Paeoniaceae (Peony family), e.g. Chinese peony **[8]**
36/66 . . . Papaveraceae (Poppy family), e.g. bloodroot **[8]**
36/67 . . . Piperaceae (Pepper family), e.g. Jamaican pepper or kava **[8]**
36/68 . . . Plantaginaceae (Plantain Family) **[8]**
36/69 . . . Polygalaceae (Milkwort family) **[8]**
36/70 . . . Polygonaceae (Buckwheat family), e.g. spineflower or dock **[8]**
36/704 . . . . Polygonum, e.g. knotweed **[8]**
36/708 . . . . Rheum (rhubarb) **[8]**
36/71 . . . Ranunculaceae (Buttercup family), e.g. larkspur, hepatica, hydrastis, columbine or goldenseal **[8]**
36/714 . . . . Aconitum (monkshood) **[8]**
36/716 . . . . Clematis (leather flower) **[8]**
36/718 . . . . Coptis (goldthread) **[8]**
36/72 . . . Rhamnaceae (Buckthorn family), e.g. buckthorn, chewstick or umbrella-tree **[8]**
36/725 . . . . Ziziphus, e.g. jujube **[8]**
36/73 . . . Rosaceae (Rose family), e.g. strawberry, chokeberry, blackberry, pear or firethorn **[8]**
36/732 . . . . Chaenomeles, e.g. flowering quince **[8]**
36/734 . . . . Crataegus (hawthorn) **[8]**
36/736 . . . . Prunus, e.g. plum, cherry, peach, apricot or almond **[8]**
36/738 . . . . Rosa (rose) **[8]**
36/739 . . . . Sanguisorba (burnet) **[8]**
36/74 . . . Rubiaceae (Madder family) **[8]**
36/744 . . . . Gardenia **[8]**
36/746 . . . . Morinda **[8]**
36/748 . . . . Oldenlandia or Hedyotis **[8]**
36/75 . . . Rutaceae (Rue family) **[8]**
36/752 . . . . Citrus, e.g. lime, orange or lemon **[8]**
36/754 . . . . Evodia **[8]**
36/756 . . . . Phellodendron, e.g. corktree **[8]**
36/758 . . . . Zanthoxylum, e.g. pricklyash **[8]**
36/76 . . . Salicaceae (Willow family), e.g. poplar **[8]**
36/77 . . . Sapindaceae (Soapberry family), e.g. lychee or soapberry **[8]**
36/78 . . . Saururaceae (Lizard's-tail family) **[8]**
36/79 . . . Schisandraceae (Schisandra family) **[8]**
36/80 . . . Scrophulariaceae (Figwort family) **[8]**
36/804 . . . . Rehmannia **[8]**
36/808 . . . . Scrophularia (figwort) **[8]**
36/81 . . . Solanaceae (Potato family), e.g. tobacco, nightshade, tomato, belladonna, capsicum or jimsonweed **[8]**
36/815 . . . . Lycium (desert-thorn) **[8]**
36/82 . . . Theaceae (Tea family), e.g. camellia **[8]**
36/83 . . . Thymelaeaceae (Mezereum family), e.g. leatherwood or false ohelo **[8]**
36/835 . . . . Aquilaria **[8]**
36/84 . . . Valerianaceae (Valerian family), e.g. valerian **[8]**
36/85 . . . Verbenaceae (Verbena family) **[8]**
36/855 . . . . Clerodendrum, e.g. glorybower **[8]**
36/86 . . . Violaceae (Violet family) **[8]**
36/87 . . . Vitaceae or Ampelidaceae (Vine or Grape family), e.g. wine grapes, muscadine or peppervine **[8]**
36/88 . . Liliopsida (monocotyledons) **[8]**
36/882 . . . Acoraceae (Calamus family), e.g. sweetflag or Acorus calamus **[8]**
36/884 . . . Alismataceae (Water-plantain family) **[8]**
36/886 . . . Aloeaceae (Aloe family), e.g. aloe vera **[8]**
36/888 . . . Araceae (Arum family), e.g. caladium, calla lily or skunk cabbage **[8]**
36/8884 . . . . Arisaema, e.g. Jack in the pulpit **[8]**
36/8888 . . . . Pinellia **[8]**
36/889 . . . Arecaceae, Palmae or Palmaceae (Palm family), e.g. date or coconut palm or palmetto **[8]**
36/8895 . . . . Calamus, e.g. rattan **[8]**
36/89 . . . Cyperaceae (Sedge family) **[8]**
36/8905 . . . . Cyperus (flatsedge) **[8]**
36/894 . . . Dioscoreaceae (Yam family) **[8]**
36/8945 . . . . Dioscorea, e.g. yam, Chinese yam or water yam **[8]**
36/896 . . . Liliaceae (Lily family), e.g. daylily, plantain lily, Hyacinth or narcissus **[8]**
36/8962 . . . . Allium, e.g. garden onion, leek, garlic or chives **[8]**
36/8964 . . . . Anemarrhena **[8]**
36/8965 . . . . Asparagus, e.g. garden asparagus or asparagus fern **[8]**
36/8966 . . . . Fritillaria, e.g. checker lily or mission bells **[8]**
36/8967 . . . . Lilium, e.g. tiger lily or Easter lily **[8]**
36/8968 . . . . Ophiopogon (Lilyturf) **[8]**
36/8969 . . . . Polygonatum (Solomon's seal) **[8]**
36/898 . . . Orchidaceae (Orchid family) **[8]**
36/8984 . . . . Dendrobium **[8]**
36/8988 . . . . Gastrodia **[8]**
36/899 . . . Poaceae or Gramineae (Grass family), e.g. bamboo, corn or sugar cane **[8]**
36/8994 . . . . Coix (Job's tears) **[8]**
36/8998 . . . . Hordeum (barley) **[8]**
36/90 . . . Smilacaceae (Catbrier family), e.g. greenbrier or sarsaparilla **[8]**
36/902 . . . Sparganiaceae (Bur-reed family) **[8]**
36/904 . . . Stemonaceae (Stemona family), e.g. croomia **[8]**
36/906 . . . Zingiberaceae (Ginger family) **[8]**
36/9062 . . . . Alpinia, e.g. red ginger or galangal **[8]**
36/9064 . . . . Amomum, e.g. round cardamom **[8]**
36/9066 . . . . Curcuma, e.g. common turmeric, East Indian arrowroot or mango ginger **[8]**
36/9068 . . . . Zingiber, e.g. garden ginger **[8]**

38/00 **Medicinal preparations containing peptides** (peptides containing beta-lactam rings A61K 31/00; cyclic dipeptides not having in their molecule any other peptide link than those which form their ring, e.g. piperazine-2,5-diones, A61K 31/00; ergoline-based peptides A61K 31/48; containing macromolecular compounds having statistically distributed amino acid units A61K 31/74; medicinal preparations containing antigens or antibodies A61K 39/00; medicinal preparations characterised by the non-active ingredients, e.g. peptides as drug carriers, A61K 47/00) **[6]**

(1) The terms or expressions used in this group follow exactly the definitions given in Note (1) following the title of subclass C07K. **[6]**

(2) Preparations containing fragments of peptides or peptides modified by removal or addition of amino acids, by substitution of amino acids by others, or by combination of these modifications are classified as the preparations containing parent peptides. However, preparations containing fragments of peptides having only four or less amino acids are also classified in groups A61K 38/05 to A61K 38/07. **[6]**

(3) Preparations containing peptides prepared by recombinant DNA technology are not classified according to the host, but according to the original peptide expressed, e.g. preparations containing HIV peptide expressed in E. coli are classified with the preparations containing HIV peptides. **[6]**

38/01 . Hydrolysed proteins; Derivatives thereof **[6]**
38/02 . Peptides of undefined number of amino acids; Derivatives thereof **[6]**
38/03 . Peptides having up to 20 amino acids in an undefined or only partially defined sequence; Derivatives thereof **[6]**
38/04 . Peptides having up to 20 amino acids in a fully defined sequence; Derivatives thereof (gastrins A61K 38/16, somatostatins A61K 38/31, melanotropins A61K 38/34) **[6]**
38/05 . . Dipeptides **[6]**
38/06 . . Tripeptides **[6]**
38/07 . . Tetrapeptides **[6]**
38/08 . . Peptides having 5 to 11 amino acids **[6]**
38/09 . . . Luteinising hormone-releasing hormone (LHRH); Related peptides **[6]**
38/10 . . Peptides having 12 to 20 amino acids **[6]**
38/11 . . . Oxytocins; Vasopressins; Related peptides **[6]**
38/12 . . Cyclic peptides **[6]**
38/13 . . . Cyclosporins **[6]**
38/14 . . Peptides containing saccharide radicals; Derivatives thereof **[6]**
38/15 . . Depsipeptides; Derivatives thereof **[6]**
38/16 . Peptides having more than 20 amino acids; Gastrins; Somatostatins; Melanotropins; Derivatives thereof **[6]**
38/17 . . from animals; from humans **[6]**
38/18 . . . Growth factors; Growth regulators **[6]**
38/19 . . . Cytokines; Lymphokines; Interferons **[6]**
38/20 . . . . Interleukins **[6]**
38/21 . . . . Interferons **[6]**
38/22 . . . Hormones (derived from pro-opiomelanocortin, pro-enkephalin or pro-dynorphin A61K 38/33, e.g. corticotropin A61K 38/35) **[6]**
38/23 . . . . Calcitonins **[6]**
38/24 . . . . Follicle-stimulating hormone (FSH); Chorionic gonadotropins, e.g. HCG; Luteinising hormone (LH); Thyroid-stimulating hormone (TSH) **[6]**
38/25 . . . . Growth hormone-releasing factor (GH-RF) (Somatoliberin) **[6]**
38/26 . . . . Glucagons **[6]**
38/27 . . . . Growth hormone (GH) (Somatotropin) **[6]**
38/28 . . . . Insulins **[6]**
38/29 . . . . Parathyroid hormone (parathormone); Parathyroid hormone-related peptides **[6]**
38/30 . . . . Insulin-like growth factors (Somatomedins), e.g. IGF-1, IGF-2 **[6]**
38/31 . . . . Somatostatins **[6]**
38/32 . . . . Thymopoietins **[6]**
38/33 . . . derived from pro-opiomelanocortin, pro-enkephalin or pro-dynorphin **[6]**
38/34 . . . . Melanocyte stimulating hormone (MSH), e.g. alpha- or beta-melanotropin **[6]**
38/35 . . . . Corticotropin (ACTH) **[6]**
38/36 . . . Blood coagulation or fibrinolysis factors **[6]**
38/37 . . . . Factors VIII **[6]**
38/38 . . . Albumins **[6]**
38/39 . . . Connective tissue peptides, e.g. collagen, elastin, laminin, fibronectin, vitronectin, cold insoluble globulin (CIG) **[6]**
38/40 . . . Transferrins, e.g. lactoferrins, ovotransferrins **[6]**
38/41 . . Porphyrin- or corrin-ring-containing peptides **[6]**
38/42 . . . Haemoglobins; Myoglobins **[6]**
38/43 . . Enzymes; Proenzymes; Derivatives thereof **[6]**

Note

In this group: **[6]**
- proenzymes are classified with the corresponding enzymes; **[6]**
- enzymes are generally categorised according to the "Nomenclature and Classification of Enzymes" of the International Commission of Enzymes. Where appropriate, this designation appears in the subgroups below in parenthesis. **[6]**

38/44 . . . Oxidoreductases (1) **[6]**
38/45 . . . Transferases (2) **[6]**
38/46 . . . Hydrolases (3) **[6]**
38/47 . . . . acting on glycosyl compounds (3.2), e.g. cellulases, lactases **[6]**
38/48 . . . . acting on peptide bonds (3.4) **[6]**
38/49 . . . . . Urokinase; Tissue plasminogen activator **[6]**
38/50 . . . . acting on carbon-nitrogen bonds, other than peptide bonds (3.5), e.g. asparaginase **[6]**
38/51 . . . Lyases (4) **[6]**
38/52 . . . Isomerases (5) **[6]**
38/53 . . . Ligases (6) **[6]**
38/54 . . . Mixtures of enzymes or proenzymes covered by more than a single one of groups A61K 38/44 to A61K 38/46 or A61K 38/51 to A61K 38/53 **[6]**
38/55 . . Protease inhibitors **[6]**
38/56 . . . from plants **[6]**
38/57 . . . from animals; from humans **[6]**
38/58 . . . . from leeches, e.g. hirudin, eglin **[6]**

39/00 Medicinal preparations containing antigens or antibodies (materials for immunoassay G01N 33/53) **[2]**

(1) Preparation of antigen or antibody compositions is also classified in subclass C12N, if the step of cultivating the micro-organism is of interest. **[3]**

(2) Groups A61K 39/002 to A61K 39/12 cover preparations containing protozoa, bacteria, viruses, or subunits thereof, e.g. membrane parts. **[3]**

39/002 . Protozoa antigens **[3]**
39/005 . . Trypanosoma antigens **[3]**
39/008 . . Leishmania antigens **[3]**
39/012 . . Coccidia antigens **[3]**
39/015 . . Hemosporidia antigens, e.g. Plasmodium antigens **[3]**
39/018 . . . Babesia antigens, e.g. Theileria antigens **[3]**
39/02 . Bacterial antigens **[2]**
39/04 . . Mycobacterium, e.g. Mycobacterium tuberculosis **[2,3]**
39/05 . . Corynebacterium; Propionibacterium **[3]**
39/07 . . Bacillus **[3]**
39/08 . . Clostridium, e.g. Clostridium tetani **[2]**
39/085 . . Staphylococcus **[3]**
39/09 . . Streptococcus **[3]**
39/095 . . Neisseria **[3]**
39/10 . . Brucella; Bordetella, e.g. Bordetella pertussis **[2,3]**
39/102 . . Pasteurella; Haemophilus **[3]**
39/104 . . Pseudomonas **[3]**
39/106 . . Vibrio; Campylobacter **[3]**
39/108 . . Escherichia; Klebsiella **[3]**
39/112 . . Salmonella; Shigella **[3]**
39/114 . . Fusobacterium **[3]**
39/116 . . Polyvalent bacterial antigens **[3]**
39/118 . Chlamydiaceae, e.g. Chlamydia trachomatis or Chlamydia psittaci **[3]**
39/12 . Viral antigens **[2]**
39/125 . . Picornaviridae, e.g. calicivirus **[3]**
39/13 . . . Poliovirus **[3]**
39/135 . . . Foot-and-mouth disease virus **[3]**
39/145 . . Orthomyxoviridae, e.g. influenza virus **[3]**
39/15 . . Reoviridae, e.g. calf diarrhea virus **[3]**
39/155 . . Paramyxoviridae, e.g. parainfluenza virus **[3]**
39/165 . . . Mumps or measles virus **[3]**
39/17 . . . Newcastle disease virus **[3]**
39/175 . . . Canine distemper virus **[3]**
39/187 . . Hog cholera virus **[3]**
39/193 . . Equine encephalomyelitis virus **[3]**
39/20 . . Rubella virus **[2]**
39/205 . . Rhabdoviridae, e.g. rabies virus **[3]**
39/21 . . Retroviridae, e.g. equine infectious anemia virus **[3]**
39/215 . . Coronaviridae, e.g. avian infectious bronchitis virus **[3]**
39/225 . . . Porcine transmissible gastroenteritis virus **[3]**
39/23 . . Parvoviridae, e.g. feline panleukopenia virus **[3]**
39/235 . . Adenoviridae **[3]**
39/245 . . Herpetoviridae, e.g. herpes simplex virus **[3]**
39/25 . . . Varicella-zoster virus **[3]**
39/255 . . . Marek's disease virus **[3]**
39/265 . . . Infectious rhinotracheitis virus **[3]**
39/27 . . . Equine rhinopneumonitis virus **[3]**
39/275 . . Poxviridae, e.g. avipoxvirus **[3]**
39/285 . . . Vaccinia virus or variola virus **[3]**
39/29 . . Hepatitis virus **[3]**
39/295 . . Polyvalent viral antigens (vaccinia virus or variola virus A61K 39/285); Mixtures of viral and bacterial antigens **[3]**
39/35 . Allergens **[3]**
39/36 . . from pollen **[2,3]**
39/38 . Antigens from snakes **[2]**
39/385 . Haptens or antigens, bound to carriers **[3]**
39/39 . characterised by the immunostimulating additives, e.g. chemical adjuvants **[3]**
39/395 . Antibodies (agglutinins A61K 38/36); Immunoglobulins; Immune serum, e.g. antilymphocytic serum **[3]**
39/40 . . bacterial **[2,3]**
39/42 . . viral **[2,3]**
39/44 . . Antibodies bound to carriers **[2,3]**

41/00 Medicinal preparations obtained by treating materials with wave energy or particle radiation (A61K 31/59 takes precedence) **[2]**

45/00 Medicinal preparations containing active ingredients not provided for in groups A61K 31/00 to A61K 41/00 [2,6]
45/06 . Mixtures of active ingredients without chemical characterisation, e.g. antiphlogistics and cardiaca **[2]**
45/08 . Mixtures of an active ingredient and an auxiliary substance neither being chemically characterised, e.g. antihistaminicum and surface active substance **[2]**

47/00 Medicinal preparations characterised by the non-active ingredients used, e.g. carriers, inert additives [2]
47/02 . Inorganic compounds **[5]**
47/04 . . Non-metals; Compounds thereof **[5]**
47/06 . Organic compounds **[5]**
47/08 . . containing oxygen **[5]**
47/10 . . . Alcohols; Phenols; Salts thereof **[5]**
47/12 . . . Carboxylic acids; Salts or anhydrides thereof **[5]**
47/14 . . . Esters of carboxylic acids **[5]**
47/16 . . containing nitrogen **[5]**
47/18 . . . Amines; Quaternary ammonium compounds **[5]**
47/20 . . containing sulfur **[5]**
47/22 . . Heterocyclic compounds **[5]**
47/24 . . containing atoms other than carbon, hydrogen, halogen, oxygen, nitrogen or sulfur **[5]**
47/26 . . Carbohydrates **[5]**
47/28 . . Steroids **[5]**
47/30 . Macromolecular compounds **[5]**
47/32 . . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
47/34 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
47/36 . . Polysaccharides; Derivatives thereof **[5]**
47/38 . . . Cellulose; Derivatives thereof **[5]**
47/40 . . . Cyclodextrins; Derivatives thereof **[5]**
47/42 . . Proteins; Polypeptides; Degradation products thereof; Derivatives thereof **[5]**
47/44 . Oils, fats or waxes according to more than one of groups A61K 47/02 to A61K 47/42 **[5]**

47/46 . Ingredients of undetermined constitution or reaction products thereof **[5]**

47/48 . the non-active ingredient being chemically bound to the active ingredient, e.g. polymer drug conjugates **[5]**

48/00 Medicinal preparations containing genetic material which is inserted into cells of the living body to treat genetic diseases; **Gene therapy [5]**

49/00 Preparations for testing <u>in vivo</u> [3]

49/04 . X-ray contrast preparations **[3]**

49/06 . Nuclear magnetic resonance (NMR) contrast preparations; Magnetic resonance imaging (MRI) contrast preparations **[7]**

49/08 . . characterised by the carrier **[7]**

49/10 . . . Organic compounds **[7]**

49/12 . . . . Macromolecular compounds **[7]**

49/14 . . . . Peptides, e.g. proteins **[7]**

49/16 . . . . . Antibodies; Immunoglobulins; Fragments thereof **[7]**

49/18 . . characterised by a special physical form, e.g. emulsions, microcapsules, liposomes **[7]**

49/20 . . containing free radicals **[7]**

49/22 . Echographic preparations; Ultrasound imaging preparations **[7]**

50/00 Electrically conductive preparations for use in therapy or testing <u>in vivo</u>, e.g. conductive adhesives or gels to be used with electrodes for electrocardiography (ECG) or for transcutaneous drug administration [8]

51/00 Preparations containing radioactive substances for use in therapy or testing <u>in vivo</u> [6]

<u>Note</u>

In this group, it is desirable to add the indexing codes of groups A61K 101/00 to A61K 103/00. **[6]**

51/02 . characterised by the carrier **[6]**

51/04 . . Organic compounds **[6]**

51/06 . . . Macromolecular compounds **[6]**

51/08 . . . Peptides, e.g. proteins **[6]**

51/10 . . . . Antibodies or immunoglobulins; Fragments thereof **[6]**

51/12 . characterised by a special physical form, e.g. emulsion, microcapsules, liposomes **[6]**

<u>Indexing scheme associated with group A61K 51/00, relating to the nature of the radioactive substance.</u> [6]

101/00 Radioactive non-metals [6]

101/02 . Halogens **[6]**

103/00 Radioactive metals [6]

103/10 . Technetium; Rhenium **[6]**

103/20 . Indium **[6]**

103/30 . Rare earths **[6]**

103/32 . . Yttrium **[6]**

103/34 . . Gadolinium **[6]**

103/36 . . Ytterbium **[6]**

103/40 . Actinides **[6]**

<u>Indexing scheme associated with group A61K 36/00, relating to plant parts with medicinal activity.</u> [8]

125/00 Containing or obtained from roots, bulbs, tubers, corms or rhizomes [8]

127/00 Containing or obtained from leaves [8]

129/00 Containing or obtained from bark [8]

131/00 Containing or obtained from seeds, nuts, fruits or grains [8]

133/00 Containing or obtained from flowers or blossoms [8]

135/00 Containing or obtained from stems, stalks, branches, twigs or shoots [8]

A61L METHODS OR APPARATUS FOR STERILISING MATERIALS OR OBJECTS IN GENERAL; **DISINFECTION, STERILISATION, OR DEODORISATION OF AIR**; **CHEMICAL ASPECTS OF BANDAGES, DRESSINGS, ABSORBENT PADS, OR SURGICAL ARTICLES**; **MATERIALS FOR BANDAGES, DRESSINGS, ABSORBENT PADS, OR SURGICAL ARTICLES** (preservation of bodies or disinfecting characterised by the agent employed A01N; preserving, e.g. sterilising, food or foodstuffs A23; preparations for medical, dental or toilet purposes A61K) **[4]**

<u>Note</u>

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

<u>Subclass index</u>

Disinfection or sterilising

Note

In groups A61L 2/00 to A61L 12/00, it is desirable to add the indexing codes of group A61L 101/00. **[7]**

2/00 **Methods or apparatus for disinfecting or sterilising materials or objects other than foodstuffs or contact lenses**; **Accessories therefor** (atomisers for disinfecting agents A61M; sterilisation of packages or package contents in association with packaging B65B 55/00; treatment of water, waste water, sewage or sludge C02F; disinfecting paper D21H 21/36; disinfecting devices for water closets E03D; articles having provision for disinfection, see the relevant subclasses for these articles, e.g. H04R 1/12) **[3,5,7]**

2/02 . using physical phenomena **[3]**
2/025 . . Ultrasonics **[7]**
2/03 . . Electric current, e.g. electrolysis **[7]**
2/04 . . Heat (A61L 2/08 takes precedence) **[3]**
2/06 . . . Hot gas **[3]**
2/07 . . . . Steam **[7]**
2/08 . . Radiation **[3]**
2/10 . . . Ultra-violet radiation **[3]**
2/12 . . . Microwaves **[3]**
2/14 . . Plasma, i.e. ionised gases **[3]**
2/16 . using chemical substances **[3]**
2/18 . . Liquid substances **[3]**
2/20 . . Gaseous substances, e.g. vapours **[3]**
2/22 . . Phase substances, e.g. smokes, aerosols **[3]**
2/23 . . Solid substances, e.g. granules, powders, blocks, tablets **[7]**
2/232 . . . layered or coated **[7]**
2/235 . . . cellular, porous or foamed **[7]**
2/238 . . . Metals or alloys, e.g. oligodynamic metals **[7]**
2/24 . Apparatus using programmed or automatic operation **[3]**
2/26 . Accessories **[3]**
2/28 . . Devices for testing the effectiveness or completeness of sterilisation, e.g. indicators which change colour (apparatus involving enzymes or micro-organisms C12M 1/34) **[7]**

9/00 **Disinfection, sterilisation or deodorisation of air** (purifying air by respirators A62B, A62D 9/00; chemical or biological purification of waste gases B01D 53/34; air-conditioning systems incorporating sterilisation F24F 3/16)

9/01 . Deodorant compositions **[2]**
9/012 . . characterised by being in a special form, e.g. gels, emulsions **[7]**
9/013 . . containing animal or plant extracts, or vegetable material **[7]**
9/014 . . containing sorbent material, e.g. activated carbon **[7]**
9/015 . using gaseous or vaporous substances, e.g. ozone (A61L 9/20 takes precedence) **[3]**
9/02 . . using substances evaporated in the air by heating or combustion **[3]**
9/03 . . . Apparatus therefor **[3]**
9/04 . . using substances evaporated in the air without heating **[3]**
9/05 . . . specially adapted to be released by contact with a liquid, e.g. for toilets **[7]**
9/12 . . . Apparatus, e.g. holders, therefor **[3]**
9/14 . using sprayed or atomised substances **[3]**
9/16 . using physical phenomena **[3]**
9/18 . . Radiation (A61L 9/22 takes precedence) **[3]**
9/20 . . . Ultra-violet radiation **[3]**
9/22 . . Ionisation **[3]**

11/00 **Disinfection or sterilising methods specially adapted for refuse**

12/00 **Methods or apparatus for disinfecting or sterilising contact lenses**; **Accessories therefor [7]**

12/02 . using physical phenomena, e.g. electricity, ultrasonics or ultrafiltration **[7]**
12/04 . . Heat (A61L 12/06 takes precedence) **[7]**
12/06 . . Radiation, e.g. ultra-violet or microwaves **[7]**
12/08 . using chemical substances **[7]**
12/10 . . Halogens or compounds thereof **[7]**
12/12 . . Non-macromolecular oxygen-containing compounds, e.g hydrogen peroxide or ozone (A61L 12/10 takes precedence) **[7]**
12/14 . . Organic compounds not covered by groups A61L 12/10 or A61L 12/12 **[7]**

Chemical aspects of bandages, dressings, or absorbent pads or use of materials for their realisation; **Materials for surgical articles, e.g. surgical sutures**; **Surgical adhesives or cements**; **Materials for prostheses, catheters or colostomy devices**

15/00 **Chemical aspects of, or use of materials for, bandages, dressings or absorbent pads** (for liquid bandages A61L 26/00; radioactive dressings A61M 36/14)

15/07 . Stiffening bandages

(1) In groups A61L 15/08 to A61L 15/12, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**
(2) When classifying in groups A61L 15/08 to A61L 15/12, classification is also made in group A61L 15/14 if the use of materials characterised by their function or physical properties is of interest. **[5]**

15/08 . . containing inorganic materials, e.g. plaster of Paris **[5]**
15/10 . . containing organic materials **[5]**
15/12 . . containing macromolecular materials **[5]**
15/14 . . Use of materials characterised by their function or physical properties **[5]**
15/16 . Bandages, dressings or absorbent pads for physiological fluids such as urine or blood, e.g. sanitary towels, tampons **[5]**

(1) In groups A61L 15/18 to A61L 15/40, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

(2) When classifying in groups A61L 15/18 to A61L 15/40, classification is also made in group A61L 15/42 if the use of materials characterised by their function or physical properties is of interest. **[5]**

15/18 . . containing inorganic materials **[5]**
15/20 . . containing organic materials **[5]**
15/22 . . containing macromolecular materials **[5]**
15/24 . . . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds; Derivatives thereof **[5]**
15/26 . . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds; Derivatives thereof **[5]**
15/28 . . . Polysaccharides or their derivatives **[5]**
15/30 . . . Rubbers or their derivatives **[5]**
15/32 . . . Proteins, polypeptides; Degradation products or derivatives thereof, e.g. albumin, collagen, fibrin, gelatin **[5]**
15/34 . . . Oils, fats, waxes, or natural resins **[5]**
15/36 . . containing micro-organisms **[5]**
15/38 . . containing enzymes **[5]**
15/40 . . containing ingredients of undetermined constitution or reaction products thereof **[5]**
15/42 . . Use of materials characterised by their function or physical properties **[5]**
15/44 . . . Medicaments **[5]**
15/46 . . . Deodorants or malodour counteractants, e.g. to inhibit the formation of ammonia or bacteria **[5]**
15/48 . . . Surfactants **[5]**
15/50 . . . Lubricants; Anti-adhesive agents **[5]**
15/52 . . . Water-repellants **[5]**
15/54 . . . Radio-opaque materials **[5]**
15/56 . . . Wetness-indicators or colorants **[5]**
15/58 . . . Adhesives (electrically conductive adhesives for use in therapy or testing in vivo A61K 50/00) **[5]**
15/60 . . . Liquid-swellable gel-forming materials, e.g. super-absorbents **[5]**
15/62 . . . Hydrosoluble or hydrodegradable materials **[5]**
15/64 . . . specially adapted to be resorbable inside the body **[5]**

17/00 Materials for surgical sutures or for ligaturing blood vessels [3,4]

Note

When classifying in group A61L 17/00, classification is also made in A61L 33/00 if the materials used are antithrombogenic. **[7]**

Note

In groups A61L 17/04 to A61L 17/14, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**

17/04 . Non-resorbable materials **[7]**
17/06 . At least partly resorbable materials **[7]**
17/08 . . of animal origin, e.g. catgut, collagen **[7]**
17/10 . . containing macromolecular materials **[7]**
17/12 . . . Homopolymers or copolymers of glycolic or lactic acid **[7]**
17/14 . Post-treatment to improve physical properties **[7]**

24/00 Surgical adhesives or cements; **Adhesives for colostomy devices** (electrically conductive adhesives for use in therapy or testing in vivo A61K 50/00) **[7]**

Note

When classifying in group A61L 24/00, classification is also made in group A61L 33/00 if the materials used are antithrombogenic. **[7]**

Note

In groups A61L 24/02 to A61L 24/04, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**

24/02 . containing inorganic materials **[7]**
24/04 . containing macromolecular materials **[7]**
24/06 . . obtained by reactions only involving carbon-to-carbon unsaturated bonds **[7]**
24/08 . . Polysaccharides **[7]**
24/10 . . Polypeptides; Proteins **[7]**
24/12 . . Ionomer cements, e.g. glass-ionomer cements **[7]**

26/00 Chemical aspects of, or use of materials for, liquid bandages [7]

Note

When classifying in group A61L 26/00, classification is also made in A61L 33/00 if the materials used are antithrombogenic. **[7]**

27/00 Materials for prostheses or for coating prostheses (dental prostheses A61C 13/00; shape or structure of prostheses A61F 2/00; use of preparations for artificial teeth A61K 6/02; artificial kidneys A61M 1/14) **[4]**

Note

When classifying in group A61L 27/00, classification is also made in A61L 33/00 if the materials used are antithrombogenic. **[7]**

(1) In groups A61L 27/02 to A61L 27/40, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**
(2) When classifying in groups A61L 27/02 to A61L 27/40 classification is also made in group A61L 27/50 if the use of materials characterised by their function or physical properties is of interest. **[7]**

27/02 . Inorganic materials **[7]**
27/04 . . Metals or alloys **[7]**
27/06 . . . Titanium or titanium alloys **[7]**
27/08 . . Carbon **[7]**
27/10 . . Ceramics or glasses **[7]**
27/12 . . Phosphorus-containing materials, e.g. apatite **[7]**
27/14 . Macromolecular materials **[7]**
27/16 . . obtained by reactions only involving carbon-to-carbon unsaturated bonds **[7]**
27/18 . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[7]**
27/20 . . Polysaccharides **[7]**
27/22 . . Polypeptides or derivatives thereof **[7]**
27/24 . . . Collagen **[7]**

27/26 . . Mixtures of macromolecular materials **[7]**
27/28 . Materials for coating prostheses **[7]**
27/30 . . Inorganic materials **[7]**
27/32 . . . Phosphorus-containing materials, e.g. apatite **[7]**
27/34 . . Macromolecular materials **[7]**
27/36 . containing ingredients of undetermined constitution or reaction products thereof **[7]**
27/38 . . Animal cells (for use in artificial skin A61L 27/60) **[7]**
27/40 . Composite materials, i.e. layered or containing one material dispersed in a matrix of the same or different material **[7]**
27/42 . . having an inorganic matrix **[7]**
27/44 . . having a macromolecular matrix **[7]**
27/46 . . . with phosphorus-containing inorganic fillers **[7]**
27/48 . . . with macromolecular fillers **[7]**
27/50 . Materials characterised by their function or physical properties **[7]**
27/52 . . Hydrogels or hydrocolloids **[7]**
27/54 . . Biologically active materials, e.g. therapeutic substances **[7]**
27/56 . . Porous or cellular materials **[7]**
27/58 . . Materials at least partially resorbable by the body **[7]**
27/60 . . Materials for use in artificial skin **[7]**

28/00 Materials for colostomy devices (adhesives for colostomy devices A61L 24/00) **[7]**

Note

When classifying in group A61L 28/00, classification is also made in A61L 33/00 if the materials used are antithrombogenic. **[7]**

29/00 Materials for catheters or for coating catheters (shape or structure of catheters A61M 25/00) **[4]**

Note

When classifying in group A61L 29/00, classification is also made in A61L 33/00 if the materials used are antithrombogenic. **[7]**

(1) In groups A61L 29/02 to A61L 29/12, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**
(2) When classifying in groups A61L 29/02 to A61L 29/12, classification is also made in group A61L 29/14 if the use of materials characterised by their function or physical properties is of interest. **[7]**

29/02 . Inorganic materials **[7]**
29/04 . Macromolecular materials **[7]**
29/06 . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[7]**
29/08 . Materials for coatings **[7]**
29/10 . . Inorganic materials **[7]**
29/12 . Composite materials, i.e. layered or containing one material dispersed in a matrix of the same or different material **[7]**
29/14 . Materials characterised by their function or physical properties **[7]**
29/16 . . Biologically active materials, e.g. therapeutic substances **[7]**
29/18 . . Materials at least partially X-ray or laser opaque **[7]**

31/00 Materials for other surgical articles [4]

Note

When classifying in group A61L 31/00, classification is also made in A61L 33/00 if the materials used are antithrombogenic. **[7]**

(1) In groups A61L 31/02 to A61L 31/12, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**
(2) When classifying in groups A61L 31/02 to A61L 31/12, classification is also made in group A61L 31/14 if the use of materials characterised by their function or physical properties is of interest. **[7]**

31/02 . Inorganic materials **[7]**
31/04 . Macromolecular materials **[7]**
31/06 . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[7]**
31/08 . Materials for coatings **[7]**
31/10 . . Macromolecular materials **[7]**
31/12 . Composite materials, i.e. layered or containing one material dispersed in a matrix of the same or different material **[7]**
31/14 . Materials characterised by their function or physical properties **[7]**
31/16 . . Biologically active materials, e.g. therapeutic substances **[7]**
31/18 . . Materials at least partially X-ray or laser opaque **[7]**

33/00 Antithrombogenic treatment of surgical articles, e.g. sutures, catheters, prostheses, or of articles for the manipulation or conditioning of blood; **Materials for such treatment [4,7]**

Note

In groups A61L 33/02 to A61L 33/18, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**

33/02 . Use of inorganic materials **[7]**
33/04 . Use of organic materials, e.g. acetylsalicylic acid **[7]**
33/06 . Use of macromolecular materials **[7]**
33/08 . . Polysaccharides **[7]**
33/10 . . . Heparin, heparinoid or derivatives thereof **[7]**
33/12 . . Polypeptides, proteins or derivatives thereof **[7]**
33/14 . Use of fibrinolytic agents or platelet aggregation inhibitors **[7]**
33/16 . Use of enzymes, e.g. urokinase, streptokinase **[7]**
33/18 . Use of ingredients of undertermined constitution or reaction products thereof **[7]**

Indexing scheme associated with groups A61L 2/00 to A61L 12/00, relating to the chemical composition of the materials used in disinfecting, sterilising or deodorising. [7]

101/00 Chemical composition of materials used in disinfecting, sterilising or deodorising [7]

101/02 . Inorganic materials **[7]**

101/04 . . Elemental carbon, e.g. active charcoal **[7]**
101/06 . . containing halogen **[7]**
101/08 . . . Elemental halogen **[7]**
101/10 . . Ozone **[7]**
101/12 . . containing silicon **[7]**
101/14 . . containing sulfur **[7]**
101/16 . . containing phosphorus **[7]**
101/18 . . Ammonia **[7]**
101/20 . . Acids **[7]**
101/22 . . Peroxides **[7]**
101/24 . . containing aluminium **[7]**
101/26 . . containing copper **[7]**
101/28 . . containing iron **[7]**
101/30 . . containing zinc **[7]**
101/32 . Organic compounds **[7]**
101/34 . . Hydroxy compounds **[7]**
101/36 . . Carboxylic acids or derivatives thereof **[7]**
101/38 . . Ethers **[7]**
101/40 . . containing sulfur **[7]**
101/42 . . Organo-metallic compounds or complexes **[7]**
101/44 . . Heterocyclic compounds **[7]**
101/46 . . Macromolecular compounds **[7]**
101/48 . . . obtained by reactions only involving carbon-to-carbon unsaturated bonds **[7]**
101/50 . . . Polysaccharides or derivatives thereof **[7]**
101/52 . Micro-organisms or substances produced by or extracted from micro-organisms **[7]**
101/54 . Enzymes **[7]**
101/56 . Plant extracts or vegetable products of undetermined chemical constitution, e.g. plant fibre **[7]**

A61M **DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY** (introducing media into or onto the bodies of animals A61D 7/00; means for inserting tampons A61F 13/26; devices for administering food or medicines orally A61J; containers for collecting, storing or administering blood or medical fluids A61J 1/05); **DEVICES FOR TRANSDUCING BODY MEDIA OR FOR TAKING MEDIA FROM THE BODY** (surgery A61B; chemical aspects of surgical articles A61L; magnetotherapy using magnetic elements placed within the body A61N 2/10); **DEVICES FOR PRODUCING OR ENDING SLEEP OR STUPOR [4,5]**

(1) This subclass covers suction, pumping or atomising devices for medical use (e.g. cups, breast relievers, irrigators, sprays, powder insufflators, atomisers, inhalers), apparatus for general or local anaesthetics, devices or methods for causing a change in the state of consciousness, catheters, dilators, apparatus for introducing medicines into the body other than orally.
(2) In this subclass, group A61M 36/00, which relates to the application of radioactive material to the body, takes precedence over other groups. **[5]**
(3) When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

Subclass index

1/00 **Suction or pumping devices for medical purposes**; **Devices for carrying-off, for treatment of, or for carrying-over, body-liquids**; **Drainage systems** (catheters A61M 25/00; tube connectors, tube couplings, valves or branch units, specially adapted for medical use A61M 39/00; devices for taking samples of blood A61B 5/15; saliva removers for dentists A61C 17/06; filters implantable into blood vessels A61F 2/01) **[5]**

1/02 . Blood transfusion apparatus (blood infusion by syringes A61M 5/14)
1/04 . Pneumothorax apparatus
1/06 . Milking pumps
1/08 . Cupping glasses
1/10 . Blood pumps; Artificial hearts; Devices for mechanical circulatory assistance, e.g. intra-aortic balloon pumps (heart stimulation A61H 31/00) **[4]**
1/12 . . implantable into the body **[4]**
1/14 . Dialysis systems; Artificial kidneys; Blood oxygenators (semi-permeable membranes characterised by the material, manufacturing processes therefor B01D 71/00) **[4]**
1/16 . . with membranes **[4]**
1/18 . . . in the shape of hollow fibres **[4]**
1/20 . . . tubular **[4]**
1/22 . . . sheet-like **[4]**
1/24 . . . . spirally wound **[4]**
1/26 . . . which are moving **[4]**
1/28 . . Peritoneal dialysis **[4]**
1/30 . . Single needle dialysis **[4]**
1/32 . . Oxygenators without membranes **[4]**

1/34 . Filtering material out of the blood by passing it through a membrane, i.e. hemofiltration, diafiltration **[4]**

1/36 . Other treatment of blood in a by-pass of the natural circulatory system, e.g. temperature adaptation, irradiation **[4]**

1/38 . . Removing constituents from donor blood and returning remainder to body **[5]**

Syringes; **Irrigators**; **Baths for subaquatic intestinal cleaning** **[6]**

3/00 Medical syringes, e.g. enemata; **Irrigators** (A61M 5/00 takes precedence; pistons A61M 5/315) **[2]**

3/02 . Enemata; Irrigators **[5]**

3/04 . . specially adapted for the uterus **[5]**

3/06 . . combined with bidets **[5]**

5/00 Devices for bringing media into the body in a subcutaneous, intra-vascular or intramuscular way; **Accessories therefor, e.g. filling or cleaning devices, arm rests** (tube connectors, tube couplings, valves or branch units, specially adapted for medical use A61M 39/00; containers specially adapted for medical or pharmaceutical purposes A61J 1/00) **[5]**

5/14 . Infusion devices, e.g. infusing by gravity; Blood infusion; Accessories therefor **[5]**

5/142 . . Pressure infusion, e.g. using pumps **[5]**

Note

In this group, the following expression is used with the meaning indicated:
– "pressure infusion" includes powered injection working at a controlled rate. **[5]**

5/145 . . . using pressurised reservoirs, e.g. by means of pistons **[5]**

5/148 . . . . flexible (A61M 5/155 takes precedence) **[5]**

5/152 . . . . . pressurised by contraction of elastic reservoirs **[5]**

5/155 . . . . pressurised by gas **[5]**

5/158 . . Needles **[5]**

5/162 . . Needle sets, i.e. connections by puncture between reservoir and tube **[5]**

5/165 . . Filtering accessories, e.g. blood filters, filters for infusion liquids (A61M 1/34, A61M 5/36 take precedence) **[5]**

5/168 . . Means for controlling media flow to the body or for metering media to the body, e.g. drip meters, counters **[5]**

5/172 . . . electrical or electronic **[5]**

5/175 . . . mechanical **[5]**

5/178 . Syringes **[5]**

5/19 . . having more than one chamber **[5]**

5/20 . . Automatic syringes, e.g. with automatically actuated piston rod, with automatic needle injection, filling automatically (A61M 5/142 takes precedence) **[2,5]**

5/24 . . Ampoule syringes, i.e. syringes with needle for use in combination with replaceable ampoules or cartridges, e.g. automatic **[5]**

5/28 . . Syringe ampoules or cartridges, i.e. ampoules or cartridges provided with a needle **[5]**

5/30 . . Syringes for injection by jet action, without needle, e.g. for use with replaceable ampoules or cartridges **[5]**

5/303 . . . Media expelled from injector by explosive charge **[5]**

5/307 . . . Media expelled from injector by pressurised fluid **[5]**

5/31 . . Details **[2,5]**

5/315 . . . Pistons; Piston-rods; Guiding, blocking or restricting the movement of the rod; Appliances on the rod for facilitating dosing **[2,5]**

5/32 . . . Needles; Details of needles pertaining to their connection with syringe or hub (infusion needles A61M 5/158); Accessories for bringing the needle into, or holding the needle on, the body; Devices for protection of needles **[2,5]**

5/34 . . . . Constructions for connecting the needle **[2,5]**

5/36 . with means for eliminating or preventing injection or infusion of air into body **[5]**

5/38 . . using hydrophilic or hydrophobic filters **[5]**

5/40 . . using low-level float-valve to cut off media flow from reservoir **[5]**

5/42 . having means for desensitising skin, for protruding skin to facilitate piercing, or for locating point where body is to be pierced **[5]**

5/44 . having means for cooling or heating the devices or media **[5]**

5/46 . having means for controlling depth of insertion **[5]**

5/48 . having means for varying, regulating, indicating or limiting injection pressure (A61M 5/142 takes precedence) **[5]**

5/50 . having means for preventing re-use, or for indicating if defective, used, tampered with or unsterile **[5]**

5/52 . Arm-rests **[5]**

9/00 Baths for subaquatic intestinal cleaning

Sprayers; **Atomisers**; **Insufflators**

11/00 Sprayers or atomisers specially adapted for therapeutic purposes

11/02 . operated by air pressure applied to the liquid to be sprayed or atomised

11/04 . operated by the vapour pressure of the liquid to be sprayed or atomised

11/06 . of the injector type

11/08 . . Pocket atomisers of the injector type

13/00 Insufflators for therapeutic or disinfectant purposes

Inhaling devices

15/00 Inhalators

15/02 . with activated or ionized gases; Ozone-inhalators

15/06 . Inhaling appliances shaped like cigars, cigarettes or pipes

15/08 . Inhaling devices inserted into the nose

16/00 Devices for influencing the respiratory system of patients by gas treatment, e.g. mouth-to-mouth respiration; **Tracheal tubes** (stimulating the respiratory movement by mechanical, pneumatic or electrical means, iron lungs combined with gas breathing means A61H 31/00) **[4]**

16/01 . specially adapted for anaesthetising **[4]**

16/04 . Tracheal tubes **[4]**

16/06 . Respiratory or anaesthetic masks **[4]**

16/08 . Bellows; Connecting tubes **[4]**

16/10 . Preparation of respiratory gases or vapours **[4]**

16/12 . . by mixing different gases **[4]**

16/14 . . by mixing different fluids, one of them being in a liquid phase **[4]**

16/16 . . . Devices to humidify the respiration air **[4]**
16/18 . . . Vaporising devices for anaesthetic preparations **[4]**
16/20 . Valves specially adapted to medical respiratory devices **[4]**
16/22 . Carbon dioxide-absorbing devices **[4]**

Other devices for producing sleep or stupor; **Devices for ending sleep or stupor** **[4]**

19/00 **Devices for local anaesthesia**; **Devices for hypothermia** (A61M 5/42 takes precedence) **[2]**

21/00 **Other devices or methods to cause a change in the state of consciousness**; **Devices for producing or ending sleep by mechanical, optical, or acoustical means, e.g. for hypnosis** (beds for promoting sleep A61G 7/043)
21/02 . for inducing sleep or relaxation, e.g. by direct nerve stimulation, hypnosis, analgesia (for massage A61H; electrotherapy A61N, e.g. applying alternating or intermittent electric currents for producing anaesthesia A61N 1/34) **[5]**

Probes; **Catheters**; **Dilators**; **Drainage appliances for wounds**

23/00 **Solid probes**; **Bougies**

25/00 **Catheters**; **Hollow probes** (for measuring or testing A61B)
25/01 . Introducing, guiding, advancing, emplacing or holding catheters (A61M 25/10 takes precedence) **[5]**
25/02 . . Holding devices, e.g. on the body **[5]**
25/04 . . . in the body, e.g. expansible **[5]**
25/06 . . Body-piercing guide needles or the like (A61M 25/088 takes precedence) **[5,6]**
25/08 . . Advancing means, e.g. self-propelled **[5]**
25/082 . . . Self-propulsion arrangements (A61M 25/085 takes precedence) **[6]**
25/085 . . . Fluid propulsion **[6]**
25/088 . . using an additional catheter, e.g. to reach relatively inaccessible places **[6]**
25/09 . . Guide wires **[6]**
25/092 . . Remote control of the orientation of the distal end **[6]**
25/095 . . Arrangements for enabling the detection of the internal position of the catheter, e.g. radiographically **[6]**
25/098 . . . using radio-opaque markers **[6]**
25/10 . Balloon catheters **[5]**
25/12 . . Arrangements for detaching the balloon when in place **[6]**
25/14 . Arrangement or shape of fluid flow passages, e.g. of plural fluid passages (A61M 25/10 takes precedence) **[6]**
25/16 . Making or assembling not otherwise provided for **[6]**
25/18 . . Connecting catheters or probes to hubs **[6]**

27/00 **Drainage appliances for wounds, or the like** (implements for holding wounds open A61B 17/02)

29/00 **Dilators with or without means for introducing media, e.g. remedies** (stents A61F 2/82) **[2]**
29/02 . Inflatable dilators (connection of valves to inflatable elastic bodies B60C 29/00); Dilators made of swellable materials **[3]**
29/04 . . Dilators made of swellable materials **[5]**

31/00 **Devices for introducing or retaining media, e.g. remedies, in cavities of the body** (A61M 25/00 takes precedence) **[2,5]**

35/00 **Devices for applying media, e.g. remedies, on the human body** (devices for handling toilet or cosmetic substances A45D; absorbent pads, e.g. swabs, A61F 13/15) **[2]**

36/00 **Applying radioactive material to the body** **[5]**
36/02 . combined with other radiant- or wave-energy source, e.g. electromagnetic, thermal, micro-wave **[5]**
36/04 . Arrangements specially adapted for placing, e.g. inhaling or injecting, radioactive material within the body **[5]**
36/06 . . by fluid injection of radioactive or enhancing agent through a body-piercing conduit **[5]**
36/08 . . . Fluid reservoir shielding, e.g. syringe shielding **[5]**
36/10 . . Utero-vaginal or pelvic application **[5]**
36/12 . . Injectors, holders for seeds or implants, e.g. capsules **[5]**
36/14 . Radioactive dressings **[5]**

37/00 **Other apparatus for introducing media into the body** (for reproduction or fertilisation A61B 17/425; apparatus for iontophoresis or cataphoresis A61N 1/30); **Percutany, i.e. introducing medicines into the body by diffusion through the skin** (salt baths A61H 33/04) **[5]**

39/00 **Tubes, tube connectors, tube couplings, valves, access sites or the like, specially adapted for medical use** (for respiratory devices, e.g. tracheal tubes, A61M 16/00; artificial heart valves A61F 2/24) **[5]**
39/02 . Access sites **[5]**
39/04 . . having pierceable self-sealing members **[5]**
39/06 . . Haemostasis valves, i.e. gaskets sealing around a needle, catheter or the like, closing on removal thereof **[6]**
39/08 . Tubes; Storage means specially adapted therefor **[6]**
39/10 . Tube connectors or tube couplings **[6]**
39/12 . . for joining a flexible tube to a rigid attachment **[6]**
39/14 . . for connecting tubes having sealed ends **[6]**
39/16 . . having provision for disinfection or sterilisation **[6]**
39/18 . . . Methods or apparatus for making the connection under sterile conditions, i.e. sterile docking **[6]**
39/20 . Closure caps or plugs for connectors or open ends of tubes **[6]**
39/22 . Valves or arrangement of valves **[6]**
39/24 . . Check- or non-return valves **[6]**
39/26 . . Valves closing automatically on disconnecting the line and opening on reconnection thereof **[6]**
39/28 . . Clamping means for squeezing flexible tubes, e.g. roller clamps **[6]**

A61N **ELECTROTHERAPY**; **MAGNETOTHERAPY**; **RADIATION THERAPY**; **ULTRASOUND THERAPY** (measurement of bioelectric currents A61B; surgical instruments, devices or methods for transferring non-mechanical forms of energy to or from the body A61B 18/00; anaesthetic apparatus in general A61M; incandescent lamps H01K; infra-red radiators for heating H05B) **[6]**

Note

In this subclass, the following term is used with the meaning indicated:
– "therapy" implies that the treatment, when it aims at destroying sick or abnormal cells, is performed within the limits of healthy cell life, the destruction thereof being undesired, contrary to that which takes place with instruments, devices or methods covered by group A61B 18/00. **[5,7]**

Subclass index

1/00 **Electrotherapy**; **Circuits therefor** (A61N 2/00 takes precedence; electrically conductive preparations for use in therapy or testing in vivo A61K 50/00) **[5]**
1/02 . Details
1/04 . . Electrodes
1/05 . . . for implantation or insertion into the body, e.g. heart electrode (A61N 1/06 takes precedence) **[4]**
1/06 . . . for high-frequency therapy
1/08 . . Arrangements or circuits for monitoring, protecting, controlling or indicating (for a single specific type of apparatus A61N 1/10 to A61N 1/44) **[4]**
1/10 . Applying static electricity (applying ionised gases or vapours A61N 1/44)
1/14 . Leading-off electric charges, e.g. by earthing
1/16 . Screening or neutralising undesirable influences from atmospheric or terrestrial radiation or fields
1/18 . Applying electric currents by contact electrodes
1/20 . . continuous direct currents
1/22 . . . Electromedical belts
1/24 . . . . with built-in power source
1/26 . . . Electromedical brushes; Electromedical massage devices
1/28 . . . Apparatus for applying thermoelectric currents
1/30 . . . Apparatus for iontophoresis or cataphoresis
1/32 . . alternating or intermittent currents
1/34 . . . for producing anaesthesia
1/36 . . . for stimulation, e.g. heart pace-makers
1/362 . . . . Heart stimulators (A61N 1/372 takes precedence; heart defibrillators A61N 1/39) **[4]**
1/365 . . . . . controlled by a physiological parameter, e.g. by heart potential **[4]**
1/368 . . . . . comprising more than one electrode co-operating with different heart regions **[4]**
1/37 . . . . . Monitoring; Protecting **[4]**
1/372 . . . . Arrangements in connection with the implantation of stimulators **[4]**
1/375 . . . . . Constructional arrangements, e.g. casings **[4]**
1/378 . . . . . Electrical supply **[4]**
1/38 . . . for producing shock effects
1/39 . . . . Heart defibrillators **[4]**
1/40 . Applying electric fields by inductive or capacitive coupling
1/44 . Applying ionised fluids

2/00 **Magnetotherapy [5]**
2/02 . using magnetic fields produced by coils, including single turn loops or electromagnets (A61N 2/12 takes precedence) **[5]**
2/04 . . using variable fields, e.g. low frequency or pulsating fields **[5]**
2/06 . using magnetic fields produced by permanent magnets (A61N 2/12 takes precedence) **[5]**
2/08 . . applied externally **[5]**
2/10 . . applied within the body, e.g. with injected or implanted elements **[5]**
2/12 . using variable magnetic fields obtained by mechanical movement **[5]**

5/00 **Radiation therapy** (devices or apparatus applicable to both therapy and diagnosis A61B 6/00; applying radioactive material to the body A61M 36/00) **[5,6]**
5/01 . Devices for producing movement of radiation source during therapy
5/02 . using microwaves (A61N 5/01 takes precedence)
5/04 . . Radiators for near-field treatment
5/06 . using light (A61N 5/01 takes precedence)
5/067 . . using laser light **[7]**
5/073 . . using polarised light (A61N 5/067 takes precedence) **[7]**
5/08 . . using combined infra-red and ultra-violet light
5/10 . X-ray therapy; Gamma-ray therapy; Particle-irradiation therapy (A61N 5/01 takes precedence)

7/00 **Ultrasound therapy** (lithotripsy A61B 17/22, A61B 17/225; massage using supersonic vibration A61H 23/00) **[6]**
7/02 . Localised ultrasound hyperthermia **[6]**

A61P SPECIFIC THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS [7]

(1) This subclass covers therapeutic activity of chemical compounds or medicinal preparations already classified as such in subclasses A61K or C12N, or in classes C01, C07 or C08. **[7]**
(2) In this subclass, the term "drugs" includes chemical compounds or compositions with therapeutic activity. **[7]**
(3) In this subclass, therapeutic activity is classified in all appropriate places. **[7]**
(4) The classification symbols of this subclass are not listed first when assigned to patent documents. **[7]**

1/00 Drugs for disorders of the alimentary tract or the digestive system [7]
1/02 . Stomatological preparations, e.g. drugs for caries, aphtae, periodontitis **[7]**
1/04 . for ulcers, gastritis or reflux esophagitis, e.g. antacids, inhibitors of acid secretion, mucosal protectants **[7]**
1/06 . Anti-spasmodics, e.g. drugs for colics, esophagic dyskinesia **[7]**
1/08 . for nausea, cinetosis or vertigo; Antiemetics **[7]**
1/10 . Laxatives **[7]**
1/12 . Antidiarrhoeals **[7]**
1/14 . Prodigestives, e.g. acids, enzymes, appetite stimulants, antidyspeptics, tonics, antiflatulents **[7]**
1/16 . for liver or gallbladder disorders, e.g. hepatoprotective agents, cholagogues, litholytics **[7]**
1/18 . for pancreatic disorders, e.g. pancreatic enzymes **[7]**

3/00 Drugs for disorders of the metabolism (of the blood or the extracellular fluid A61P 7/00) **[7]**
3/02 . Nutrients, e.g. vitamins, minerals **[7]**
3/04 . Anorexiants; Antiobesity agents **[7]**
3/06 . Antihyperlipidemics **[7]**
3/08 . for glucose homeostasis (pancreatic hormones A61P 5/48) **[7]**
3/10 . . for hyperglycaemia, e.g. antidiabetics **[7]**
3/12 . for electrolyte homeostasis **[7]**
3/14 . . for calcium homeostasis (vitamin D A61P 3/02; parathyroid hormones A61P 5/18; calcitonin A61P 5/22; osteoporosis A61P 19/10; bone metastasis A61P 35/04) **[7]**

5/00 Drugs for disorders of the endocrine system [7]
5/02 . of the hypothalamic hormones, e.g. TRH, GnRH, CRH, GRH, somatostatin **[7]**
5/04 . . for decreasing, blocking or antagonising the activity of the hypothalamic hormones **[7]**
5/06 . of the anterior pituitary hormones, e.g. TSH, ACTH, FSH, LH, PRL, GH **[7]**
5/08 . . for decreasing, blocking or antagonising the activity of the anterior pituitary hormones **[7]**
5/10 . of the posterior pituitary hormones, e.g. oxytocin, ADH **[7]**
5/12 . . for decreasing, blocking or antagonising the activity of the posterior pituitary hormones **[7]**
5/14 . of the thyroid hormones, e.g. T3, T4 **[7]**
5/16 . . for decreasing, blocking or antagonising the activity of the thyroid hormones **[7]**
5/18 . of the parathyroid hormones **[7]**
5/20 . . for decreasing, blocking or antagonising the activity of PTH **[7]**
5/22 . . for decreasing, blocking or antagonising the activity of calcitonin **[7]**
5/24 . of the sex hormones **[7]**
5/26 . . Androgens **[7]**
5/28 . . Antiandrogens **[7]**
5/30 . . Oestrogens **[7]**
5/32 . . Antioestrogens **[7]**
5/34 . . Gestagens **[7]**
5/36 . . Antigestagens **[7]**
5/38 . of the suprarenal hormones **[7]**
5/40 . . Mineralocorticosteroids, e.g. aldosterone; Drugs increasing or potentiating the activity of mineralocorticosteroids **[7]**
5/42 . . for decreasing, blocking or antagonising the activity of mineralocorticosteroids **[7]**
5/44 . . Glucocorticosteroids; Drugs increasing or potentiating the activity of glucocorticosteroids **[7]**
5/46 . . for decreasing, blocking or antagonising the activity of glucocorticosteroids **[7]**
5/48 . of the pancreatic hormones **[7]**
5/50 . . for increasing or potentiating the activity of insulin **[7]**

7/00 Drugs for disorders of the blood or the extracellular fluid [7]
7/02 . Antithrombotic agents; Anticoagulants; Platelet aggregation inhibitors **[7]**
7/04 . Antihaemorrhagics; Procoagulants; Haemostatatic agents; Antifibrinolytic agents **[7]**
7/06 . Antianaemics **[7]**
7/08 . Plasma substitutes; Perfusion solutions; Dialytics or haemodialytics; Drugs for electrolytic or acid-base disorders, e.g. hypovolemic shock (artificial tears A61P 27/04) **[7]**
7/10 . Antioedematous agents; Diuretics **[7]**
7/12 . Antidiuretics, e.g. drugs for diabetes insipidus (ADH A61P 5/10) **[7]**

9/00 Drugs for disorders of the cardiovascular system [7]
9/02 . Non-specific cardiovascular stimulants, e.g. drugs for syncope, antihypotensives **[7]**
9/04 . Inotropic agents, i.e. stimulants of cardiac contraction; Drugs for heart failure **[7]**
9/06 . Antiarrhythmics **[7]**
9/08 . Vasodilators for multiple indications **[7]**
9/10 . for treating ischaemic or atherosclerotic diseases, e.g. antianginal drugs, coronary vasodilators, drugs for myocardial infarction, retinopathy, cerebrovascula insufficiency, renal arteriosclerosis **[7]**
9/12 . Antihypertensives **[7]**
9/14 . Vasoprotectives; Antihaemorrhoidals; Drugs for varicose therapy; Capillary stabilisers **[7]**

11/00 Drugs for disorders of the respiratory system [7]
11/02 . Nasal agents, e.g. decongestants **[7]**
11/04 . for throat disorders **[7]**
11/06 . Antiasthmatics **[7]**
11/08 . Bronchodilators **[7]**

11/10 . Expectorants **[7]**
11/12 . Mucolytics **[7]**
11/14 . Antitussive agents **[7]**
11/16 . Central respiratory analeptics **[7]**

13/00 Drugs for disorders of the urinary system (diuretics A61P 7/10) **[7]**
13/02 . of urine or of the urinary tract, e.g. urine acidifiers **[7]**
13/04 . for urolithiasis **[7]**
13/06 . Anti-spasmodics **[7]**
13/08 . of the prostate **[7]**
13/10 . of the bladder **[7]**
13/12 . of the kidneys **[7]**

15/00 Drugs for genital or sexual disorders (for disorders of sex hormones A61P 5/24); **Contraceptives [7]**
15/02 . for disorders of the vagina **[7]**
15/04 . for inducing labour or abortion; Uterotonics **[7]**
15/06 . Antiabortive agents; Labour repressants **[7]**
15/08 . for gonadal disorders or for enhancing fertility, e.g. inducers of ovulation or of spermatogenesis **[7]**
15/10 . for impotence **[7]**
15/12 . for climacteric disorders **[7]**
15/14 . for lactation disorders, e.g. galactorrhoea **[7]**
15/16 . Masculine contraceptives **[7]**
15/18 . Feminine contraceptives **[7]**

17/00 Drugs for dermatological disorders [7]
17/02 . for treating wounds, ulcers, burns, scars, keloids, or the like **[7]**
17/04 . Antipruritics **[7]**
17/06 . Antipsoriatics **[7]**
17/08 . Antiseborrheics **[7]**
17/10 . Anti-acne agents **[7]**
17/12 . Keratolytics, e.g. wart or anti-corn preparations **[7]**
17/14 . for baldness or alopecia **[7]**
17/16 . Emollients or protectives, e.g. against radiation **[7]**
17/18 . Antioxidants, e.g. antiradicals (preparations for protection against sunlight A61Q 17/00) **[8]**

19/00 Drugs for skeletal disorders [7]
19/02 . for joint disorders, e.g. arthritis, arthrosis **[7]**
19/04 . for non-specific disorders of the connective tissue **[7]**
19/06 . Antigout agents, e.g. antihyperuricemic or uricosuric agents **[7]**
19/08 . for bone diseases, e.g. rachitism, Paget's disease **[7]**
19/10 . . for osteoporosis **[7]**

21/00 Drugs for disorders of the muscular or neuromuscular system [7]
21/02 . Muscle relaxants, e.g. for tetanus or cramps **[7]**
21/04 . for myasthenia gravis **[7]**
21/06 . Anabolic agents (androgens A61P 5/26) **[7]**

23/00 Anaesthetics [7]
23/02 . Local anaesthetics **[7]**

25/00 Drugs for disorders of the nervous system [7]
25/02 . for peripheral neuropathies **[7]**
25/04 . Centrally acting analgesics, e.g. opioids **[7]**
25/06 . Antimigraine agents **[7]**
25/08 . Antiepileptics; Anticonvulsants **[7]**
25/10 . . for petit-mal **[7]**
25/12 . . for grand-mal **[7]**
25/14 . for treating abnormal movements, e.g. chorea, dyskinesia **[7]**
25/16 . . Anti-Parkinson drugs **[7]**
25/18 . Antipsychotics, i.e. neuroleptics; Drugs for mania or schizophrenia **[7]**
25/20 . Hypnotics; Sedatives **[7]**
25/22 . Anxiolytics **[7]**
25/24 . Antidepressants **[7]**
25/26 . Psychostimulants, e.g. nicotine, cocaine **[7]**
25/28 . for treating neurodegenerative disorders of the central nervous system, e.g. nootropic agents, cognition enhancers, drugs for treating Alzheimer's disease or other forms of dementia **[7]**
25/30 . for treating abuse or dependence **[7]**
25/32 . . Alcohol-abuse **[7]**
25/34 . . Tobacco-abuse **[7]**
25/36 . . Opioid-abuse **[7]**

27/00 Drugs for disorders of the senses [7]
27/02 . Ophthalmic agents **[7]**
27/04 . . Artificial tears; Irrigation solutions **[7]**
27/06 . . Antiglaucoma agents or miotics **[7]**
27/08 . . Mydriatics or cycloplegics **[7]**
27/10 . . for accommodation disorders, e.g. myopia **[7]**
27/12 . . for cataracts **[7]**
27/14 . . Decongestants or antiallergics **[7]**
27/16 . Otologicals **[7]**

29/00 Non-central analgesic, antipyretic or antiinflammatory agents, e.g antirheumatic agents; **Non-steroidal antiinflammatory drugs (NSAIDs) [7]**
29/02 . without antiinflammatory effect **[7]**

31/00 Antiinfectives, i.e. antibiotics, antiseptics, chemotherapeutics [7]
31/02 . Local antiseptics **[7]**
31/04 . Antibacterial agents **[7]**
31/06 . . for tuberculosis **[7]**
31/08 . . for leprosy **[7]**
31/10 . Antimycotics **[7]**
31/12 . Antivirals **[7]**
31/14 . . for RNA viruses **[7]**
31/16 . . . for influenza or rhinoviruses **[7]**
31/18 . . . for HIV **[7]**
31/20 . . for DNA viruses **[7]**
31/22 . . . for herpes viruses **[7]**

33/00 Antiparasitic agents [7]
33/02 . Antiprotozoals, e.g. for leishmaniasis, trichomoniasis, toxoplasmosis **[7]**
33/04 . . Amoebicides **[7]**
33/06 . . Antimalarials **[7]**
33/08 . . for Pneumocystis carinii **[7]**
33/10 . Anthelmintics **[7]**
33/12 . . Schistosomicides **[7]**
33/14 . Ectoparasiticides, e.g. scabicides **[7]**

35/00 Antineoplastic agents [7]
35/02 . specific for leukemia **[7]**
35/04 . specific for metastasis **[7]**

37/00 Drugs for immunological or allergic disorders [7]
37/02 . Immunomodulators **[7]**
37/04 . . Immunostimulants **[7]**
37/06 . . Immunosuppressants, e.g. drugs for graft rejection **[7]**
37/08 . Antiallergic agents (antiasthmatic agents A61P 11/06; ophthalmic antiallergics A61P 27/14) **[7]**

39/00 **General protective or antinoxious agents [7]**
39/02 . Antidotes **[7]**
39/04 . Chelating agents **[7]**
39/06 . Free radical scavengers or antioxidants **[7]**

41/00 **Drugs used in surgical methods, e.g. surgery adjuvants for preventing adhesion or for vitreum substitution [7]**

43/00 **Drugs for specific purposes, not provided for in groups A61P 1/00 to A61P 41/00 [7]**

Note

Classification is only made in this group when a specific therapeutic activity for a chemical compound or medicinal preparation has been clearly disclosed, the specific therapeutic activity not being appropriate to any of groups A61P 1/00 to A61P 41/00. **[2010.01]**

A61Q SPECIFIC USE OF COSMETICS OR SIMILAR TOILET PREPARATIONS [8]

(1) This subclass covers the use of cosmetics or similar toilet preparations already classified as such in main group A61K 8/00, in subclasses C11D or C12N, or in classes C01, C07 or C08. **[8]**
(2) When classifying in this subclass, classification is also made in subclass A61P if the preparation is stated to have therapeutic activity. **[8]**
(3) In this subclass, the use of cosmetics or similar toilet preparations is classified in all appropriate places. **[8]**
(4) The classification symbols of this subclass are not listed first when assigned to patent documents. **[8]**

1/00 **Make-up preparations**; **Body powders**; **Preparations for removing make-up [8]**
1/02 . Preparations containing skin colorants, e.g. pigments (preparations in powder form A61Q 1/12) **[8]**
1/04 . . for lips **[8]**
1/06 . . . Lipsticks **[8]**
1/08 . . for cheeks, e.g. rouge **[8]**
1/10 . . for eyes, e.g. eyeliner, mascara **[8]**
1/12 . Face or body powders, e.g. for grooming, adorning or absorbing **[8]**
1/14 . Preparations for removing make-up **[8]**

3/00 **Manicure or pedicure preparations [8]**
3/02 . Nail coatings **[8]**
3/04 . Nail coating removers **[8]**

5/00 **Preparations for care of the hair [8]**
5/02 . Preparations for cleaning the hair **[8]**
5/04 . Preparations for permanent waving or straightening the hair **[8]**
5/06 . Preparations for styling the hair, e.g. by temporary shaping or colouring **[8]**
5/08 . Preparations for bleaching the hair **[8]**
5/10 . Preparations for permanently dyeing the hair **[8]**
5/12 . Preparations containing hair conditioners **[8]**

7/00 **Preparations for affecting hair growth [8]**
7/02 . Preparations for inhibiting or slowing hair growth **[8]**

9/00 **Preparations for removing hair or for aiding hair removal [8]**
9/02 . Shaving preparations **[8]**
9/04 . Depilatories **[8]**

11/00 **Preparations for care of the teeth, of the oral cavity or of dentures, e.g. dentifrices or toothpastes**; **Mouth rinses [8]**
11/02 . Preparations for deodorising, bleaching or disinfecting dentures **[8]**

13/00 **Formulations or additives for perfume preparations** (essential oils or perfumes per se C11B 9/00) **[8]**

15/00 **Anti-perspirants or body deodorants** (deodorisation of air A61L 9/00) **[8]**

17/00 **Barrier preparations**; **Preparations brought into direct contact with the skin for affording protection against external influences, e.g. sunlight, X-rays or other harmful rays, corrosive materials, bacteria or insect stings [8]**
17/02 . containing insect repellants **[8]**
17/04 . Topical preparations for affording protection against sunlight or other radiation; Topical sun tanning preparations **[8]**

19/00 **Preparations for care of the skin [8]**
19/02 . for chemically bleaching or whitening the skin **[8]**
19/04 . for chemically tanning the skin (topical sun tanning preparations A61Q 17/04) **[8]**
19/06 . for countering cellulitis **[8]**
19/08 . Anti-ageing preparations **[8]**
19/10 . Washing or bathing preparations **[8]**

90/00 **Cosmetics or similar toilet preparations for specific uses not provided for in other groups of this subclass [2009.01]**

Note

Classification is only made in this group when a specific use for a cosmetic or similar toilet preparation has been clearly disclosed, the specific use not being appropriate to any of the preceding groups in this subclass. **[2010.01]**

A62 LIFE-SAVING; FIRE-FIGHTING

A62B **DEVICES, APPARATUS OR METHODS FOR LIFE-SAVING** (valves specially adapted for medical use A61M 39/00; composition of chemical substances used in respirators, gas-masks, breathing apparatus or the like A62D; rescuing from mountains or trees A63B 27/00, A63B 29/00; life-saving devices, apparatus or methods specially adapted for use in water B63C 9/00; divers' equipment B63C 11/00; specially adapted for use with aircraft, e.g. parachutes or ejector seats, B64D; rescue devices peculiar to mining E21F 11/00)

Subclass index

Rescuing from fire; **Rescuing from buildings or the like**

1/00 **Devices for lowering persons from buildings or the like**

1/02 . by making use of rescue cages, bags, or the like (elevators, escalators or moving walkways B66B)

1/04 . . Single parts, e.g. fastening devices

1/06 . by making use of rope-lowering devices (capstans, winches B66D)

1/08 . . with brake mechanisms for the winches or pulleys

1/10 . . . mechanically operated

1/12 . . . hydraulically operated

1/14 . . with brakes sliding on the rope

1/16 . . Life-saving ropes or belts (safety belts A62B 35/00; mountain guy-ropes A63B 29/02; life-saving belts for use at sea B63C)

1/18 . . Other single parts for rope lowering-devices, e.g. take-up rollers for ropes, devices for shooting ropes

1/20 . by making use of sliding-ropes, sliding-poles or chutes, e.g. hoses, pipes, sliding-grooves, sliding sheets

1/22 . by making use of jumping devices, e.g. jumping-sheet, jumping-mattresses

3/00 **Devices or single parts for facilitating escape from buildings or the like, e.g. protection shields, protection screens**; **Portable devices for preventing smoke penetrating into distinct parts of buildings** (A62B 1/00 takes precedence)

5/00 **Other devices for rescuing from fire** (ladders E06C)

Respirators; **Gas-masks, including breathing apparatus, e.g. for high altitude, or masks therefor**; **Devices affording protection against harmful chemical agents**

7/00 **Respiratory apparatus** (for medical purposes A61M 16/00)

7/02 . with compressed oxygen or air

7/04 . . and lung-controlled oxygen or air valves

7/06 . with liquid oxygen

7/08 . containing chemicals producing oxygen

7/10 . with filter elements

7/12 . with fresh-air hose

7/14 . for high-altitude aircraft

9/00 **Component parts for respiratory or breathing apparatus** (A62B 19/00, A62B 21/00, A62B 23/00 take precedence) **[4]**

9/02 . Valves

9/04 . Couplings; Supporting frames

9/06 . Mouthpieces; Nose-clips (for medical purposes A61M 15/00)

11/00 **Devices for reconditioning breathing air in sealed rooms** (chemical purification, disinfection, or sterilisation of air A61L; in aircraft or submarines, insofar as they influence the construction of the vehicle or are influenced by its construction B63B, B64D, respectively; air-conditioning in general F24F)

13/00 **Special devices for ventilating gasproof shelters** (ventilating in general F24F)

15/00 **Installations affording protection against poisonous or injurious substances, e.g. with separate breathing apparatus** (building aspects E04H 9/00)

17/00 **Protective clothing affording protection against heat or harmful chemical agents or for use at high altitudes** (protective clothing or garments for work or sport A41D 13/00; protecting eyes or ears A61F 9/00; composition of materials for protective clothing A62D 5/00; life-saving garments for use at sea B63C; diving suits B63C 11/02; flying suits B64D 10/00; space suits B64G 6/00; bullet-proof clothing F41H 1/02) **[2]**

17/04 . Hoods

17/08 . Protective coverings for animals

18/00 **Breathing masks or helmets, e.g. affording protection against chemical agents or for use at high altitudes** (A62B 17/00 takes precedence; anaesthetic masks A61M 16/06)

18/02 . Masks (gas-masks for animals A62B 18/06; masks for welders A61F 9/06)

18/04 . Gas helmets
18/06 . Gas masks for animals
18/08 . Component parts for gas-masks or gas-helmets, e.g. windows, straps, speech transmitters, signal-devices (eye-pieces for protective goggles A61F 9/02; composition of materials for the windows or other transparent parts A62D 7/00)
18/10 . . Valves

19/00 Cartridges with absorbing substances for respiratory apparatus
19/02 . with oxidising agents

21/00 Devices for producing oxygen from chemical substances for respiratory apparatus

23/00 Filters for breathing-protection purposes (gas-filters in general B01D)
23/02 . for respirators
23/04 . for gasproof shelters
23/06 . Nose filters

25/00 Devices for storing respiratory or breathing apparatus [4]

27/00 Methods or devices for testing respiratory or breathing apparatus (apparatus for testing gastightness in general G01M) **[4]**

29/00 Devices, e.g. installations, for rendering harmless or for keeping off harmful chemical agents (respiratory apparatus A62B 7/00; gasproof doors, windows, shutters E06B)

31/00 Containers or portable cabins for affording breathing protection with devices for reconditioning the breathing air or for ventilating (ventilation of gasproof shelters A62B 13/00; protective clothes or coverings A62B 17/00; treatment rooms for medical purposes A61G 10/00) **[4]**

33/00 Devices for allowing seemingly-dead persons to escape or draw attention; **Breathing apparatus for accidentally buried person**

35/00 Safety belts or body harnesses; **Similar equipment for limiting displacement of the human body, especially in case of sudden changes of motion** (buckles A44B 11/00; accessories for children's furniture A47D 15/00; children's seats B60N 2/24; safety belts or body harnesses for land vehicles B60R 22/00; harnesses for parachutes B64D 17/30; harnessing in aircraft B64D 25/06; releasable fastenings F16B) **[4]**
35/04 . incorporating energy absorbing means **[4]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

A62C FIRE-FIGHTING (fire-extinguishing compositions, use of chemical substances in extinguishing fires A62D 1/00; spraying, applying liquids or other fluent materials to surfaces in general B05; fire-fighting aircraft B64D 1/16; alarm arrangements G08B, e.g. fire alarms actuated by smoke or gases G08B 17/10)

Subclass index

2/00 Fire prevention or containment (A62C 3/00 takes precedence; flame traps A62C 4/00) **[5]**
2/04 . Removing or cutting-off the supply of inflammable material **[5]**
2/06 . Physical fire-barriers **[5]**
2/08 . . Water curtains (nozzles A62C 31/02) **[5]**
2/10 . . Fire-proof curtains **[5]**
2/12 . . Hinged dampers **[5]**
2/14 . . . with two or more blades **[5]**
2/16 . . . . multi-vane roll or fold-up type **[5]**
2/18 . . Sliding dampers **[5]**
2/20 . . . at 90 degrees to the plane of the opening **[5]**
2/22 . . Fire-dampers with provision for the removal of an obstacle, e.g. rails, conveyers, before closing the opening **[5]**
2/24 . . Operating or controlling mechanisms **[5]**

3/00 Fire prevention, containment or extinguishing specially adapted for particular objects or places (for nuclear reactors G21C 9/04) **[5]**
3/02 . for area conflagrations, e.g. forest fires, subterranean fires **[5]**
3/04 . for dust or loosely-baled or loosely-piled materials, e.g. in silos, in chimneys (flame traps A62C 4/00) **[5]**
3/06 . of highly inflammable material, e.g. light metals, petroleum products **[5]**
3/07 . in vehicles, e.g. in road vehicles **[5]**

3/08 . . in aircraft **[5]**
3/10 . . in ships **[5]**
3/16 . in electrical installations, e.g. cableways **[5]**

4/00 Flame traps allowing passage of gas but not of flame or explosion wave [2]
4/02 . in gas-pipes (safety valves F16K 17/00) **[2]**
4/04 . in flues or chimneys **[2]**

5/00 Making of fire-extinguishing materials immediately before use (nozzles A62C 31/02) **[5]**
5/02 . of foam **[5]**
5/027 . . Heavy foam **[5]**
5/033 . of gel **[5]**

Hand fire-extinguishers [5]

8/00 Hand tools or accessories specially adapted for fire-fighting, e.g. tool boxes [5]
8/02 . Buckets or pails **[5]**
8/04 . Rakes or beaters **[5]**
8/06 . Fire-blankets **[5]**
8/08 . Shields **[5]**

11/00 Portable extinguishers with manually-operated pumps [5]

13/00 Portable extinguishers which are permanently pressurised or pressurised immediately before use (A62C 11/00 takes precedence) **[5]**
13/02 . with pressure gas produced by chemicals
13/04 . . with separate acid container
13/06 . . . with acid container without closure device
13/08 . . . with acid container with closure device
13/10 . . . . with loose-lid closure device (loosely-engaging lids or covers for containers for liquids without means for effecting sealing of container in general B65D 51/02)
13/12 . . . . with valve closure device
13/14 . . . with acid container the shell of which is ruptured by pin, screw-pin, or similar device
13/16 . . . with movable acid container ruptured by falling when operated
13/18 . . . with acid container ruptured by a striking weight, e.g. by a falling weight
13/20 . . with the chemicals in a single case, e.g. in a cartridge
13/22 . . with incendiary substances producing pressure gas
13/62 . with a single permanently pressurised container **[5]**
13/64 . . the extinguishing material being released by means of a valve **[5]**
13/66 . with extinguishing material and pressure gas being stored in separate containers **[5]**
13/68 . . characterised by means for releasing the extinguishing material **[5]**
13/70 . . characterised by means for releasing the pressure gas **[5]**
13/72 . . characterised by releasing means operating essentially simultaneously on both containers **[5]**
13/74 . . . the pressure gas container being pierced or broken **[5]**
13/76 . Details or accessories **[5]**
13/78 . . Suspending or supporting devices **[5]**

15/00 Extinguishers essentially of the knapsack type (knapsacks, carrying-frames, pack-frames carried on the body A45F 3/00)

17/00 Hand fire-extinguishers essentially in the form of pistols or rifles

19/00 Hand fire-extinguishers in which the extinguishing substance is expelled by an explosion; **Exploding containers thrown into the fire**

25/00 Portable extinguishers with power-driven pumps [5]

27/00 Fire-fighting land vehicles (vehicle aspects, see the appropriate subclasses of classes B60 to B62)

29/00 Fire-fighting vessels or like floating structures (shipbuilding or navigation aspects, see the appropriate subclasses of class B63) **[5]**

31/00 Delivery of fire-extinguishing material (pumps F04; hoses F16L)
31/02 . Nozzles specially adapted for fire-extinguishing **[5]**
31/03 . . adjustable, e.g. from spray to jet or vice-versa **[5]**
31/05 . . with two or more outlets **[5]**
31/07 . . . for different media **[5]**
31/12 . . for delivering foam or atomized foam
31/22 . . specially adapted for piercing walls, heaped materials, or the like
31/24 . . attached to ladders, poles, towers, or other structures with or without rotary heads
31/28 . Accessories for delivery devices, e.g. supports

33/00 Hose accessories [5]
33/02 . Apparatus for cleaning or drying hoses (drying shelves F26B)
33/04 . Supports or clamps for fire hoses
33/06 . Hose or pipe bridges

35/00 Permanently-installed equipment (A62C 31/00, A62C 33/00, A62C 37/00 take precedence; for forming water curtains A62C 2/08)
35/02 . with containers for delivering the extinguishing substance (for forming water curtains A62C 2/08)
35/04 . . Swingable or tiltable containers
35/06 . . Containers destroyed or opened by falling **[5]**
35/08 . . Containers destroyed or opened by bursting charge **[5]**
35/10 . . Containers destroyed or opened by flames or heat **[5]**
35/11 . . controlled by a signal from the danger zone **[5]**
35/13 . . . with a finite supply of extinguishing material **[5]**
35/15 . . . with a system for topping-up the supply of extinguishing material automatically **[5]**
35/20 . Hydrants, e.g. wall-hoses, wall units, plug-in cabinets (hydrants in streets E03B 9/02) **[5]**
35/58 . Pipe-line systems **[5]**
35/60 . . wet, i.e. containing extinguishing material even when not in use **[5]**
35/62 . . dry, i.e. empty of extinguishing material when not in use **[5]**
35/64 . . pressurised **[5]**
35/66 . . . Accelerators **[5]**
35/68 . . Details, e.g. of pipes or valve systems (valves in general F16K) **[5]**

37/00 Control of fire-fighting equipment (heat-sensitive devices G01K) **[5]**
37/08 . comprising an outlet device containing a sensor, or itself being the sensor, i.e. self-contained sprinklers **[5]**
37/09 . . telescopic or adjustable **[5]**

37/10 . . Releasing means, e.g. electrically released **[5]**
37/11 . . . heat-sensitive **[5]**
37/12 . . . . with fusible links **[5]**
37/14 . . . . with frangible vessels **[5]**
37/16 . . . . with thermally-expansible links **[5]**
37/20 . . Resetting after use; Tools therefor **[5]**
37/21 . . . automatic **[5]**
37/36 . an actuating signal being generated by a sensor separate from an outlet device **[5]**
37/38 . . by both sensor and actuator, e.g. valve, being in the danger zone **[5]**
37/40 . . . with electric connection between sensor and actuator **[5]**
37/42 . . . with mechanical connection between sensor and actuator, e.g. rods, levers **[5]**
37/44 . . only the sensor being in the danger zone **[5]**
37/46 . . Construction of the actuator **[5]**
37/48 . . . Thermally sensitive initiators **[5]**
37/50 . Testing or indicating devices for determining the state of readiness of the equipment **[5]**

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

A62D CHEMICAL MEANS FOR EXTINGUISHING FIRES; PROCESSES FOR MAKING HARMFUL CHEMICAL SUBSTANCES HARMLESS, OR LESS HARMFUL, BY EFFECTING A CHEMICAL CHANGE; COMPOSITION OF MATERIALS FOR COVERINGS OR CLOTHING FOR PROTECTING AGAINST HARMFUL CHEMICAL AGENTS; COMPOSITION OF MATERIALS FOR TRANSPARENT PARTS OF GAS-MASKS, RESPIRATORS, BREATHING BAGS OR HELMETS; COMPOSITION OF CHEMICAL MATERIALS FOR USE IN BREATHING APPARATUS

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

1/00 Fire-extinguishing compositions; Use of chemical substances in extinguishing fires

1/02 . containing or yielding a gas phase, e.g. foams (A62D 1/06, A62D 1/08 take precedence) **[3]**
1/04 . . characterised by the foam stabiliser **[3]**
1/06 . containing gas-producing, chemically-reactive components **[3]**
1/08 . containing volatile or gas-charged liquids **[3]**

3/00 Processes for making harmful chemical substances harmless, or less harmful, by effecting a chemical change in the substances (devices for rendering harmful chemical agents harmless A62B 29/00; consuming noxious gases by combustion F23G 7/06) **[1,2007.01]**

(1) This group does not cover :
– chemical or physico-chemical type processes where eradicating or diminishing the dangerousness of harmful chemical substances produces useful products, e.g. cement. These types of processes are covered by the appropriate subclass for making the specific product. However, in situations where processes for making products include a subset of process steps with eradicating or diminishing the dangerousness of a harmful chemical substance as its fundamental goal, and this subset is in itself novel and unobvious, this subset is covered by group A62D 3/00. **[2007.01]**

(2) In this group the following term is used with the meaning indicated:
– "harmful chemical substances" are chemical waste substances which are too hazardous or toxic to be discarded in an ordinary municipal landfill. **[2007.01]**

(3) In this group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2007.01]**

(4) In this group, it is desirable to add the indexing code(s) of group A62D 101/00relating to the nature of the harmful chemical substance. **[2007.01]**

3/02 . by biological methods, i.e. processes using enzymes or micro-organisms **[2007.01]**
3/10 . by subjecting to electric or wave energy or particle or ionizing radiation **[2007.01]**
3/11 . . Electrochemical processes, e.g. electrodialysis **[2007.01]**
3/115 . . . Electrolytic degradation or conversion **[2007.01]**
3/13 . . to sonic energy **[2007.01]**
3/15 . . to particle radiation, e.g. electron beam radiation **[2007.01]**
3/17 . . to electromagnetic radiation, e.g. emitted by a laser **[2007.01]**
3/172 . . . Gamma rays, i.e. radiation having a wavelength of about 0.003 to 0.03 nm **[2007.01]**
3/174 . . . X-rays, i.e. radiation having a wavelength of about 0.03 to 3 nm **[2007.01]**
3/176 . . . Ultraviolet radiation, i.e. radiation having a wavelength of about 3 to 400 nm **[2007.01]**
3/178 . . . Microwave radiation, i.e. radiation having a wavelength of about 0.3 to 30 cm **[2007.01]**
3/19 . . to plasma **[2007.01]**
3/20 . by hydropyrolysis or destructive steam gasification, e.g. using water and heat to effect chemical change **[2007.01]**
3/30 . by reacting with chemical agents **[2007.01]**
3/32 . . by treatment in molten chemical reagent, e.g. salts or metals **[2007.01]**
3/33 . . by chemically fixing the harmful substance, e.g. by chelation or complexation **[2007.01]**
3/34 . . Dehalogenation using reactive chemical agents able to degrade **[2007.01]**
3/35 . . by hydrolysis **[2007.01]**

3/36 . . Detoxification by using acid or alkaline reagents **[2007.01]**
3/37 . . by reduction, e.g. hydrogenation **[2007.01]**
3/38 . . by oxidation; by combustion **[2007.01]**
3/40 . by heating to effect chemical change, e.g. by pyrolysis **[2007.01]**

5/00 Composition of materials for coverings or clothing affording protection against harmful chemical agents

7/00 Composition of materials for transparent parts of gas-masks, respirators, breathing bags, or helmets
7/02 . Clear-view sheets which prevent the formation of water drops or ice

9/00 Composition of chemical substances for use in breathing apparatus

Indexing scheme associated with group A62D 3/00 relating to the nature of the harmful chemical substances [2007.01]

101/00 Harmful chemical substances made harmless, or less harmful, by effecting chemical change [2007.01]

Note

When indexing a substance in groups A62D 101/02 to A62D 101/08, indexing according to its chemical structure may also be made in one or more of groups A62D 101/20 to A62D 101/40. **[2007.01]**

101/02 . Chemical warfare substances, e.g. cholinesterase inhibitors **[2007.01]**
101/04 . Pesticides, e.g. insecticides, herbicides, fungicides or nematicides **[2007.01]**
101/06 . Explosives, propellants or pyrotechnics, e.g. rocket fuel or napalm **[2007.01]**
101/08 . Toxic combustion residues, e.g. toxic substances contained in fly ash from waste incineration **[2007.01]**
101/20 . Organic substances **[2007.01]**
101/22 . . containing halogen **[2007.01]**
101/24 . . containing heavy metals **[2007.01]**
101/26 . . containing nitrogen or phosphorus **[2007.01]**
101/28 . . containing oxygen, sulfur, selenium or tellurium, i.e. chalcogen **[2007.01]**
101/40 . Inorganic substances **[2007.01]**
101/41 . . Inorganic fibers, e.g. asbestos **[2007.01]**
101/43 . . containing heavy metals, in the bonded or free state **[2007.01]**
101/45 . . containing nitrogen or phosphorus **[2007.01]**
101/47 . . containing oxygen, sulfur, selenium or tellurium, i.e. chalcogen **[2007.01]**
101/49 . . containing halogen **[2007.01]**

A63 SPORTS; GAMES; AMUSEMENTS

A63B APPARATUS FOR PHYSICAL TRAINING, GYMNASTICS, SWIMMING, CLIMBING, OR FENCING; BALL GAMES; TRAINING EQUIPMENT (apparatus for passive exercising, massage A61H)

Subclass index

Gymnastic exercising apparatus [3]

1/00 Horizontal bars for gymnastics
1/04 . Cleaning the rods

3/00 Parallel bars or similar gymnastic apparatus

4/00 Balance beams [5]

5/00 Apparatus for jumping (mats for jumping A63B 6/00; for racing or riding sports, e.g. hurdles, A63K) **[5]**
5/02 . High-jumping posts
5/04 . . Ropes therefor
5/06 . Vaulting poles
5/08 . Spring-boards (of trampoline type A63B 5/11) **[5]**
5/10 . . for aquatic sports
5/11 . Trampolines **[5]**
5/12 . Bolster vaulting apparatus, e.g. horses, bucks, tables
5/16 . Training devices for jumping; Devices for balloon-jumping; Jumping aids
5/20 . Skipping-ropes
5/22 . Foot obstacles for skipping

6/00 Mats or the like for absorbing shocks for jumping, gymnastics or the like [5]
6/02 . for landing, e.g. for pole vaulting **[5]**

7/00 Freely-suspended gymnastic apparatus
7/02 . Swinging rings; Trapezes
7/04 . Climbing-ropes
7/06 . Rotors with hanging ropes
7/08 . Apparatus for rope-dancing

9/00 Climbing poles, frames, or stages

15/00 Clubs for gymnastics or the like
15/02 . with illuminating devices

17/00 Exercising apparatus combining several parts such as ladders, rods, beams, slides
17/02 . rigidly combined
17/04 . separable

19/00 Hoop exercising apparatus
19/02 . Freely-movable rolling hoops, e.g. gyrowheels
19/04 . movably supported on a framework

21/00 Exercising apparatus for developing or strengthening the muscles or joints of the body by working against a counterforce, with or without measuring devices (electric or electronic controls therefor A63B 24/00)
21/002 . isometric or isokinetic, i.e. substantial force variation without substantial muscle motion **[5]**
21/005 . using electromagnetic or electric force-resisters **[5]**
21/008 . using hydraulic or pneumatic force-resisters **[5]**
21/012 . using frictional force-resisters **[5]**
21/015 . . including rotating or oscillating elements **[5]**
21/018 . . including a rope moving relative to the surface of elements **[5]**
21/02 . using resilient force-resisters **[5]**
21/04 . . attached to static foundation
21/045 . . having torsion element **[5]**
21/05 . . Linearly-compressed elements **[5]**
21/055 . . extension element type **[5]**
21/06 . User-manipulated weights **[5]**
21/062 . . including guide for vertical array of weights **[5]**
21/065 . . worn on user's body **[5]**
21/068 . . using user's body weight **[5]**
21/072 . . Dumb-bells, bar-bells or the like **[5]**
21/075 . . . with variable weights **[5]**
21/078 . . Devices for bench press exercises **[5]**
21/08 . . anchored at one end
21/16 . Supports for anchoring force-resisters
21/22 . Resisting devices with rotary bodies
21/28 . Devices for two persons operating in opposition

22/00 Exercising apparatus specially adapted for conditioning the cardio-vascular system, for training agility or co-ordination of movements (force-resisting aspects A63B 21/00; electric or electronic controls therefor A63B 24/00) **[5]**
22/02 . with movable endless bands **[5]**
22/04 . with movable steps **[5]**
22/06 . with rotating cycling movement (support stands for bicycles A63B 69/16; unicycles B62K 1/00) **[5]**
22/08 . . for the legs **[5]**
22/10 . . for the arms **[5]**
22/12 . . for legs and arms simultaneously **[5]**
22/14 . Platforms for reciprocating rotating motion about a vertical axis **[5]**

22/16 . Platforms for rocking motion about a horizontal axis; Balancing drums; Balancing boards or the like **[5]**

22/18 . with elements having a circulating or rotating movement, generated by oscillating movement of the user (hoop exercising apparatus A63B 19/00) **[5]**

22/20 . using rollers, wheels, castors or the like to be moved over the floor or other surface during exercising **[5]**

23/00 Exercising apparatus specially adapted for particular parts of the body (A63B 22/00 takes precedence; force-resisting aspects A63B 21/00; electric or electronic controls therefor A63B 24/00; devices for exercising or strengthening of fingers or arms in teaching operation of keyboards G09B, e.g. G09B 15/06) **[5]**

23/02 . for the abdomen, the spinal column, the torso, or the shoulders

23/025 . for the head or neck **[5]**

23/03 . . for face muscles **[5]**

23/035 . for limbs, i.e. upper or lower limbs, e.g. simultaneously **[5]**

23/04 . . for lower limbs **[5]**

23/08 . . . for ankle-joints **[5]**

23/10 . . . for feet or toes **[5]**

23/12 . . for upper limbs **[5]**

23/14 . . . for wrist-joints **[5]**

23/16 . . . for hands or fingers **[5]**

23/18 . for improving respiratory function **[5]**

23/20 . for vaginal muscles **[5]**

24/00 Electric or electronic controls for exercising apparatus of groups A63B 1/00 to A63B 23/00 [5]

25/00 Stilts or the like

25/02 . Elastic stilts

25/04 . with wheels

25/06 . Shoes formed with stilts to elongate the step

25/08 . Hopping-sticks, e.g. pogo sticks

25/10 . Elastic bouncing shoes fastened to the foot

26/00 Exercising apparatus not covered by groups A63B 1/00 to A63B 25/00 [5]

Climbing; **Mountaineering**

27/00 Apparatus for climbing poles, trees, or the like (safety belts for climbers A62B 35/00)

27/02 . Climbing devices for round poles attachable to the feet

27/04 . Climbing devices for profile poles attachable to the feet

29/00 Apparatus for mountaineering (helmets A42B 3/00; non-skid devices or attachments for footwear, e.g. crampons, A43C 15/00; breathing masks or helmets for use at high altitudes A62B 18/00; picks B25D 7/00) **[3]**

29/02 . Mountain guy-ropes or accessories, e.g. avalanche ropes; Means for indicating the location of accidentally buried, e.g. snow-buried, persons

29/04 . Steps for climbing (for permanent fixing E06C 9/04)

29/08 . Hand equipment for climbers

Swimming

31/00 Swimming aids (teaching swimming A63B 69/10 to A63B 69/14; life-saving in water B63C 9/00)

31/02 . Swimming gloves

31/04 . . with arrangements for enlarging the propulsive surface

31/08 . Swim fins, flippers or other swimming aids held by, or attachable to, the hands, arms, feet or legs (A63B 31/18 takes precedence; worn as gloves A63B 31/02) **[3]**

31/10 . . held by, or attachable to, the hands or feet **[3]**

31/11 . . . attachable only to the feet **[3]**

31/12 . . held by, or attachable to, the arms or legs **[3]**

31/14 . . with valve-flaps

31/16 . . with arrangements for varying the size of the swimming surface

31/18 . Swimming appliances with propulsive effect for hands and feet simultaneously

33/00 Swimming equipment attachable to the head, e.g. swimming helmets, swimming goggles (breathing aids, e.g. snorkels, B63C 11/12)

35/00 Swimming framework with driving mechanisms operated by the swimmer or by a motor (other vessels or like floating structures for pleasure or sport B63B 35/71, B63B 35/73; divers' sleds or like craft B63C 11/46)

35/02 . shaped like a fish tail

35/04 . with paddle wheels

35/06 . with twin-bladed paddles or buoyant members

35/08 . with propeller propulsion

35/10 . . operated by the swimmer

35/12 . . operated by a motor

Balls

37/00 Solid balls; **Marbles** (heavy throwing-balls A63B 65/06)

37/02 . Special cores

37/04 . . Rigid cores

37/06 . . Elastic cores

37/08 . . Liquid cores; Plastic cores

37/10 . . with eccentric centre of gravity

37/12 . Special coverings

37/14 . Special surfaces

39/00 Hollow non-inflatable balls

39/02 . Arrangements for maintaining the pressure

39/04 . . Pricking balls

39/06 . Special coverings

39/08 . . made of two halves

41/00 Hollow inflatable balls

41/02 . Bladders

41/04 . . Closures therefor

41/08 . Ball covers; Closures therefor

41/10 . Bladder and cover united

41/12 . Tools or devices for blowing up or closing balls

43/00 Balls with special arrangements

43/02 . with a handle

43/04 . with an eccentric centre of gravity; with mechanism for changing the centre of gravity (solid balls A63B 37/10)

43/06 . with illuminating devices

45/00 Apparatus or methods for manufacturing balls (working of plastics or substances in a plastic state B29)

45/02 . Marking of balls

47/00 Devices for handling or treating balls
47/02 . for picking-up
47/04 . for cleaning balls (apparatus for cleaning balls, as accessories for bowling- or table alleys A63D 5/10)

Rackets, bats, or other accessories for ball games

49/00 Tennis, badminton, or like rackets
49/02 . Frames
49/04 . . with balancing devices
49/06 . . with slits
49/08 . . with special construction of the handle
49/10 . . made of non-metallic materials, other than wood
49/12 . . made of metal
49/14 . . Protection devices on the frame
49/16 . Presses
49/18 . Covers

51/00 Stringing tennis rackets
51/02 . Strings; String substitutes
51/04 . . Sheet-like structures used as substitutes
51/06 . Double-sided stringings
51/08 . Diagonal stringings
51/10 . Reinforcements for stringings
51/12 . Devices arranged in or on the racket for adjusting the tension of the strings
51/14 . Devices for stringing
51/16 . . Machines or apparatus for stringing while manufacturing

53/00 Golf clubs
53/02 . Joint structures between the head and the shaft
53/04 . Heads
53/06 . . adjustable
53/08 . with special arrangements for obtaining a variable impact
53/10 . Non-metallic shafts
53/12 . Metallic shafts
53/14 . Handles
53/16 . . adjustable

55/00 Bags for golf clubs; **Stands for golf clubs for use on the course**
55/02 . with special receptacles for the balls
55/04 . Supports with devices for anchoring to the ground
55/06 . . Bags with tripod or like set-up stands
55/08 . Wheeled carriers for golf bags
55/10 . Stands for golf clubs for use on the course

57/00 Golf game accessories, e.g. golf cups, golf tees

59/00 Bats, rackets, or the like, for other games (bats with a ball tethered thereto A63B 67/20)
59/02 . for lacrosse, pelota, or similar games
59/04 . for table tennis
59/06 . for baseball, rounders, or similar games
59/08 . for cricket
59/10 . for croquet
59/12 . for hockey
59/14 . for ice hockey
59/16 . for polo
59/18 . Circular bats for other games

61/00 Tennis nets or accessories for tennis or like games
61/02 . Posts; Revolvably-mounted posts
61/04 . Straining or adjusting devices for nets

63/00 Targets or goals for ball games (golf cups A63B 57/00)
63/02 . rigidly mounted (A63B 63/08 takes precedence) **[3]**
63/04 . adjustably or pivotally mounted (A63B 63/08 takes precedence) **[3]**
63/06 . Revolving targets
63/08 . with horizontal opening for ball, e.g. for basketball **[3]**

65/00 Implements for throwing (throwing toys A63H 33/18)
65/02 . Darts, spears or the like
65/04 . Throwing-hammers
65/06 . Heavy throwing-balls
65/08 . Boomerangs
65/10 . Discus discs; Quoits
65/12 . Ball-throwing apparatus with or without catchers

67/00 Sporting games not provided for in groups A63B 1/00 to A63B 65/00
67/02 . Special golf games, e.g. miniature golf
67/04 . Table games physically beneficial for the human body, modelled on outdoor sports, e.g. table tennis (other table games A63F)
67/06 . Ring or disc tossing games
67/08 . Juggling or spinning ball games played as games of skill
67/10 . Games with thread-suspended or swingably- mounted bodies, e.g. balls, pointed bodies shaped as birds, animals, or the like, for aiming at and hitting targets (games using a bat with a ball tethered thereto A63B 67/20; pin games with tethered balls A63D 7/00)
67/12 . Flip games
67/14 . Curling stone; Shuffleboard; Similar sliding games
67/16 . Tethered aerial top or spinner games
67/18 . Badminton, shuttlecock, or like games with feathered missiles
67/20 . Games using a bat with a ball tethered thereto **[3]**
67/22 . . the bat having one or more holes therein **[3]**

69/00 Training appliances or apparatus for special sports (training of parachutists B64D 23/00)
69/02 . for fencing
69/04 . simulating the movement of horses (toy animals for riding A63G 19/00)
69/06 . for rowing or sculling
69/08 . . with water-filled pools
69/10 . Swimming instruction apparatus for use without water
69/12 . Arrangements in swimming pools for teaching swimming
69/14 . . Teaching frames for swimming
69/16 . for cycling
69/18 . for skiing
69/20 . Punching balls
69/22 . . mounted on, or suspended from, a fixed support
69/24 . . mounted on, or suspended from, a movable support
69/26 . . . attached to the human body
69/28 . . Attachments located on the balls at opposite points
69/30 . . . Resilient attachments
69/32 . . with indicating devices
69/34 . Boxing or football dummies
69/36 . for golf

69/38 . for tennis
69/40 . Stationarily-arranged devices for projecting balls (traps for clay-pigeon targets F41J 9/18)

71/00 Games or sports accessories not covered in groups A63B 1/00 to A63B 69/00 (starting appliances A63K 3/02)
71/02 . for large-room or outdoor sporting games
71/04 . for small-room or indoor sporting games
71/06 . Indicating or scoring devices for games or players
71/08 . Body-protectors for players or sportsmen (protective clothing or garments for sporting purposes A41D 13/00)
71/10 . . for the head (in the form of caps or hats A42B 1/08; helmets A42B 3/00)
71/12 . . for the body or the legs
71/14 . . for the hands, e.g. baseball, boxing, or golfing gloves (archer's finger tabs F41B 5/16)
71/16 . . . air-filled

A63C SKATES; **SKIS**; **ROLLER SKATES**; **DESIGN OR LAYOUT OF COURTS, RINKS OR THE LIKE** (devices for underwater sports A63B 31/00, A63B 33/00, B63C 11/00; devices for gliding on water, e.g. water skis, B63B 35/79, B63B 35/81, B63B 35/83) **[5]**

Subclass index

Skates; **Accessories for skating**

1/00 Skates (roller skates or skate boards A63C 17/00)
1/02 . rigidly mounted on the sole of the boot
1/04 . fastened by means of clamps
1/06 . . with sole and heel plates each equipped with clamps
1/08 . . with simultaneously-tightened sole and heel clamps
1/10 . . tightened by the movement of the foot
1/12 . . tightened by lateral swinging or shifting of the blade or of the whole skate
1/14 . . tightened by means of springs
1/16 . . Special structure of the clamp fastening devices
1/18 . fastened by means of straps
1/20 . with fastening means on special metal parts
1/22 . with special foot-plates of the boot
1/24 . . Elastic plates
1/26 . . divided into two parts permitting adjustment to the size of the foot
1/28 . . Pivotally-mounted plates
1/30 . with special blades
1/32 . . Special constructions of the simple blade
1/34 . . Multi-part blades
1/36 . . with several blades
1/38 . of the tubular type
1/40 . manufactured of one piece of material
1/42 . Manufacture of skates

3/00 Accessories for skates
3/02 . Supports for the foot-joint (footwear with foot-supporting parts A43B 7/14)
3/04 . Supporting frames or gliders for skaters
3/06 . Supports for use whilst strapping skates on to boots
3/08 . Special spikes for the blades of skates
3/10 . Auxiliary devices for sharpening blades
3/12 . Guards for skate blades
3/14 . Keys for skates

Skis; **Accessories for skiing**

5/00 Skis; **Ski vehicles** (sledges with runners, e.g. ski-bobs, B62B 13/00)
5/02 . collapsible; divided
5/025 . Short skis **[4]**
5/03 . Mono-skis **[4]**
5/035 . Skis with ground engaging rolls or belts **[4]**
5/04 . Structure of the ski surface **[4]**
5/044 . . of the running sole **[4]**
5/048 . . of the edges **[4]**
5/052 . . of the tips or rear ends **[4]**
5/056 . . Materials for the running sole **[4]**
5/06 . Special devices on parts of the skis, e.g. steering devices
5/065 . . Anti-crossing devices **[4]**
5/07 . . Means for adjusting stiffness of skis
5/075 . . Vibration-dampers (vibration dampers per se F16F 7/00) **[4]**
5/08 . Motor-driven skis (A63C 5/035 takes precedence) **[4]**
5/11 . Skis combined with sails or the like **[4]**
5/12 . Making of skis; Selection of particular materials (materials for the running sole A63C 5/056) **[4]**
5/14 . . using synthetic materials; having a plurality of bonded layers **[4]**
5/16 . Devices enabling skis to be used whilst held in a particular configuration with respect to each other, e.g. for training purposes **[4]**

7/00 Devices preventing skis from slipping back; **Ski-stoppers or ski-brakes [4]**
7/02 . Skins; Substitutes for skins
7/04 . Fastening-devices for skins
7/06 . Tooth-shaped running sole-plates
7/08 . Stoppage blades attachable to the skis in such manner that these blades are permanently in the operative position

7/10 . Hinged stoppage blades attachable to the skis in such manner that these blades can be moved out of the operative position
7/12 . Clamp-irons preventing lateral slipping

9/00 Ski bindings
9/02 . Non-self-releasing bindings with swivel sole-plate or swivel parts, i.e. Ellefsen-type
9/04 . Non-self-releasing long strap bindings
9/06 . Non-self-releasing heel-engaging cable bindings fastened to the front end of the ski
9/08 . yieldable or self-releasing in the event of an accident, i.e. safety bindings
9/081 . . with swivel sole-plate
9/082 . . with swivel heel-plate
9/083 . . with loosenable cable strap
9/084 . . with heel hold-downs, e.g. swingable
9/085 . . with sole hold-downs, e.g. swingable
9/086 . . using parts which are fixed on the shoe of the user and are releasable from the ski binding
9/088 . . with electronically controlled locking devices **[4]**
9/10 . Non-self-releasing toe jaw-irons; Non-self-releasing binding hooks made of one piece
9/12 . Non-self-releasing elastic heel-straps
9/14 . Non-self-releasing bindings without heel-straps, but with both guiding cheeks and toe-straps
9/16 . Non-self-releasing bindings without straps, but with guiding cheeks
9/18 . Non-self-releasing bindings without heel-straps, but with a clamping device arranged at the front end of, or behind, the binding
9/20 . Non-self-releasing bindings with special sole edge holders instead of toe-straps
9/22 . Arrangements for adjusting the toe-clamps
9/24 . Tighteners for ski bindings (tighteners for self-releasing ski bindings A63C 9/08)

11/00 Accessories for skis (fittings on vehicles for carrying skis B60R 9/12)
11/02 . Devices for stretching, clamping or pressing skis for transportation or storage **[4]**
11/04 . for treating skis
11/06 . . Edge-sharpeners
11/08 . . Apparatus for waxing or dewaxing (ski waxes C09G 3/00)
11/10 . Apparatus for towing skis
11/12 . Apparatus for hooking the heel part of the boot to the ski
11/14 . Apparatus for repairing damaged skis
11/16 . Special devices on boots for fastening skis thereto (A63C 9/00 takes precedence)
11/18 . Devices for removing snow from skis, ski-bindings or ski-boots
11/20 . Snow-protectors on skis
11/22 . Ski-sticks
11/24 . . Rings for ski-sticks
11/26 . Devices for use in mounting ski-bindings to skis, e.g. jigs **[4]**

13/00 Snow shoes
13/02 . Snow shoe rings

17/00 Roller skates; **Skate-boards [4]**
17/01 . Skate-boards (A63C 17/02 to A63C 17/28 take precedence) **[4]**
17/02 . with wheels arranged in two pairs
17/04 . with wheels arranged otherwise than in two pairs
17/06 . . single-track type
17/08 . . . single-wheel type
17/10 . with endless tracks
17/12 . with driving mechanisms
17/14 . with brakes, e.g. toe stoppers, freewheel roller clutches
17/16 . for use on specially shaped or arranged runways
17/18 . convertible into ice or snow-running skates
17/20 . with fixable wheels permitting the skates to be used for walking
17/22 . Wheels for roller skates
17/24 . . with ball-shaped or spherical running surfaces
17/26 . with special auxiliary arrangements, e.g. illuminating, marking, or push-off devices
17/28 . with arrangements for sitting

19/00 Design or layout of playing courts, rinks, bowling greens or areas for water-skiing; **Covers therefor** (water roundabouts A63G 3/00; construction of surfaces or foundations E01C; roofs E04B 7/00; buildings or groups of buildings for sports E04H 3/10; swimming or splash baths or pools E04H 4/00; coverings for baths E04H 4/06) **[4]**
19/02 . Shaping of the surface of courts according to the necessities of the different games
19/04 . Mats or carpets for courts
19/06 . Apparatus for setting-out or dividing courts
19/08 . . Mechanical means for marking-out
19/10 . Ice-skating or roller-skating rinks; Slopes or trails for skiing, ski-jumping or tobogganing (chutes A63G 21/00; ski-lifts B61B 11/00; making or maintaining surfaces of snow or ice suitable for traffic or sporting purposes E01H 4/00; removing snow or ice E01H 5/00; production of ice or snow F25C 3/00) **[4]**
19/12 . Removable protective covers for courts, rinks or games pitches or the like **[4]**

A63D BOWLING-ALLEYS; **BOWLING GAMES**; **BOCCIA**; **BOWLS**; **BAGATELLE**; **BILLIARDS** (indoor games using small moving playing bodies, e.g. balls, A63F 7/00)

Subclass index

1/00 **Bowling-alleys**; **Boccia courts** (bowling greens A63C 19/00)
1/02 . collapsible; portable
1/04 . Form or material of the surface; Pin-stands integral with the surface
1/06 . Adjusting apparatus; Stands for players
1/08 . Tracks for returning or circulating the balls

3/00 **Table alleys**; **Miniature bowling-alleys**; **Bowling games**
3/02 . Arrangement of devices for propelling or projecting the balls

5/00 **Accessories for bowling-alleys or table alleys**
5/02 . Apparatus for trapping or lifting the balls; Separate devices for returning the balls
5/04 . Indicating devices
5/06 . Pin stands
5/08 . Arrangements for setting-up or taking away pins
5/09 . . the pins being assembled in right order before setting down
5/10 . Apparatus for cleaning balls, pins, or alleys

7/00 **Games of pins, e.g. ninepins with tethered balls**

9/00 **Pins**

13/00 **Bagatelle**; **Similar games** (devices for projecting or rolling-off the balls A63F 7/24)

Note

In this group, the following term is used with the meaning indicated:
– "Bagatelle" means a modification of billiards in which the player's object is to strike the balls so that they, and perhaps other balls, shall fall into numbered holes that determine the score.

15/00 **Billiards**; **Billiard tables**; **Pocket billiards** (bagatelles A63D 13/00)
15/02 . Billiard tables adapted to rest on ordinary tables or the like
15/04 . Billiard tables convertible into other tables, or the like (into beds A47C 17/62)
15/06 . Cushions or fastenings therefor
15/08 . Cues
15/10 . . Apparatus for holding or handing-up cues
15/12 . . Tip fastenings
15/14 . . Means for roughening the cue-tips
15/16 . Chalk holders
15/20 . Scoring or registering devices

A63F **CARD, BOARD, OR ROULETTE GAMES**; **INDOOR GAMES USING SMALL MOVING PLAYING BODIES**; **GAMES NOT OTHERWISE PROVIDED FOR** (data-processing equipment characterised by a specific application for game playing G06F 17/00, G06F 19/00) **[5]**

1/00 **Card games** (aspects of games using an electronically generated display having two or more dimensions showing representations related to the game A63F 13/00) **[1,7]**
1/02 . Cards; Special shapes of cards (card-printing methods B41K, B41M)
1/04 . Card games combined with other games
1/06 . Card game appurtenances
1/08 . . Card-presses
1/10 . . Card-holders
1/12 . . Card-shufflers
1/14 . . Card-dealers
1/16 . . Apparatus for indicating the dealer
1/18 . . Scoring or registering devices; Indicators (A63F 1/16 takes precedence; time-testing devices G07C)

3/00 **Board games**; **Raffle games** (racing games, traffic games, or obstacle games characterised by figures moved by action of the players A63F 9/14; aspects of games using an electronically generated display having two or more dimensions showing representations related to the game A63F 13/00) **[1,7]**
3/02 . Chess; Similar board games
3/04 . Geographical or like games
3/06 . Lottos or bingo games; Systems, apparatus or devices for checking such games **[5]**
3/08 . Raffle games that can be played by a fairly large number of people

5/00 **Roulette games** (aspects of games using an electronically generated display having two or more dimensions showing representations related to the game A63F 13/00) **[1,7]**
5/02 . Roulette-like ball games
5/04 . Disc roulettes; Dial roulettes; Teetotums; Dice-tops

7/00 **Indoor games using small moving playing bodies, e.g. balls, discs or blocks** (board games, raffle games A63F 3/00; roulette games A63F 5/00; aspects of games using an electronically generated display having two or more dimensions showing representations related to the game A63F 13/00; miniature bowling games A63D 3/00; bagatelle or similar games A63D 13/00; billiards, pocket billiards A63D 15/00) **[1,7]**
7/02 . using falling playing bodies or playing bodies running on an inclined surface, e.g. pinball games
7/04 . using balls to be shaken or rolled in small boxes
7/06 . Games simulating outdoor ball games, e.g. hockey (if physically beneficial for the human body A63B 67/00)
7/07 . . in which the playing bodies contact, or are supported by, the playing surface continuously, e.g. using air-cushion support **[3]**
7/20 . . in which the playing bodies are projected through the air **[3]**
7/22 . Accessories; Details **[3]**
7/24 . . Devices controlled by the player to project or roll-off the playing bodies (arrangement of such devices in table alleys, miniature bowling-alleys or bowling games A63D 3/02; in bagatelle or billiards A63D 13/00, A63D 15/00) **[3]**
7/26 . . . electric or magnetic **[3]**
7/28 . . . using gravity **[3]**

7/30 . . Obstacles; Targets; Scoring or pocketing devices; Playing-body-actuated sensors, e.g. switches; Tilt indicators **[3]**

7/32 . . . Apparatus for varying scoring values **[3]**

7/34 . . Other devices for handling the playing bodies, e.g. bonus ball return means **[3]**

7/36 . . Constructional details not covered by groups A63F 7/24 to A63F 7/34, e.g. frames, game boards, guide tracks **[3]**

7/38 . . . Playing surfaces movable during play **[3]**

7/40 . . . Balls or other moving playing bodies, e.g. pinballs, discs **[3]**

9/00 **Games not otherwise provided for** (aspects of games using an electronically generated display having two or more dimensions showing representations related to the game A63F 13/00) **[1,7]**

9/02 . Shooting or hurling games (throwing-implements for sports or recreational use A63B 65/00; throwing or projecting toys per se A63H 33/18; targets, target ranges, bullet catchers F41J) **[3]**

9/04 . Dice (dice-tops A63F 5/04); Dice-boxes; Mechanical dice-throwing devices

9/06 . Patience; Other games for self-amusement (balls to be shaken in small boxes A63F 7/04)

9/08 . . Puzzles provided with elements movable in relation to each other

9/10 . . Two-dimensional jig-saw puzzles

9/12 . . Three-dimensional jig-saw puzzles

9/14 . Racing games, traffic games, or obstacle games characterised by figures moved by action of the players (games using dice A63F 3/00)

9/16 . Spinning-top games

9/18 . Question-and-answer games

9/20 . Dominoes or like games; Mah-Jongg games

9/24 . Games using electronic circuits not otherwise provided for **[5]**

9/26 . Balancing games, i.e. bringing elements into or out of balance **[7]**

9/28 . Chain-reaction games with toppling pieces; Dispensers or positioning devices therefor **[7]**

9/30 . Capturing games for grabbing or trapping objects, e.g. fishing games **[7]**

9/32 . Games with a collection of long sticks, e.g. mikado (A63F 9/30 takes precedence) **[7]**

9/34 . Games using magnetically moved or magnetically held pieces, not provided for in other subgroups of group A63F 9/00 **[7]**

11/00 **Game accessories of general use [7]**

Note

Game accessories specially adapted for a particular type of game are classified in one of the groups A63F 1/00 to A63F 9/00 covering the particular game. **[7]**

13/00 **Aspects of games using an electronically generated display having two or more dimensions, e.g. on a television screen, showing representations related to the game** (electric circuitry, see the relevant subclasses therefor) **[7]**

13/02 . Accessories (input or output arrangements for electrical digital computers G06F 3/00) **[7]**

13/04 . . for aiming at specific areas on the display, e.g. with photodetecting means **[7]**

13/06 . . using player-operated means for controlling the position of a specific area on the display **[7]**

13/08 . Constructional details or arrangements, e.g. housing, wiring, connections, cabinets, not otherwise provided for **[7]**

13/10 . Control of the course of the game, e.g. start, progress, end **[7]**

13/12 . involving interaction between a plurality of game devices, e.g. transmission or distribution systems **[7]**

A63G **MERRY-GO-ROUNDS**; **SWINGS**; **ROCKING-HORSES** (swings or rocking horses as nursery furniture A47D 13/10); **CHUTES**; **SWITCHBACKS**; **SIMILAR DEVICES FOR PUBLIC AMUSEMENT**

Subclass index

Merry-go-rounds or roundabouts

1/00 **Roundabouts**

1/02 . with masking tunnels

1/04 . with toboggans

1/06 . with several concentric turntables

1/08 . power-driven

1/10 . . electrically driven

1/12 . rotated by the passengers themselves

1/14 . . rotated by pushing the feet against a fixed surface or by running

1/16 . . rotated by means of grip-rings

1/18 . . rotated by oars

1/20 . . rotated by swinging or rocking

1/22 . with bicycles serving as seats

1/24 . with seats performing movements in a horizontal plane, other than circular movements

1/26 . . with seats moving with a planetary motion in a horizontal plane

1/28 . with centrifugally-swingable suspended seats

1/30 . with seats moving up-and-down, e.g. figure-seats

1/32 . with seats two or more of which form a see-saw

1/34 . with seats moving in an undulating track

1/36 . with movably-mounted swing-like seats not moving radially outwards

1/38 . with rocking turntables

1/40 . . and oblique masts

1/42 . . cone-like shaped

1/44 . with turntables moved up and down

1/46 . . moved by a screw spindle
1/48 . with turntables and movably-mounted vehicles thereon which move to the outside when the roundabout is rotated

3/00 Water roundabouts, e.g. freely floating
3/02 . with floating seats
3/04 . for swimmers
3/06 . Submarine roundabouts

4/00 Accessories for roundabouts not restricted to one of groups A63G 1/00 or A63G 3/00

5/00 Games on roundabouts

7/00 Up-and-down-hill tracks; Switchbacks

Swings; See-saws; Rocking horses; Other toy animals for riding [3]

9/00 Swings
9/02 . with two suspensory axles
9/04 . with moving supporting-points
9/06 . Climbing swings
9/08 . Looping-the loop swings
9/10 . with seats shaped as riding horses, breeches, or the like
9/12 . Special fastenings of the suspensory point
9/14 . elastically suspended
9/16 . Driving mechanisms, such as ropes, gear, belt, motor drive
9/18 . . moved by rocking runners
9/20 . . Oar swings
9/22 . Brakes

11/00 See-saws

13/00 Cradle swings; Rocking-horses; Like devices resting on the ground
13/02 . Cradle swings
13/04 . . Spring-supported cradle swings
13/06 . Rocking-horses
13/08 . . mounted on links or springs
13/10 . . with dismountable runners usable for other purposes

15/00 Rocking horses on runners adapted for progressive movement
15/02 . with divided runners
15/04 . with arrangements for pushing forward

17/00 Hobby-horses

19/00 Toy animals for riding
19/02 . made to travel by riding movements other than by ratchet wheels
19/04 . with eccentric wheels
19/06 . Swingably-mounted toy animals for riding made to travel by means of parallelogram-joints
19/08 . made to travel by ratchet-wheels, e.g. by stretching the legs
19/10 . . by pressing the seats or saddles up-and-down
19/12 . . by performing oscillations
19/14 . . by moving the stirrups or pedals
19/16 . made to travel by punting
19/18 . made to travel by pacing
19/20 . motor-driven

Chutes; Slides; Similar apparatus for public amusement

21/00 Chutes; Helter-skelters
21/02 . without rails
21/04 . with fixed rails
21/06 . with passing arrangements for cars
21/08 . with additional rotation of cars
21/10 . with spiral tracks
21/12 . with special cars, e.g. horse-shaped
21/14 . with driven slideways
21/16 . with forced removal of the passenger from the seat
21/18 . Water-chutes
21/20 . Slideways with movably suspended cars, or with cars moving on ropes, or the like
21/22 . Suspended slideways

23/00 Rotating or rocking pots

25/00 Autocar-like self-drivers; Runways therefor

27/00 Russian swings; Great wheels, e.g. Ferris wheels
27/02 . with special movements of the seat-carriers
27/04 . with tiltable axis
27/06 . rolling on the level
27/08 . mounted on roundabouts

29/00 Rolling drums turning somersaults with or without rolling seats
29/02 . with seats staying at the bottom of the drum

Other apparatus for public amusement

31/00 Amusement arrangements
31/02 . with moving substructures
31/04 . . with jolting substructures
31/06 . . with undulatory motion of the substructure
31/08 . . with looping, hopping, or throwing motions of the substructure
31/10 . . with escalators or similar moving substructures
31/12 . . with inflatable and movable substructures (connection of valves to inflatable elastic bodies B60C 29/00)
31/14 . . with planes mounted on springs; with movable planes
31/16 . creating illusions of travel

33/00 Devices allowing competitions between several persons, not otherwise provided for

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A63H TOYS, E.G. TOPS, DOLLS, HOOPS, BUILDING BLOCKS

Subclass index

MECHANICALLY OR GRAVITY DRIVEN TOY FIGURES 11/00, 13/00, 15/00

TOY VEHICLES
Model railways, toy trains 19/00, 21/00

1/00 **Tops** (flying tops A63H 27/127)
1/02 . with detachable winding devices
1/04 . . with string or band winding devices
1/06 . with integral winding devices
1/08 . with arrangements for winding-up by blowing
1/10 . able to be spun by whirling the axis with both hands
1/12 . Whip tops; Top whips
1/16 . Hopping, dancing, or curve-drawing tops
1/18 . Double tops; Multiple tops mounted in or on one another
1/20 . with figure-like features; with movable objects, especially figures
1/22 . Colour tops
1/24 . with illuminating arrangements
1/26 . emitting blasts or explosions
1/28 . Musical tops
1/30 . Climbing tops, e.g. Yo-Yo
1/32 . Whirling or spinning discs driven by twisted cords

Dolls; **Figures**; **Musical toys**

3/00 **Dolls**

Note

In this group, the following term is used with the meaning indicated:
– "doll" includes a toy animal.

3/02 . made of fabrics or stuffed
3/04 . with deformable framework
3/06 . Air-filled or inflatable toy figures
3/08 . of flat paper to be cut-out, folded, or clothed
3/10 . Flat toy figures provided with limbs, with or without arrangements for making them stand up (A63H 3/08 takes precedence) **[4]**
3/12 . Double-faced dolls
3/14 . into which the fingers of the hand can be inserted, e.g. hand-puppets
3/16 . made of parts that can be put together
3/18 . Jumping jacks
3/20 . with parts moved due to movements of other parts, e.g. limbs
3/24 . Drinking dolls; Dolls producing tears; Wetting dolls
3/26 . Floating dolls
3/28 . Arrangements of sound-producing means in dolls; Means in dolls for producing sounds
3/31 . . Bellows, cylinders or the like for sound production
3/33 . . Other sound-producing means specially adapted for dolls
3/36 . Details; Accessories
3/38 . . Dolls' eyes
3/40 . . . movable
3/42 . . . Manufacture of eyes
3/44 . . Dolls' hair or wigs; Eyelashes; Eyebrows
3/46 . . Connections for limbs
3/48 . . Mounting of parts within dolls, e.g. automatic eyes
3/50 . . Frames, stands, or wheels for dolls or toy animals
3/52 . . Dolls' houses, furniture, or other equipment; Dolls' clothing (dolls' footwear A43B 3/28)

5/00 **Musical or noise-producing devices for additional toy effects other than acoustical** (musical tops A63H 1/28; hand-thrown impact-exploded noise makers F42B 4/16)
5/04 . Pistols or machine guns operated without detonators; Crackers (firecrackers F42B 4/04)

7/00 **Toy figures led or propelled by the user**
7/02 . by pushing or drawing
7/04 . . moving together with a toy vehicle
7/06 . . with feet formed by rotary members

9/00 **Special methods or compositions for the manufacture of dolls, toy animals, toy figures, or parts thereof**

Mechanically or gravity driven toy figures

11/00 **Self-movable toy figures**
11/02 . moved by vibrations produced by rotating eccentric weights
11/04 . Climbing figures moving up-and-down
11/06 . Jumping toys
11/08 . Toys performing somersaults
11/10 . Figure toys with single- or multiple-axle undercarriages, by which the figures perform a realistic running motion when the toy is moving over the floor
11/12 . . Wheeled toys with figures performing a wriggling motion when moving
11/14 . Mechanically-moved walking figures balanced by gyrostatic effects
11/18 . Figure toys which perform a realistic walking motion **[4]**
11/20 . . with pairs of legs, e.g. horses **[4]**

13/00 **Toy figures with self-moving parts, with or without movement of the toy as a whole**
13/02 . imitating natural actions, e.g. catching a mouse by a cat, the kicking of an animal
13/03 . . Egg-laying toy animals **[4]**
13/04 . . Mechanical figures imitating the movement of players or workers
13/06 . . . imitating boxing or fighting
13/08 . . . able to perform military exercises
13/10 . . . shooting arrows or other missiles
13/12 . . . Gymnastic or acrobatic toy figures
13/14 . . . Rope-jumping toy figures
13/15 . . . imitating drawing or writing **[4]**
13/16 . Boxes from which figures jump
13/18 . Toy swinging chairs; Rocking-figure toys
13/20 . Toy roundabouts with moving figures; Toy models of fairs or the like, with moving figures

15/00 Other gravity-operated toy figures
15/02 . Figures staggering down an inclined path by means of the gravity effect
15/04 . Toy figures swinging about a point above the centre of gravity
15/06 . Self-righting toys
15/08 . Tumbling toy figures operated by balls enclosed therein

Toy vehicles; **Toy engines**

17/00 Toy vehicles, e.g. with self-drive; **Accessories therefor**
17/02 . convertible into other forms under the action of impact or shock, e.g. arrangements for imitating accidents
17/045 . shaped as armoured cars, tanks or the like **[4]**
17/05 . Trucks; Lorries
17/06 . . with tipping bodies
17/08 . . carrying a mechanically-raised ladder
17/10 . . carrying a tank for transporting liquids
17/12 . with cranes, winches or the like
17/14 . Endless-track automobiles or trucks
17/16 . in the form of a bicycle, with or without riders thereon
17/18 . Tricycles, e.g. with moving figures
17/21 . shaped as motorcycles with or without figures **[4]**
17/22 . Scooters with driver figure propelled by their wheels or by movement of the figure
17/24 . shaped as sledges, sleighs, or bobsleighs with or without figures
17/25 . Other wheeled vehicles with moving figures
17/26 . Details; Accessories (drive mechanisms A63H 29/00)
17/267 . . Mounting wheels on the chassis **[4]**
17/273 . . Opening or closing mechanisms for doors or the like **[4]**
17/28 . . Electric lighting systems
17/30 . . Direction-indicators
17/32 . . Acoustical or optical signalling devices
17/34 . . Arrangements for imitating the noise of motors
17/36 . . Steering-mechanisms for toy vehicles
17/38 . . . actuated by hand
17/385 . . . remotely controlled **[4]**
17/39 . . . . radio controlled **[4]**
17/395 . . . steered by programme **[4]**
17/40 . . . Toy vehicles automatically steering or reversing by collision with an obstacle
17/41 . . . Toy vehicles prevented from falling off the supporting surface by automatic steering or reversing **[4]**
17/42 . . Automatic stopping or braking arrangements
17/44 . . Toy garages for receiving toy vehicles; Filling stations

18/00 Highways or trackways for toys (railway permanent way A63H 19/30; for special railways A63H 21/00); **Propulsion by special interaction between vehicle and track**
18/02 . Construction or arrangement of the trackway
18/04 . . Up-and-down-hill trackways (A63H 18/06 takes precedence)
18/06 . . designed to cause movement of a vehicle by alteration of the inclination of part of the trackway
18/08 . with mechanical means for guiding or steering
18/10 . with magnetic means for steering
18/12 . Electric current supply to toy vehicles through the track
18/14 . Drives arranged in the track, e.g. endless conveying means, magnets, driving-discs
18/16 . Control of vehicle drives by interaction between vehicle and track; Control of track elements by vehicles

19/00 Model railways (propulsion by special interaction between vehicle and track A63H 18/00)
19/02 . Locomotives; Motor coaches
19/04 . . spring-driven
19/06 . . Steam-driven locomotives; Engines therefor
19/08 . . . Boilers for locomotives
19/10 . . electrically driven
19/12 . . . with electric reversing gear
19/14 . . Arrangements for imitating locomotive features, e.g. whistling, signalling, puffing
19/15 . Special types of cars
19/16 . Parts for model railway vehicles
19/18 . . Car coupling or uncoupling mechanisms
19/20 . . Illuminating arrangements
19/22 . . Wheels; Wheel axles; Bogies
19/24 . Electric toy railways; Systems therefor
19/26 . . Toy vehicles with overhead trolley-wire; Trolley-buses
19/28 . Mechanical toy railway systems
19/30 . Permanent way; Rails; Rail-joint connections
19/32 . . Switches or points; Operating means therefor
19/34 . Bridges; Stations; Signalling systems
19/36 . Model railway structures, e.g. kinds of arrangement of several units in containers, or on plates, or in combination with scenics for toy purposes

21/00 Other toy railways
21/02 . with cable- or rail-suspended vehicles
21/04 . Mono-railways, e.g. with vehicles embracing the rail in the form of a saddle (A63H 21/02 takes precedence)

23/00 Toy boats; **Floating toys**; **Other aquatic toy devices [2]**
23/02 . Boats; Sailing boats
23/04 . . Self-propelled boats, ships or submarines
23/06 . . . jet-propelled
23/08 . Cartesian or other divers
23/10 . Other water toys, floating toys, or like buoyant toys
23/12 . . Waterborne toy projectiles; Knock-apart toys; Exploding ship toys
23/14 . . Special drives
23/16 . . Aquatic toy installations; Harbour arrangements

25/00 Toy steam, gas, or compressed-air engines (for locomotives A63H 19/06)
25/02 . Distributing-gear

27/00 Toy aircraft; **Other flying toys** (toys with parachutes A63H 33/20)
27/01 . Toy aircraft with flexible or folded wings **[4]**
27/04 . Captive toy aircraft
27/08 . Kites
27/10 . Balloons
27/127 . Flying toys capable of landing or taking-off vertically; Flying tops **[4]**
27/133 . . Helicopters; Gyroplanes (A63H 27/04 takes precedence) **[4]**
27/14 . Starting or launching devices for toy aircraft; Arrangements on toy aircraft for starting or launching
27/16 . Flying toys made of folded paper **[4]**

27/18 . Constructional features of fuselages, wings or the like, e.g. for model aircraft **[4]**
27/20 . Transmission systems for actuating flying control surfaces, lift-increasing flaps or the like **[4]**
27/22 . Self-propelled toy aircraft, e.g. with extensible rubber bands (A63H 27/04, A63H 27/127 take precedence) **[4]**
27/24 . . combustion engine or electric motor propelled **[4]**
27/26 . . . Jet-propelled flying toys, e.g. aeroplanes (A63H 27/04, A63H 27/127 take precedence) **[4]**
27/28 . Toy ornithopters **[4]**
27/30 . Features common to propellers for model aircraft, e.g. constructional features (for helicopters A63H 27/133) **[4]**
27/32 . Alighting gear for toy aircraft, e.g. wheeled type, floats **[4]**

Driving or controlling toys, e.g. toy vehicles

29/00 Drive mechanisms for toys in general
29/02 . Clockwork mechanisms
29/04 . . Helical-spring driving mechanisms
29/06 . . Other elements therefor
29/08 . Driving mechanisms actuated by balls or weights
29/10 . Driving mechanisms actuated by flowing media
29/12 . . by a sand stream
29/14 . . by a water stream
29/16 . . by steam or compressed air
29/18 . Driving mechanisms with extensible rubber bands
29/20 . Flywheel driving mechanisms
29/22 . Electric drives (power supply through track A63H 18/12)
29/24 . Details or accessories for drive mechanisms, e.g. means for winding-up or starting toy engines

30/00 Remote-control arrangements specially adapted for toys, e.g. for toy vehicles (remotely controlled steering mechanisms for toy vehicles A63H 17/385; for model railways A63H 19/24, A63H 19/28) **[4]**
30/02 . Electrical arrangements
30/04 . . using wireless transmission
30/06 . Hydraulic or pneumatic arrangements

31/00 Gearing for toys
31/02 . Screw-spindle mechanisms
31/04 . Friction mechanisms
31/06 . Belt or string gear
31/08 . Gear-control mechanisms; Gears for imparting a reciprocating motion
31/10 . Gearing mechanisms actuated by movable wires enclosed in flexible tubes

33/00 Other toys
33/02 . Toy hoops; Sticks for propelling
33/04 . Building blocks, strips, or similar building parts
33/06 . . to be assembled without the use of additional elements
33/08 . . . provided with complementary holes, grooves, or protuberances, e.g. dovetails
33/10 . . to be assembled by means of additional non-adhesive elements
33/12 . . . Perforated strips or the like assembled by rods, bolts, or the like
33/14 . . specially adapted to be assembled by adhesive or cement
33/16 . Models made by folding paper
33/18 . Throwing or slinging toys (spring toy guns F41B 7/08)
33/20 . Toys with parachutes; Toy parachutes
33/22 . Optical, colour, or shadow toys (kaleidoscopes G02B 27/08)
33/26 . Magnetic or electric toys (electric drives A63H 29/22)
33/28 . Soap-bubble toys; Smoke toys (arrangements for producing smoke images or rings during smoking A24F 13/30)
33/30 . Imitations of apparatus, not otherwise provided for, e.g. telephones, weighing-machines or cash-registers **[3]**
33/32 . Moulds, shapes, spades, or the like, for playing with sand
33/36 . Sparking toys
33/38 . Picture books with additional toy effects, e.g. pop-up or slide displays **[4]**
33/40 . Windmills; Other toys actuated by air currents (driving mechanisms for toys actuated by steam or compressed air A63H 29/16)
33/42 . Toy models or toy scenery not otherwise provided for

37/00 Jokes; **Confetti, streamers, or other dance favours [4]**

A63J DEVICES FOR THEATRES, CIRCUSES, OR THE LIKE; **CONJURING APPLIANCES OR THE LIKE** (buildings for meetings, entertainments or sports E04H 3/10)

Subclass index

1/00 Stage arrangements (fabrics for theatre decorations, for costumes, for curtains D03D; structural arrangements of stage or theatre E04H)
1/02 . Scenery; Curtains; Other decorations; Means for moving same

3/00 Equipment for, or arrangement of, circuses or arenas (circus buildings E04B, E04H)

5/00 Auxiliaries for producing special effects on stages, or in circuses or arenas (lighting therefor F21S)
5/02 . Arrangements for making stage effects; Auxiliary stage appliances
5/04 . . Arrangements for making sound-effects

5/10 . Arrangements for making visible or audible the words spoken

5/12 . Apparatus for raising or lowering persons (elevators, escalators or moving walkways B66B)

7/00 Auxiliary apparatus for artistes

9/00 Centrifugal tracks, loop-the-loops, or the like (chutes for public amusement A63G 21/00)

11/00 Labyrinths

13/00 Panoramas, dioramas, stereoramas, or the like (models in general G09B)

15/00 Peep-shows, e.g. raree-shows; **Kaleidoscopic or other opalescence exhibitions** (colour toys A63H 33/22; kaleidoscopes G02B 27/08)

17/00 Apparatus for performing colour-music

19/00 Puppet, marionette, or shadow shows or theatres

21/00 Conjuring appliances; **Auxiliary apparatus for conjurers**

25/00 Equipment specially adapted for cinemas (cinematographic projection means G03B) **[2009.01]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

A63K RACING; **RIDING SPORTS**; **EQUIPMENT OR ACCESSORIES THEREFOR** (stop watches G04F 7/06; timing G07C 1/22; indicating arrangements for variable information by selection or combination of individual elements G09F 9/00)

1/00 Race-courses; **Race-tracks**

1/02 . for greyhounds or other dogs

3/00 Equipment or accessories for racing or riding sports

3/02 . Starting-appliances, e.g. starting blocks

3/04 . Hurdles or the like

99/00 Subject matter not provided for in other groups of this subclass [8]

A99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

A99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION B – PERFORMING OPERATIONS; TRANSPORTING

SEPARATING; MIXING

Note

The following notes are meant to assist in the use of this part of the classification scheme; they must not be read as modifying in any way the elaborations.

(1) In this sub-section, the separation of different materials, e.g. of different matter, size, or state, is predominantly found in the following subclasses:
B01D
B03B, B03C, B03D
B04B, B04C
B07B, B07C.

(2) The classifying characteristics of these subclasses are:
(i) the physical state of the matter to be separated;
(ii) the principle of the process used;
(iii) particular kinds of apparatus.
The first of these characteristics involves six different aspects, assembled in three groups:
(a) liquid/liquid or liquid/gas and gas/gas;
(b) solid/liquid or solid/gas;
(c) solid/solid.

(3) These subclasses are to be used according to the following general rules:
– B01D is the most general class as far as separation other than solids from solids is concerned.
– Apparatus for separating solids from solids are covered by B03B when the process concerned is regarded as the equivalent of "washing" in the sense of the mining art, even if such apparatus is a pneumatic one, especially pneumatic tables or jigs. Screens per se are not covered by this subclass but are classified in B07B, even if they are being used in a wet process. All other apparatus for the separation of solids from solids according to dry methods are classified in B07B.
– If the separation takes place as a result of the detection or measurement of some feature of the material or articles to be sorted it is classified in B07C.
– It should also be noted that the separation of isotopes of the same chemical element is covered by B01D 59/00, whatever process or apparatus is employed.

Subsection index

B01 PHYSICAL OR CHEMICAL PROCESSES OR APPARATUS IN GENERAL

B01B BOILING; BOILING APPARATUS

1/00 **Boiling**; **Boiling apparatus for physical or chemical purposes** (preparation of starch C08B 30/00; sugar industry C13; steam generation F22; domestic boilers F24) **[2]**

1/02 . Preventing foaming (in general B01D 19/02)

1/04 . . by chemical means

1/06 . Preventing bumping

1/08 . Boiling apparatus provided with reflux condenser

B01D SEPARATION (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electric fields B03C; centrifuges B04B; vortex apparatus B04C; presses per se for squeezing-out liquid from liquid-containing material B30B 9/02) **[5]**

(1) This subclass covers :
- evaporation, distillation, crystallisation, filtration, dust precipitation, gas cleaning, absorption, adsorption;
- similar processes which are not concerned with, or limited to, separation (except in the case of absorption or adsorption).

(2) In this subclass, the terms or expressions are used with the meaning indicated:
- "filtration" and analogous terms include straining solids from fluids. Filtration is a process that normally uses a filter medium;
- "filter medium" is a porous material or porous arrangement of material used to filter solids from fluids; **[5]**
- "filtering element" is a section of filter medium in addition to parts to which the medium is demountably or permanently fixed, including other sections of medium, end caps, peripheral frames or edge strips, but excluding housings; **[5]**
- "filter housing" is the fluid-constraining impervious vessel, whether open or closed, which contains, or is adapted to contain, one or more filtering elements or filter media; **[5]**
- "filter chamber" is the space within a housing, where filtering elements or filter media are located. Partitions may divide a single housing into a plurality of chambers; **[5]**
- "filtering apparatus" consists of filtering elements combined with housings, cleaning arrangements, motor or the like parts, which are characteristic of the particular type of apparatus. Ancillary devices such as pumps or valves are considered part of a filtering apparatus when inside the apparatus. Ancillary devices performing similar or different unit operation such as comminutors, mixers or non-filtering separators, whether or not inside the apparatus, are not considered part of a filtering apparatus. The term does not extend to apparatus, e.g. washing machines, of which the filter forms only a part. **[5]**

(3) For apparatus used in drying or evaporation, class F26 takes precedence over this subclass.

(4) Group B01D 59/00 takes precedence over the other groups of this subclass and over other subclasses in class B01.

Subclass index

1/00 **Evaporating** (drying solid materials or objects by evaporating liquids therefrom F26B)

1/02 . Evaporators with heating coils

1/04 . Evaporators with horizontal tubes

1/06 . Evaporators with vertical tubes

1/08 . . with short tubes (B01D 1/12 takes precedence)

1/10 . . with long tubes, e.g. Kestner evaporators (B01D 1/12 takes precedence)

1/12 . . and forced circulation

1/14 . with heated gases or vapours in contact with the liquid

1/16 . by spraying (B01D 1/22 takes precedence)

1/18 . . to obtain dry solids (B01D 1/24 takes precedence)

1/20 . . Sprayers

1/22 . by bringing a thin layer of the liquid into contact with a heated surface

1/24 . . to obtain dry solids

1/26 . Multiple-effect evaporating

1/28 . with vapour compression

1/30 . Accessories for evaporators

3/00 **Distillation or related exchange processes in which liquids are contacted with gaseous media, e.g. stripping [2]**

3/02 . in boilers or stills **[2]**

3/04 . pipe stills

3/06 . Flash distillation **[2]**

3/08 . in rotating vessels; Atomisation on rotating discs (B01D 3/10 takes precedence)

3/10 . Vacuum distillation (B01D 3/12 takes precedence) **[2]**

3/12 . Molecular distillation **[2]**

3/14 . Fractional distillation

3/16 . . Fractionating columns in which vapour bubbles through liquid

3/18 . . . with horizontal bubble plates

3/20 . . . . Bubble caps; Risers for vapour; Discharge pipes for liquid

3/22 . . . with horizontal sieve plates or grids; Construction of sieve plates or grids

3/24 . . . with sloping plates or elements mounted stepwise

3/26 . . Fractionating columns in which vapour and liquid flow pass each other, or in which the fluid is sprayed into the vapour, or in which a two-phase mixture is passed in one direction

3/28 . . . Fractionating columns with surface contact and vertical guides, e.g. film action

3/30 . . Fractionating columns with movable parts or in which centrifugal movement is caused

3/32 . . Other features of fractionating columns

3/34 . with one or more auxiliary substances

3/36 . . Azeotropic distillation

3/38 . . Steam distillation

3/40 . . Extractive distillation

3/42 . Regulation; Control

5/00 **Condensation of vapours**; **Recovering volatile solvents by condensation** (B01D 8/00 takes precedence; condensers F28B) **[3]**

7/00 **Sublimation** (B01D 8/00 takes precedence; freeze-drying F26)

7/02 . Crystallisation directly from the vapour phase (into single crystals C30B 23/00) **[2]**

8/00 **Cold traps**; **Cold baffles [3]**

9/00 **Crystallisation** (crystallisation directly from the vapour phase B01D 7/02; making single crystals C30B)

9/02 . from solutions

9/04 . . concentrating solutions by removing frozen solvent therefrom

11/00 **Solvent extraction**

11/02 . of solids

11/04 . of solutions which are liquid

12/00 **Displacing liquid, e.g. from wet solids or from dispersions of liquids or from solids in liquids, by means of another liquid**

15/00 **Separating processes involving the treatment of liquids with solid sorbents**; **Apparatus therefor [4]**

15/02 . with moving adsorbents

15/04 . with ion-exchange materials as adsorbents (B01D 15/36 takes precedence) **[1,8]**

15/08 . Selective adsorption, e.g. chromatography

Note

In order that group B01D 15/08 may provide a basis for a complete search with respect to chromatography in general, all subject matter of general interest is classified in this group even if it is classified primarily in the application-oriented groups, for example dairy products A23C 9/148, treatment of blood e.g. A61M 1/36, optically active organic compounds C07B 57/00 or peptides C07K 1/16. **[8]**

15/10 . . characterised by constructional or operational features **[8]**
15/12 . . . relating to the preparation of the feed **[8]**
15/14 . . . relating to the introduction of the feed to the apparatus **[8]**
15/16 . . . relating to the conditioning of the fluid carrier **[8]**
15/18 . . . relating to flow patterns **[8]**
15/20 . . . relating to the conditioning of the sorbent material **[8]**
15/22 . . . relating to the construction of the column **[8]**
15/24 . . . relating to the treatment of the fractions to be distributed **[8]**
15/26 . . characterised by the separation mechanism **[8]**
15/30 . . . Partition chromatography **[8]**
15/32 . . . Bonded phase chromatography, e.g. with normal bonded phase, reversed phase or hydrophobic interaction **[8]**
15/34 . . . Size-selective separation, e.g. size-exclusion chromatography; Gel filtration; Permeation **[8]**
15/36 . . . involving ionic interaction, e.g. ion-exchange, ion-pair, ion-suppression or ion-exclusion **[8]**
15/38 . . . involving specific interaction not covered by one or more of groups B01D 15/30 to B01D 15/36, e.g. affinity, ligand exchange or chiral chromatography **[8]**
15/40 . . . using supercritical fluid as mobile phase or eluent **[8]**
15/42 . . characterised by the development mode, e.g. by displacement or by elution **[8]**

17/00 Separation of liquids, not provided for elsewhere, e.g. by thermal diffusion
17/02 . Separation of non-miscible liquids
17/022 . . by contact with a preferentially wettable solid **[4]**
17/025 . . by gravity, in a settling tank **[4]**
17/028 . . . provided with a set of baffles **[4]**
17/032 . . . provided with special equipment for removing at least one of the separated liquids **[4]**
17/035 . . by using gas-bubbles or moving solids introduced into the mixture **[4]**
17/038 . . by centrifugal force (centrifuges B04B; cyclones B04C) **[4]**
17/04 . . Breaking emulsions
17/05 . . . by chemical treatment **[4]**
17/06 . Separation of liquids from each other by electricity
17/09 . by thermal diffusion **[4]**
17/12 . Auxiliary equipment particularly adapted for use with liquid-separating apparatus, e.g. control circuits **[4]**

19/00 Degasification of liquids
19/02 . Foam dispersion or prevention
19/04 . . by addition of chemical substances

21/00 Separation of suspended solid particles from liquids by sedimentation (differential sedimentation B03D 3/00)
21/01 . using flocculating agents **[2]**
21/02 . Settling tanks **[4]**
21/04 . . with moving scrapers
21/06 . . . with rotating scrapers
21/08 . . provided with flocculating compartments
21/18 . Construction of the scrapers or the driving mechanisms for settling tanks
21/20 . . Driving mechanisms
21/22 . . Safety mechanisms
21/24 . Feed or discharge mechanisms for settling tanks
21/26 . Separation of sediment aided by centrifugal force
21/28 . Mechanical auxiliary equipment for acceleration of sedimentation, e.g. by vibrators or the like **[4]**
21/30 . Control equipment **[4]**
21/32 . . Density control of clear liquid or sediment, e.g. optical control **[4]**
21/34 . . Regulation of feed distribution; Regulation of liquid level **[4]**

Filtration; **Filtering material, regeneration thereof [2]**

24/00 Filters comprising loose filtering material, i.e. filtering material without any binder between the individual particles or fibres thereof (B01D 27/02 takes precedence) **[5]**
24/02 . with the filter bed stationary during the filtration **[5]**
24/04 . . the filtering material being clamped between pervious fixed walls (B01D 24/10, B01D 24/20 take precedence) **[5]**
24/06 . . . the pervious walls comprising a series of louvres or slots **[5]**
24/08 . . . the filtering material being supported by at least two pervious coaxial walls **[5]**
24/10 . . the filtering material being held in a closed container **[5]**
24/12 . . . Downward filtration, the filtering material being supported by pervious surfaces (B01D 24/18 takes precedence) **[5]**
24/14 . . . Downward filtration, the container having distribution or collection headers or pervious conduits (B01D 24/18 takes precedence) **[5]**
24/16 . . . Upward filtration (B01D 24/18 takes precedence) **[5]**
24/18 . . . Combined upward and downward filtration **[5]**
24/20 . . the filtering material being provided in an open container **[5]**
24/22 . . . Downward filtration, the filter material being supported by pervious surfaces **[5]**
24/24 . . . Downward filtration, the container having distribution or collection headers or pervious conduits **[5]**
24/26 . . . Upward filtration **[5]**
24/28 . with the filter bed moving during the filtration (with the filter bed fluidised B01D 24/36) **[5]**
24/30 . . Translation **[5]**
24/32 . . Rotation **[5]**
24/34 . with the filtering material and its pervious support moving (tipping buckets, trays or like sections B01D 33/327) **[5]**
24/36 . with the filter bed fluidised during the filtration (with the filter bed being stationary B01D 24/02) **[5]**
24/38 . Feed or discharge devices **[5]**
24/40 . . for feeding **[5]**

24/42 . . for discharging filtrate **[5]**
24/44 . . for discharging filter cake, e.g. chutes **[5]**
24/46 . Regenerating the filtering material in the filter (B01D 24/44 takes precedence) **[5]**
24/48 . integrally combined with devices for controlling the filtration **[5]**

25/00 Filters formed by clamping together several filtering elements or parts of such elements (disc filters B01D 29/39) **[5]**

25/02 . in which the elements are pre-formed independent filtering units, e.g. modular systems
25/12 . Filter presses, i.e. of the plate or plate and frame type
25/127 . . with one or more movable filter bands arranged to be clamped between the press plates or between a plate and a frame during filtration, e.g. zigzag endless filter bands (B01D 25/172, B01D 25/176, B01D 25/19 take precedence) **[5]**
25/133 . . . with compression of the filter cake, e.g. by inflatable membranes **[5]**
25/164 . . Chamber-plate presses, i.e. the sides of the filtering elements being clamped between two successive filtering plates (B01D 25/127, B01D 25/172, B01D 25/176, B01D 25/19 take precedence) **[5]**
25/168 . . . with compression of the filter cake, e.g. by inflatable membranes **[5]**
25/172 . . Plate spreading means (removal of filter cakes B01D 25/32) **[5]**
25/176 . . attaching the filter element to the filter press plates, e.g. around the central feed hole in the plates **[5]**
25/19 . . Clamping means for closing the filter press, e.g. hydraulic jacks **[5]**
25/21 . . Plate and frame presses (B01D 25/172, B01D 25/176, B01D 25/19 take precedence) **[5]**
25/22 . Cell-type filters
25/24 . . Cell-type roll filters
25/26 . . Cell-type stack filters
25/28 . Leaching or washing filter cakes in the filter
25/30 . Feeding devices
25/32 . Removal of filter cakes
25/34 . . by moving the filter elements
25/36 . . . by centrifugal force
25/38 . . by moving parts, e.g. scrapers, contacting stationary filter elements

27/00 Cartridge filters of the throw-away type [5]

27/02 . with cartridges made from a mass of loose material
27/04 . with cartridges made of a piece of unitary material, e.g. filter paper
27/06 . . with corrugated, folded or wound material
27/07 . . . having a coaxial stream through the filtering element **[5]**
27/08 . Construction of the casing
27/10 . Safety devices, e.g. by-passes
27/14 . having more than one filtering element **[5]**

29/00 Filters with filtering elements stationary during filtration, e.g. pressure or suction filters, not covered by groups B01D 24/00 to B01D 27/00; **Filtering elements therefor**

29/01 . with flat filtering elements (B01D 29/39 takes precedence) **[5]**
29/03 . . self-supporting **[5]**
29/05 . . supported **[5]**
29/07 . . . with corrugated, folded or wound filtering sheets **[5]**
29/075 . . located in a closed housing and comprising scrapers or agitators on the cake side of the filtering elements, e.g. Nutsche- or Rosenmund-type filters for performing multiple step operations such as chemical reactions, filtering and cake treatment **[5]**

Note

If the subject matter classified in this group also contains relevant information covered by other subgroups of group B01D 29/00, it is also classified in the other appropriate subgroups of group B01D 29/00. **[5]**

29/085 . Funnel filters; Holders therefor **[5]**

Note

If the subject matter classified in this group also contains relevant information covered by other subgroups of group B01D 29/00, it is also classified in the other appropriate subgroups of group B01D 29/00. **[5]**

29/09 . with filtering bands, e.g. movable between filtering operations **[5]**
29/11 . with bag, cage, hose, tube, sleeve or like filtering elements **[5]**
29/13 . . Supported filter elements **[5]**
29/15 . . . arranged for inward flow filtration **[5]**
29/17 . . . . open-ended **[5]**
29/19 . . . . on solid frames with surface grooves or the like **[5]**
29/21 . . . . with corrugated, folded or wound sheets **[5]**
29/23 . . . arranged for outward flow filtration **[5]**
29/25 . . . . open-ended **[5]**
29/27 . . . . Filter bags **[5]**
29/31 . . Self-supporting filtering elements **[5]**
29/33 . . . arranged for inward flow filtration **[5]**
29/35 . . . arranged for outward flow filtration **[5]**
29/37 . . . open-ended **[5]**
29/39 . with hollow discs side by side on, or around, one or more tubes, e.g. of the leaf type **[5]**
29/41 . . mounted transversely on the tube **[5]**
29/43 . . mounted otherwise than transversely on the tube **[5]**
29/44 . Edge filtering elements, i.e. using contiguous impervious surfaces **[4]**
29/46 . . of flat, stacked bodies **[4]**
29/48 . . of spirally or helically wound bodies **[4]**
29/50 . with multiple filtering elements, characterised by their mutual disposition (B01D 29/39 takes precedence) **[5]**
29/52 . . in parallel connection **[5]**
29/54 . . . arranged concentrically or coaxially **[5]**
29/56 . . in series connection **[5]**
29/58 . . . arranged concentrically or coaxially **[5]**
29/60 . integrally combined with devices for controlling the filtration **[5]**
29/62 . Regenerating the filter material in the filter (devices for taking out of action one or more units of multi-unit filters, e.g. for regeneration, B01D 35/12) **[5]**
29/64 . . by scrapers, brushes or the like, acting on the cake side of the filtering element **[5]**

29/66 . . by flushing, e.g. counter-current air-bumps **[5]**
29/68 . . . with backwash arms, shoes or nozzles **[5]**
29/70 . . by forces created by movement of the filter element **[5]**
29/72 . . . involving vibrations **[5]**
29/74 . . . involving centrifugal force **[5]**
29/76 . Handling the filter cake in the filter for purposes other than for regenerating (B01D 29/94 takes precedence) **[5]**
29/78 . . for washing **[5]**
29/80 . . for drying **[5]**
29/82 . . . by compression **[5]**
29/84 . . . by gases or by heating **[5]**
29/86 . . Retarding cake deposition on the filter during the filtration period, e.g. using stirrers **[5]**
29/88 . having feed or discharge devices **[5]**
29/90 . . for feeding **[5]**
29/92 . . for discharging filtrate **[5]**
29/94 . . for discharging the filter cake, e.g. chutes **[5]**
29/96 . in which the filtering elements are moved between filtering operations; Particular measures for removing or replacing the filtering elements; Transport systems for filters (B01D 29/09, B01D 29/70 take precedence) **[5]**

33/00 Filters with filtering elements which move during the filtering operation (filters comprising loose filtering material moving or fluidised during filtration B01D 24/28 to B01D 24/36; centrifuges B04B) **[5]**

33/01 . with translationally moving filtering elements, e.g. pistons (B01D 33/04 to B01D 33/327 take precedence) **[5]**
33/03 . . with vibrating filter elements **[5]**
33/04 . with filtering bands or the like supported on cylinders which are impervious for filtering **[5]**
33/044 . with filtering bands or the like supported on cylinders which are pervious for filtering **[5]**
33/048 . . with endless filtering bands **[5]**
33/052 . . . combined with a compression device (B01D 33/64 takes precedence) **[5]**
33/056 . Construction of filtering bands or supporting belts, e.g. devices for centering, mounting or sealing the filtering bands or the supporting belts **[5]**
33/06 . with rotary cylindrical filtering surfaces, e.g. hollow drums (B01D 33/044 takes precedence)
33/067 . . Construction of the filtering drums, e.g. mounting or sealing arrangements **[5]**
33/073 . . arranged for inward flow filtration **[5]**
33/09 . . . with surface cells independently connected to pressure distributors **[5]**
33/11 . . arranged for outward flow filtration **[5]**
33/13 . . . with surface cells independently connected to pressure distributors **[5]**
33/15 . with rotary plane filtering surfaces **[5]**
33/17 . . with rotary filtering tables (tables divided into separately tiltable buckets, trays or like sections B01D 33/327) **[5]**
33/19 . . . the table surface being divided in successively tilted sectors or cells, e.g. for discharging the filter cake **[5]**
33/21 . . with hollow filtering discs transversely mounted on a hollow rotary shaft **[5]**
33/23 . . . Construction of discs or component sectors thereof **[5]**
33/25 . . with hollow frames axially mounted on a hollow rotary shaft **[5]**
33/27 . with rotary filtering surfaces, which are neither cylindrical nor planar, e.g. helical surfaces **[5]**
33/29 . the movement of the filter elements being a combination of movements (B01D 33/19 takes precedence) **[5]**
33/31 . . Planetary movement **[5]**
33/327 . . Tipping buckets, trays or like sections **[5]**
33/333 . with individual filtering elements moving along a closed path (tipping buckets, trays or like sections B01D 33/327) **[5]**
33/35 . with multiple filtering elements characterised by their mutual disposition (B01D 33/21 takes precedence) **[5]**
33/37 . . in parallel connection **[5]**
33/39 . . . concentrically or coaxially **[5]**
33/41 . . in series connection **[5]**
33/42 . . . concentrically or coaxially **[5]**
33/44 . Regenerating the filter material in the filter (devices for taking out of action one or more units of multi-unit filters, e.g. for regeneration, B01D 35/12) **[5]**
33/46 . . by scrapers, brushes or the like acting on the cake-side of the filtering element **[5]**
33/48 . . by flushing, e.g. counter-current air-bumps **[5]**
33/50 . . . with backwash arms, shoes or nozzles **[5]**
33/52 . . by forces created by movement of the filter element **[5]**
33/54 . . . involving vibrations **[5]**
33/56 . . . involving centrifugal force **[5]**
33/58 . Handling the filter cake in the filter for purposes other than for regenerating (B01D 33/76 takes precedence) **[5]**
33/60 . . for washing **[5]**
33/62 . . for drying **[5]**
33/64 . . . by compression **[5]**
33/66 . . . by gases or by heating **[5]**
33/68 . . Retarding cake deposition on the filter during the filtration period, e.g. using stirrers **[5]**
33/70 . having feed or discharge devices (B01D 33/82 takes precedence) **[5]**
33/72 . . for feeding **[5]**
33/74 . . for discharging filtrate **[5]**
33/76 . . for discharging the filter cake, e.g. chutes **[5]**
33/80 . Accessories **[5]**
33/82 . . Means for pressure distribution **[5]**

35/00 Filtering devices having features not specifically covered by groups B01D 24/00 to B01D 33/00, or for applications not specifically covered by groups B01D 24/00 to B01D 33/00; **Auxiliary devices for filtration**; **Filter housing constructions**

35/01 . Devices for the removal of gas, e.g. air purge systems **[5]**
35/02 . Filters adapted for location in special places, e.g. pipe-lines, pumps, stop-cocks (B01D 35/05 takes precedence)
35/027 . . rigidly mounted in or on tanks or reservoirs (B01D 35/04 takes precedence) **[5]**
35/04 . . Plug, tap, or cock filters
35/05 . Floating filters **[5]**
35/06 . Filters making use of electricity or magnetism (ultrafiltration, microfiltration B01D 61/14; electrodialysis, electro-osmosis B01D 61/42; combinations of filters and magnetic separators B03C 1/30) **[5]**
35/10 . Brush filters

35/12 . Devices for taking out of action one or more units of multi-unit filters, e.g. for regeneration
35/14 . Safety devices specially adapted for filtration; Devices for indicating clogging (incorporated in a throw-away filter B01D 27/10)
35/143 . . Filter condition indicators **[5]**
35/147 . . Bypass or safety valves **[5]**
35/15 . . Bidirectional working filters **[5]**
35/153 . . Anti-leakage or anti-return valves **[5]**
35/157 . . Flow control valves; Damping or calibrated passages **[5]**
35/16 . Cleaning-out devices
35/18 . Heating or cooling the filters
35/20 . Vibrating the filters (regenerating filter material by vibrations in filters with stationary filtering elements B01D 29/72; discharging the filter cake by vibrations in filters with moving filtering elements B01D 33/54, B01D 33/76) **[5]**
35/22 . Directing the mixture to be filtered on to the filters in a manner to clean the filters
35/24 . Providing loose granular material to scratch the filters clean
35/26 . Filters with built-in pumps
35/28 . Strainers not provided for elsewhere
35/30 . Filter housing constructions **[4]**
35/31 . . including arrangements for environmental protection, e.g. pressure resisting features **[5]**
35/32 . . . against radiation **[5]**
35/34 . . open-topped (B01D 35/31 takes precedence) **[5]**

36/00 Filter circuits or combinations of filters with other separating devices (devices for the removal of gas, e.g. air purge systems B01D 35/01; magnetic or electrostatic separators combined with filters B03C) **[4,5]**
36/02 . Combinations of filters of different kinds (B01D 29/50, B01D 33/35 take precedence) **[4,5]**
36/04 . Combinations of filters with settling tanks **[4]**

37/00 Processes of filtration (processes specially adapted for filtering gases B01D 46/00)
37/02 . Precoating the filtering elements or material; Addition of filter aids to the liquid being filtered
37/03 . using flocculating agents **[5]**
37/04 . Controlling the filtration

39/00 Filtering material for liquid or gaseous fluids
39/02 . Loose filtering material, e.g. loose fibres
39/04 . . Organic material, e.g. cellulose, cotton
39/06 . . Inorganic material, e.g. asbestos fibres, glass beads or fibres
39/08 . Filter cloth, i.e. woven, knitted or interlaced material (metallic B01D 39/10)
39/10 . Filter screens essentially made of metal
39/12 . . of wire gauze; of knitted wire; of expanded metal
39/14 . Other self-supporting filtering material
39/16 . . of organic material, e.g. synthetic fibres
39/18 . . . the material being cellulose or derivatives thereof
39/20 . . of inorganic material, e.g. asbestos paper or metallic filtering material of non-woven wires

41/00 Regeneration of the filtering material or filter elements outside the filter for liquid or gaseous fluids
41/02 . of loose filtering material
41/04 . of rigid self-supporting filtering material

43/00 Separating particles from liquids, or liquids from solids, otherwise than by sedimentation or filtration (flotation processes B03D 1/00; drying solid materials or objects F26B)

Separating dispersed particles from gases or vapours

45/00 Separating dispersed particles from gases or vapours by gravity, inertia, or centrifugal forces
45/02 . by utilising gravity
45/04 . by utilising inertia (B01D 45/12 takes precedence)
45/06 . . by reversal of direction of flow
45/08 . . by impingement against baffle separators
45/10 . . . which are wetted
45/12 . by centrifugal forces (centrifuges B04B; cyclones B04C)
45/14 . . generated by rotating vanes, discs, drums or brushes
45/16 . . generated by the winding course of the gas stream
45/18 . Cleaning-out devices

46/00 Filters or filtering processes specially modified for separating dispersed particles from gases or vapours (filtering elements B01D 24/00 to B01D 35/00; filtering material B01D 39/00; their regeneration outside the filters B01D 41/00)
46/02 . Particle separators, e.g. dust precipitators, having hollow filters made of flexible material
46/04 . . Cleaning filters
46/06 . . with means keeping the working surfaces flat
46/08 . . . the working surfaces forming a star shape
46/10 . Particle separators, e.g. dust precipitators, using filter plates, sheets, or pads having plane surfaces
46/12 . . in multiple arrangements
46/14 . . arranged in a star shape
46/16 . . arranged on non-filtering conveyers
46/18 . Particle separators, e.g. dust precipitators, using filtering belts
46/20 . . the belts combined with drums
46/22 . . the belts travelling during filtering
46/24 . Particle separators, e.g. dust precipitators, using rigid hollow filter bodies
46/26 . . rotatable
46/28 . Particle separators, e.g. dust precipitators, using filter brushes
46/30 . Particle separators, e.g. dust precipitators, using loose filtering material
46/32 . . the material moving during filtering
46/34 . . . not horizontally, e.g. using shoots
46/36 . . . as a substantially horizontal layer, e.g. on rotary tables, drums, conveyer belts
46/38 . . . as fluidised bed
46/40 . Particle separators, e.g. dust precipitators, using edge filters, i.e. using contiguous impervious surfaces
46/42 . Auxiliary equipment or operation thereof
46/44 . . controlling filtration
46/46 . . . automatic
46/48 . . Removing dust other than cleaning filters
46/50 . . Means for discharging electrostatic potential
46/52 . Particle separators, e.g. dust precipitators, using filters embodying folded material
46/54 . Particle separators, e.g. dust precipitators, using ultra-fine filter sheets or diaphragms

47/00 **Separating dispersed particles from gases, air or vapours by liquid as separating agent** (B01D 45/10 takes precedence; fractionating columns or parts thereof B01D 3/16)

47/02 . by passing the gas or air or vapour over or through a liquid bath

47/04 . by passing the gas or air or vapour through foam

47/05 . by condensation of the separating agent **[3]**

47/06 . Spray cleaning

47/08 . . with rotary nozzles

47/10 . Venturi scrubbers

47/12 . Washers with plural different washing sections (B01D 47/14 takes precedence) **[3]**

47/14 . Packed scrubbers **[3]**

47/16 . Apparatus having rotary means, other than rotatable nozzles, for atomising the cleaning liquid

47/18 . . with horizontally-arranged shafts

49/00 **Separating dispersed particles from gases, air or vapours by other methods**

49/02 . by thermal repulsion

50/00 **Combinations of devices for separating particles from gases or vapours**

51/00 **Auxiliary pretreatment of gases or vapours to be cleaned from dispersed particles [6]**

51/02 . Amassing the particles, e.g. by flocculation

51/04 . . by seeding, e.g. by adding particles

51/06 . . by varying the pressure of the gas or vapour

51/08 . . . by sound or ultrasonics

51/10 . Conditioning the gas to be cleaned

53/00 **Separation of gases or vapours**; **Recovering vapours of volatile solvents from gases**; **Chemical or biological purification of waste gases, e.g. engine exhaust gases, smoke, fumes, flue gases or aerosols** (recovery of volatile solvents by condensation B01D 5/00; sublimation B01D 7/00; cold traps, cold baffles B01D 8/00; separation of difficult-to-condense gases or air by liquefaction F25J 3/00) **[3,5]**

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[6]**

Note

Group B01D 53/34 takes precedence over groups B01D 53/02 to B01D 53/32.

53/02 . by adsorption, e.g. preparative gas chromatography

53/04 . . with stationary adsorbents

53/047 . . . Pressure swing adsorption **[6]**

53/053 . . . . with storage or buffer vessel **[6]**

53/06 . . with moving adsorbents

53/08 . . . according to the “moving bed” method

53/10 . . . with dispersed adsorbents

53/12 . . . . according to the “fluidised technique”

53/14 . by absorption

53/18 . . Absorbing units; Liquid distributors therefor (B01D 3/16, B01D 3/26, B01D 3/30 take precedence)

53/22 . by diffusion

53/24 . by centrifugal force (centrifuges B04B; cyclones B04C)

53/26 . Drying gases or vapours

53/28 . . Selection of materials for use as drying agents

53/30 . Controlling by gas-analysis apparatus

53/32 . by electrical effects other than those provided for in group B01D 61/00 **[5]**

53/34 . Chemical or biological purification of waste gases **[3,6]**

53/38 . . Removing components of undefined structure **[6]**

53/40 . . . Acidic components (B01D 53/44 takes precedence) **[6]**

53/42 . . . Basic components (B01D 53/44 takes precedence) **[6]**

53/44 . . . Organic components **[6]**

53/46 . . Removing components of defined structure **[6]**

53/48 . . . Sulfur compounds **[6]**

53/50 . . . . Sulfur oxides (B01D 53/60 takes precedence) **[6]**

53/52 . . . . Hydrogen sulfide **[6]**

53/54 . . . Nitrogen compounds **[6]**

53/56 . . . . Nitrogen oxides (B01D 53/60 takes precedence) **[6]**

53/58 . . . . Ammonia **[6]**

53/60 . . . Simultaneously removing sulfur oxides and nitrogen oxides **[6]**

53/62 . . . Carbon oxides **[6]**

53/64 . . . Heavy metals or compounds thereof, e.g. mercury **[6]**

53/66 . . . Ozone **[6]**

53/68 . . . Halogens or halogen compounds **[6]**

53/70 . . . . Organic halogen compounds **[6]**

53/72 . . . Organic compounds not provided for in groups B01D 53/48 to B01D 53/70, e.g. hydrocarbons **[6]**

53/73 . . After-treatment of removed components **[6]**

53/74 . . General processes for purification of waste gases; Apparatus or devices specially adapted therefor (B01D 53/92 takes precedence) **[6]**

53/75 . . . Multi-step processes **[6]**

53/76 . . . Gas phase processes, e.g. by using aerosols **[6]**

53/77 . . . Liquid phase processes **[6]**

53/78 . . . . with gas-liquid contact **[6]**

53/79 . . . . Injecting reactants **[6]**

53/80 . . . Semi-solid phase processes, i.e. by using slurries **[6]**

53/81 . . . Solid phase processes **[6]**

53/82 . . . . with stationary reactants **[6]**

53/83 . . . . with moving reactants **[6]**

53/84 . . . Biological processes **[6]**

53/85 . . . . with gas-solid contact **[6]**

53/86 . . . Catalytic processes **[6]**

53/88 . . . . Handling or mounting catalysts **[6]**

53/90 . . . . Injecting reactants **[6]**

53/92 . . of engine exhaust gases (exhaust apparatus having means for purifying or otherwise treating exhaust gases F01N 3/00) **[6]**

53/94 . . . by catalytic processes **[6]**

53/96 . . Regeneration, reactivation or recycling of reactants **[6]**

57/00 Separation, other than separation of solids, not fully covered by a single other group or subclass, e.g. B03C

57/02 . by electrophoresis **[3,5]**

59/00 Separation of different isotopes of the same chemical element

59/02 . Separation by phase transition
59/04 . . by distillation
59/06 . . by fractional melting; by zone melting
59/08 . . by fractional crystallisation, by precipitation, by zone freezing
59/10 . Separation by diffusion
59/12 . . by diffusion through barriers
59/14 . . . Construction of the barrier
59/16 . . by thermal diffusion
59/18 . . by separation jets
59/20 . Separation by centrifuging
59/22 . Separation by extracting
59/24 . . by solvent extraction
59/26 . . by sorption, i.e. absorption, adsorption, persorption
59/28 . Separation by chemical exchange
59/30 . . by ion exchange
59/32 . . by exchange between fluids
59/33 . . . involving dual temperature exchange **[2]**
59/34 . Separation by photochemical methods
59/36 . Separation by biological methods
59/38 . Separation by electrochemical methods
59/40 . . by electrolysis
59/42 . . by electromigration; by electrophoresis
59/44 . Separation by mass spectrography (particle spectrometers or separator tubes H01J 49/00)
59/46 . . using only electrostatic fields
59/48 . . using electrostatic and magnetic fields
59/50 . Separation involving two or more processes covered by different groups selected from groups B01D 59/02, B01D 59/10, B01D 59/20, B01D 59/22, B01D 59/28, B01D 59/34, B01D 59/36, B01D 59/38, B01D 59/44

Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis or ultrafiltration; **Apparatus specially adapted therefor**; **Semi-permeable membranes or their production** **[5]**

Note

In groups B01D 61/00 to B01D 71/00, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

61/00 Processes of separation using semi-permeable membranes, e.g. dialysis, osmosis or ultrafiltration; **Apparatus, accessories or auxiliary operations specially adapted therefor** (separation of gases or vapours by diffusion B01D 53/22) **[5]**

61/02 . Reverse osmosis; Hyperfiltration **[5]**
61/04 . . Feed pretreatment **[5]**
61/06 . . Energy recovery **[5]**
61/08 . . Apparatus therefor **[5]**
61/10 . . Accessories; Auxiliary operations **[5]**
61/12 . . Controlling or regulating **[5]**
61/14 . Ultrafiltration; Microfiltration **[5]**
61/16 . . Feed pretreatment **[5]**
61/18 . . Apparatus therefor **[5]**
61/20 . . Accessories; Auxiliary operations **[5]**
61/22 . . Controlling or regulating **[5]**
61/24 . Dialysis **[5]**
61/26 . . Dialysate solution flow, e.g. preparation, regeneration **[5]**
61/28 . . Apparatus therefor **[5]**
61/30 . . Accessories; Auxiliary operation **[5]**
61/32 . . Controlling or regulating **[5]**
61/34 . . . Measuring ultrafiltrate during dialysis **[5]**
61/36 . Pervaporation; Membrane distillation; Liquid permeation **[5]**
61/38 . Liquid-membrane separation **[5]**
61/40 . . using emulsion-type membranes **[5]**
61/42 . Electrodialysis; Electro-osmosis **[5]**
61/44 . . Ion-selective electrodialysis **[5]**
61/46 . . . Apparatus therefor **[5]**
61/48 . . . . having one or more compartments filled with ion-exchange material **[5]**
61/50 . . . . Stacks of the plate-and-frame type **[5]**
61/52 . . . Accessories; Auxiliary operation **[5]**
61/54 . . . Controlling or regulating **[5]**
61/56 . . Electro-osmotic dewatering **[5]**
61/58 . Multistep processes **[5]**

63/00 Apparatus in general for separation processes using semi-permeable membranes [5]

63/02 . Hollow fibre modules **[5]**
63/04 . . comprising multiple hollow fibre assemblies **[5]**
63/06 . Tubular membrane modules **[5]**
63/08 . Flat membrane modules **[5]**
63/10 . Spiral-wound membrane modules **[5]**
63/12 . . comprising multiple spiral-wound assemblies **[5]**
63/14 . Pleat-type membrane modules **[5]**
63/16 . Rotary, reciprocated or vibrated modules **[5]**

65/00 Accessories or auxiliary operations, in general, for separation processes or apparatus using semi-permeable membranes [5]

65/02 . Membrane cleaning or sterilisation **[5]**
65/04 . . with movable bodies, e.g. foam balls **[5]**
65/06 . . with special washing compositions **[5]**
65/08 . Prevention of membrane fouling or of concentration polarisation **[5]**
65/10 . Testing of membranes or membrane apparatus; Detecting or repairing leaks **[5]**

67/00 Processes specially adapted for manufacturing semi-permeable membranes for separation processes or apparatus [5]

69/00 Semi-permeable membranes for separation processes or apparatus characterised by their form, structure or properties; **Manufacturing processes specially adapted therefor [5]**

(1) In this group, the following term is used with the meaning indicated:
– "properties" covers those of a mechanical, physical or chemical nature. **[5]**

(2) Manufacturing processes, if considered of interest, are also classified in group B01D 67/00. **[5]**

69/02 . characterised by their properties **[5]**
69/04 . Tubular membranes **[5]**
69/06 . Flat membranes **[5]**

69/08 . Hollow fibre membranes (manufacture of hollow fibres D01D 5/24, D01F 1/08) **[5]**
69/10 . Supported membranes; Membrane supports **[5]**
69/12 . Composite membranes; Ultra-thin membranes **[5]**
69/14 . Dynamic membranes **[5]**

71/00 Semi-permeable membranes for separation processes or apparatus characterised by the material; Manufacturing processes specially adapted therefor [5]

(1) In this group, if the material is a composition it is classified according to the constituent present in highest proportion. This constituent is classified according to the last place rule (see Note before group B01D 61/00). If there is more than one constituent present in equal highest proportions, then each of these constituents is classified according to the last place rule. **[5]**
(2) Manufacturing processes, if considered of interest, are also classified in group B01D 67/00. **[5]**

71/02 . Inorganic material **[5]**
71/04 . . Glass **[5]**
71/06 . Organic material **[5]**
71/08 . . Polysaccharides **[5]**
71/10 . . . Cellulose; Modified cellulose **[5]**
71/12 . . . Cellulose derivatives **[5]**
71/14 . . . . Esters of organic acids **[5]**
71/16 . . . . . Cellulose acetate **[5]**
71/18 . . . . . Mixed esters, e.g. cellulose acetate-butyrate **[5]**
71/20 . . . . Esters of inorganic acids, e.g. cellulose nitrate **[5]**
71/22 . . . . Cellulose ethers **[5]**
71/24 . . Rubbers **[5]**

Note

In this group the following term is used with the meaning indicated:
– "rubber" covers:
(a) natural or conjugated diene rubber;
(b) rubber in general (for specific rubber, see the group provided for such macromolecular compound). **[5]**

71/26 . . Polyalkenes **[5]**
71/28 . . Polymers of vinyl aromatic compounds **[5]**
71/30 . . Polyalkenyl halides **[5]**
71/32 . . . containing fluorine atoms **[5]**
71/34 . . . . Polyvinylidene fluoride **[5]**
71/36 . . . . Polytetrafluoroethene **[5]**
71/38 . . Polyalkenylalcohols; Polyalkenylesters; Polyalkenylethers; Polyalkenylaldehydes; Polyalkenylketones; Polyalkenylacetals; Polyalkenylketals **[5]**
71/40 . . Polymers of unsaturated acids or derivatives thereof, e.g. salts, amides, imides, nitriles, anhydrides, esters **[5]**
71/42 . . . Polymers of nitriles, e.g. polyacrylonitrile **[5]**
71/44 . . Polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of groups B01D 71/26 to B01D 71/42 **[5]**
71/46 . . Epoxy resins **[5]**
71/48 . . Polyesters **[5]**
71/50 . . Polycarbonates **[5]**
71/52 . . Polyethers **[5]**
71/54 . . Polyureas; Polyurethanes **[5]**
71/56 . . Polyamides, e.g. polyester-amides **[5]**
71/58 . . Other polymers having nitrogen in the main chain, with or without oxygen or carbon only **[5]**
71/60 . . . Polyamines **[5]**
71/62 . . . Polycondensates having nitrogen-containing heterocyclic rings in the main chain **[5]**
71/64 . . . . Polyimides; Polyamide-imides; Polyester-imides; Polyamide acids or similar polyimide precursors **[5]**
71/66 . . Polymers having sulfur in the main chain, with or without nitrogen, oxygen or carbon only **[5]**
71/68 . . . Polysulfones; Polyethersulfones **[5]**
71/70 . . Polymers having silicon in the main chain, with or without sulfur, nitrogen, oxygen or carbon only **[5]**
71/72 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of groups B01D 71/46 to B01D 71/70 **[5]**
71/74 . . Natural macromolecular material or derivatives thereof (B01D 71/08, B01D 71/24 take precedence) **[5]**
71/76 . . Macromolecular material not specifically provided for in a single one of groups B01D 71/08 to B01D 71/74 (rubbers in general B01D 71/24) **[5]**
71/78 . . . Graft polymers **[5]**
71/80 . . . Block polymers **[5]**
71/82 . . . characterised by the presence of specified groups, e.g. introduced by chemical after-treatment **[5]**

B01F MIXING, E.G. DISSOLVING, EMULSIFYING, DISPERSING (mixing paints B44D 3/06)

Note

In this subclass, the following term or expression is used with the meaning indicated:
– "mixing" covers stirring of a single material. **[2]**

Subclass index

1/00 **Dissolving** (separating by dissolving B01D; dissolving to effect cooling F25D 5/00) **[2]**

3/00 **Mixing, e.g. dispersing, emulsifying, according to the phases to be mixed**

3/02 . gases with gases or vapours
3/04 . gases or vapours with liquids (mixing non-alcoholic beverages with gases A23L 2/54)
3/06 . gases or vapours with solids
3/08 . liquids with liquids; Emulsifying
3/10 . . Mixing very viscous liquids
3/12 . liquids with solids (displacing one liquid by another in dispersions of solids in liquids B01D 12/00)
3/14 . . Mixing very viscous liquids with solids
3/18 . solid with solids
3/20 . Pretreatment of the materials to be mixed
3/22 . Aftertreatment of the mixture

Mixers

5/00 **Flow mixers** (sprayers, atomisers B05B); **Mixers for falling materials, e.g. solid particles** (B01F 13/04 takes precedence; centrifugal mixers B04)

5/02 . Jet mixers
5/04 . Injector mixers
5/06 . Mixers in which the components are pressed together through slits, orifices, or screens (turbo-mixers B01F 5/16; colloid-mills B02C; mixing valves F16K 11/00)
5/08 . . Homogenising or emulsifying nozzles
5/10 . Circulation mixers
5/12 . Pump mixers
5/14 . . of the gear type
5/16 . . Turbo-mixers
5/18 . Spray-mixers
5/20 . . with nozzles
5/22 . . with rotary discs
5/24 . Falling particle mixers with repeated action
5/26 . Falling particle mixers with moving means, e.g. stirrers for increasing the mixing

7/00 **Mixers with rotary stirring devices in fixed receptacles**; **Kneaders** (B01F 13/04 takes precedence)

7/02 . with stirrers rotating about a horizontal or inclined axis
7/04 . . with paddles or arms
7/06 . . with propellers
7/08 . . with helices
7/10 . . with rotary discs
7/12 . . with cylinders
7/14 . . with stirrers having planetary motion
7/16 . with stirrers rotating about a vertical axis
7/18 . . with paddles or arms
7/20 . . . with fixed axis
7/22 . . with propellers
7/24 . . with helices
7/26 . . with rotary discs
7/28 . . with cylinders
7/30 . . with stirrers having planetary motion
7/32 . . with openwork frames or cages

9/00 **Mixers with rotating receptacles** (B01F 13/04 takes precedence)

9/02 . rotating about a horizontal or inclined axis, e.g. drum mixers
9/04 . . without bars
9/06 . . with fixed bars
9/08 . . with rotating stirring devices
9/10 . rotating about a vertical axis
9/12 . . with paddles or arms
9/14 . . with propellers
9/16 . . with helices
9/18 . . with rotary discs
9/20 . . with cylinders
9/22 . with stirrers having planetary motion

11/00 **Mixers with shaking, oscillating, or vibrating mechanisms** (B01F 13/04 takes precedence)

11/02 . Mixing by means of ultrasonic vibrations
11/04 . with pendulum stirrers

13/00 **Other mixers**; **Mixing plant, including combinations of dissimilar mixers**

13/02 . Mixers with gas agitation, e.g. with air supply tubes
13/04 . Mixers combined with safety devices
13/06 . Mixers adapted for working at sub- or super-atmospheric pressure
13/08 . Magnetic mixers
13/10 . Mixing plant, including combinations of dissimilar mixers

15/00 **Accessories for mixers**

15/02 . Feed or discharge mechanisms
15/04 . Forming a predetermined ratio of the substances to be mixed (controlling ratio of two or more flows of fluid or fluent material G05D 11/02)
15/06 . Heating or cooling systems

17/00 **Use of substances as emulsifying, wetting, dispersing, or foam-producing agents** (flotation agents B03D 1/001; used for particular applications, see the relevant classes, e.g. use of substances as detergents C11D) **[3,5]**

17/02 . Alkyl sulfonates or sulfuric acid ester salts derived from monohydric alcohols
17/04 . Sulfonates or sulfuric acid ester salts derived from polyhydric alcohols or amino alcohols or derivatives thereof (sulfated or sulfonated fatty oils B01F 17/08)
17/06 . Esters of higher fatty acids with hydroxyalkylated sulfonic acids or salts thereof
17/08 . Sulfation or sulfonation products of fats, oils, waxes, or higher fatty acids or esters thereof with monovalent alcohols
17/10 . Derivatives of low-molecular-weight sulfocarboxylic acids or sulfopolycarboxylic acids
17/12 . Sulfonates of aromatic or alkylated aromatic compounds
17/14 . Derivatives of phosphoric acid
17/16 . Amines or polyamines
17/18 . Quaternary ammonium compounds
17/20 . Phosphonium and sulfonium compounds
17/22 . Amides or hydrazides
17/24 . . Amides of higher fatty acids with aminoalkylated sulfonic acids
17/26 . Sulfonamides

17/28 . Aminocarboxylic acids (protein hydrolysates B01F 17/30)
17/30 . Proteins; Protein hydrolysates
17/32 . Heterocyclic compounds
17/34 . Higher-molecular-weight carboxylic acid esters (B01F 17/06 takes precedence)
17/36 . . Esters of polycarboxylic acids
17/38 . Alcohols, e.g. oxidation products of paraffins
17/40 . Phenols
17/42 . Ethers, e.g. polyglycol ethers of alcohols or phenols
17/44 . . Ether carboxylic acids
17/46 . . Ethers of aminoalcohols
17/48 . . Cellulose ethers
17/50 . Derivatives of lignin
17/52 . Natural or synthetic resins or their salts
17/54 . Silicon compounds
17/56 . Glucosides; Mucilage; Saponines

B01J CHEMICAL OR PHYSICAL PROCESSES, E.G. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS (processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08) **[2]**

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
– "solid particles" includes such particles whether catalysts, reactants or inert in solid, semi-solid or pasty state; **[2]**
– "fluidised particles" means finely divided solid particles lifted and agitated by a stream of fluid; **[2]**
– "fluidised-bed technique" means fluid-solid contacting technique in which finely divided particles are lifted and agitated by a rising stream of fluid, said stream having such a speed as to form a lower dense phase (the "bed") and an upper dilute fluidised phase of "fluidised particles"; **[2]**
– "processes conducted in the presence of solid particles" does not include processes wherein the only solid particles present are formed during the reaction. **[3]**

(2) In this subclass, tradenames that are often found in scientific and patent literature have been used in order to define precisely the scope of the groups. **[6]**

Subclass index

2/00 Processes or devices for granulating materials, in general (granulating metals B22F 9/00, slag C04B 5/02, ores or scrap C22B 1/14; mechanical aspects of working of plastics or substances in a plastic state to make granules B29B 9/00; processes for granulating fertilisers characterised by their chemical constitution, see the relevant groups in C05B to C05G; chemical aspects of powdering or granulating of macromolecular substances C08J 3/12); **Rendering particulate materials free flowing in general, e.g. making them hydrophobic [4]**
2/02 . by dividing the liquid material into drops, e.g. by spraying, and solidifying the drops (evaporating by spraying B01D 1/16)
2/04 . . in a gaseous medium
2/06 . . in a liquid medium
2/08 . . . Gelation of a colloidal solution
2/10 . in stationary drums or troughs, provided with kneading or mixing appliances
2/12 . in rotating drums
2/14 . in rotating dishes or pans
2/16 . by suspending the powder material in a gas, e.g. in fluidised beds or as a falling curtain
2/18 . using a vibrating apparatus
2/20 . by expressing the material, e.g. through sieves and fragmenting the extruded length
2/22 . by pressing in moulds or between rollers
2/24 . Obtaining flakes by scraping a solid layer from a surface
2/26 . on endless conveyer belts
2/28 . using special binding agents
2/30 . using agents to prevent the granules sticking together; Rendering particulate materials free flowing in general, e.g. making them hydrophobic **[4]**

3/00 **Processes of utilising sub-atmospheric or super-atmospheric pressure to effect chemical or physical change of matter**; **Apparatus therefor** (apparatus for compacting or sintering of metal powders B22F 3/00; pressure vessels in general F16J 12/00; pressure vessels for containing or storing compressed, liquefied or solidified gases F17C; pressure vessels for nuclear reactors G21C) **[2]**

3/02 . Feed or outlet devices therefor

3/03 . Pressure vessels, or vacuum vessels, having closure members or seals specially adapted therefor **[3]**

3/04 . Pressure vessels, e.g. autoclaves **[2]**

3/06 . Processes using ultra-high pressure, e.g. for the formation of diamonds; Apparatus therefor, e.g. moulds, dies (B01J 3/04 takes precedence; presses in general B30B) **[2]**

3/08 . . Application of shock waves for chemical reactions or for modifying the crystal structure of substances (blasting F42D) **[3]**

4/00 **Feed devices**; **Feed or outlet regulating devices** (feed or outlet devices for pressure vessels B01J 3/02)

4/02 . for feeding measured quantities of reagents

4/04 . using osmotic pressure **[4]**

6/00 **Calcining**; **Fusing**

7/00 **Apparatus for generating gases** (production of inert gas mixtures B01J 19/14; for generating specific gases, see the relevant subclasses, e.g. C01B, C10J)

7/02 . by wet methods

8/00 **Chemical or physical processes in general, conducted in the presence of fluids and solid particles**; **Apparatus for such processes** (processes or devices for granulating material B01J 2/00; furnaces F27B) **[2]**

8/02 . with stationary particles, e.g. in fixed beds **[2]**

8/04 . . the fluid passing successively through two or more beds **[2]**

8/06 . . in tube reactors; the solid particles being arranged in tubes **[2]**

8/08 . with moving particles (with fluidised particles B01J 8/18) **[2]**

8/10 . . moved by stirrers or by rotary drums or rotary receptacles **[2]**

8/12 . . moved by gravity in a downward flow **[2]**

8/14 . . moving in free vortex flow apparatus (free vortex flow apparatus in general B04C) **[2]**

8/16 . with particles being subjected to vibrations or pulsations (B01J 8/40 takes precedence) **[2]**

8/18 . with fluidised particles **[2]**

8/20 . . with liquid as a fluidising medium **[2]**

8/22 . . . gas being introduced into the liquid **[2]**

8/24 . . according to "fluidised-bed" technique (B01J 8/20 takes precedence; combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles F23C 10/00) **[2]**

8/26 . . . with two or more fluidised beds, e.g. reactor and regeneration installations **[2]**

8/28 . . . . the one above the other **[2]**

8/30 . . . . . the edge of a lower bed projecting beyond the edge of the superjacent bed **[2]**

8/32 . . . with introduction into the fluidised bed of more than one kind of moving particles **[2]**

8/34 . . . with stationary packing material in the fluidised bed, e.g. bricks, wire rings, baffles **[2]**

8/36 . . . with fluidised bed through which there is an essentially horizontal flow of particles **[2]**

8/38 . . . with fluidised bed containing a rotatable device or being subject to rotation **[2]**

8/40 . . . with fluidised bed subjected to vibrations or pulsations **[2]**

8/42 . . . with fluidised bed subjected to electric current or to radiations **[2]**

8/44 . . . Fluidisation grids **[2]**

8/46 . . . for treatment of endless filamentary, band or sheet material **[2]**

10/00 **Chemical processes in general for reacting liquid with gaseous media other than in the presence of solid particles, or apparatus specially adapted therefor** (B01J 19/08 takes precedence; separation, e.g. distillation, also combined with chemical reactions B01D) **[3]**

10/02 . of the thin-film type **[3]**

12/00 **Chemical processes in general for reacting gaseous media with gaseous media**; **Apparatus specially adapted therefor** (B01J 3/08, B01J 8/00, B01J 19/08 take precedence) **[3]**

12/02 . for obtaining at least one reaction product which, at normal temperature, is in the solid state **[3]**

13/00 **Colloid chemistry, e.g. the production of colloidal materials or their solutions, not otherwise provided for**; **Making microcapsules or microballoons** (use of substances as emulsifying, wetting, dispersing or foam producing agents B01F 17/00)

13/02 . Making microcapsules or microballoons

13/04 . . by physical processes, e.g. drying, spraying **[5]**

13/06 . . by phase separation **[5]**

13/08 . . . Simple coacervation, i.e. addition of highly hydrophilic material **[5]**

13/10 . . . Complex coacervation, i.e. interaction of oppositely charged particles **[5]**

13/12 . . . removing solvent from the wall-forming material solution **[5]**

13/14 . . . Polymerisation, crosslinking **[5]**

13/16 . . . . Interfacial polymerisation **[5]**

13/18 . . . . In situ polymerisation with all reactants being present in the same phase **[5]**

13/20 . . After-treatment of capsule walls, e.g. hardening **[5]**

13/22 . . . Coating **[5]**

14/00 **Chemical processes in general for reacting liquids with liquids**; **Apparatus specially adapted therefor** (B01J 8/00, B01J 19/08 take precedence) **[3]**

15/00 **Chemical processes in general for reacting gaseous media with non-particulate solids, e.g. sheet material**; **Apparatus specially adapted therefor** (B01J 19/08 takes precedence) **[3]**

16/00 **Chemical processes in general for reacting liquids with non-particulate solids, e.g. sheet material**; **Apparatus specially adapted therefor** (B01J 19/08 takes precedence) **[3]**

19/00 **Chemical, physical, or physico-chemical processes in general** (physical treatment of fibres, threads, yarns, fabrics, feathers or fibrous goods made from such materials, see the relevant places for such treatment, e.g. D06M 10/00); **Their relevant apparatus** (packings, fillings or grids specially adapted for biological treatment of water, waste water or sewage C02F 3/10; splashing boards or grids specially adapted for trickle coolers F28F 25/08) **[3]**

19/02 . Apparatus characterised by being constructed of material selected for its chemically-resistant properties (refractory details of furnaces F27D) **[3]**

19/06 . Solidifying liquids (making micro-capsules B01J 13/02) **[3]**

19/08 . Processes employing the direct application of electric or wave energy, or particle radiation; Apparatus therefor (application of shock waves B01J 3/08; generating or handling plasma H05H 1/00) **[3]**

19/10 . . employing sonic or ultrasonic vibrations (for auxiliary pretreatment of gases or vapours to be cleaned B01D 51/08; for cleaning B08B 3/12) **[3]**

19/12 . . employing electromagnetic waves **[3]**

19/14 . Production of inert gas mixtures; Use of inert gases in general (apparatus for generating gases B01J 7/00; separation of gases or vapours B01D 53/00) **[3]**

19/16 . Preventing evaporation or oxidation of non-metallic liquids by applying a floating layer, e.g. of micro-balloons **[3]**

19/18 . Stationary reactors having moving elements inside (B01J 19/08, B01J 19/26 take precedence) **[3]**

19/20 . . in the form of helices, e.g. screw reactors (thin-film reactors B01J 10/02) **[3]**

19/22 . . in the form of endless belts **[3]**

19/24 . Stationary reactors without moving elements inside (B01J 19/08, B01J 19/26 take precedence; with stationary particles B01J 8/02) **[3]**

19/26 . Nozzle-type reactors, i.e. the distribution of the initial reactants within the reactor is effected by their introduction or injection through nozzles **[3]**

19/28 . Moving reactors, e.g. rotary drums (B01J 19/08 takes precedence; centrifuges B04B; rotary drum furnaces F27B 7/00) **[3]**

19/30 . Loose or shaped packing elements, e.g. Raschig rings or Berl saddles, for pouring into the apparatus for mass or heat transfer **[5]**

19/32 . Packing elements in the form of grids or built-up elements for forming a unit or module inside the apparatus for mass or heat transfer **[5]**

Solid sorbent compositions; **Filter aid compositions**; **Sorbents for chromatography**; **Catalysts** **[3]**

(1) In groups B01J 20/00 to B01J 31/00, metal salts having an anion composed of metal and oxygen only, e.g. molybdates, are considered as chemically bound mixtures of the component metal oxides. **[2,5]**

(2) Attention is drawn to the definitions of groups of chemical elements following the title of section C. **[2]**

(3) In group B01J 20/00 and in each set of groups B01J 21/00 to B01J 31/00 and B01J 32/00 to B01J 38/00, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2,5]**

(4) Pure compounds or elements, or their recovery from solid sorbent compositions, filter aid compositions, or catalysts, are classified in the appropriate subclass for chemical compounds or elements. However, when it is explicitly stated that the pure compound or element, in a particular form, is especially useful as a solid sorbent, filter aid, or catalyst, it is further classified in group B01J 20/00 or B01J 35/00. **[2]**

20/00 **Solid sorbent compositions or filter aid compositions**; **Sorbents for chromatography**; **Processes for preparing, regenerating or reactivating thereof** (use of solid sorbent compositions in liquid separation B01D 15/00; use of filter aid compositions B01D 37/02; use of sorbent compositions in gas separation B01D 53/02, B01D 53/14) **[3,8]**

20/02 . comprising inorganic material **[3]**

20/04 . . comprising compounds of alkali metals, alkaline earth metals or magnesium **[3]**

20/06 . . comprising oxides or hydroxides of metals not provided for in group B01J 20/04 **[3]**

20/08 . . . comprising aluminium oxide or hydroxide; comprising bauxite **[3]**

20/10 . . comprising silica or silicate **[3]**

20/12 . . . Naturally occurring clays or bleaching earth **[3]**

20/14 . . . Diatomaceous earth **[3]**

20/16 . . . Alumino-silicates (B01J 20/12 takes precedence) **[3]**

20/18 . . . . Synthetic zeolitic molecular sieves **[3]**

20/20 . . comprising free carbon; comprising carbon obtained by carbonising processes (active carbon C01B 31/08) **[3]**

20/22 . comprising organic material **[3]**

20/24 . . Naturally occurring macromolecular compounds, e.g. humic acids or their derivatives **[3]**

20/26 . . Synthetic macromolecular compounds **[3]**

20/28 . characterised by their form or physical properties **[3]**

20/281 . Sorbents specially adapted for preparative, analytical or investigative chromatography **[8]**

20/282 . . Porous sorbents (ion exchange B01J 39/00 to B01J 41/00) **[8]**

20/283 . . . based on silica **[8]**

20/284 . . . based on alumina **[8]**

20/285 . . . based on polymers **[8]**

20/286 . . Phases chemically bonded to a substrate, e.g. to silica or to polymers **[8]**

20/287 . . . Non-polar phases; Reversed phases **[8]**

20/288 . . . Polar phases **[8]**

20/289 . . . bonded via a spacer **[8]**

20/29 . . Chiral phases **[8]**

20/291 . . Gel sorbents **[8]**

20/292 . . Liquid sorbents **[8]**

20/30 . Processes for preparing, regenerating or reactivating **[3]**

20/32 . . Impregnating or coating **[3]**

20/34 . . Regenerating or reactivating **[3]**

(1) In groups B01J 21/00 to B01J 38/00, the following term is used with the meaning indicated:
– "catalyst" covers also a carrier forming part of the catalyst. **[2,5]**

(2) Classification of the:
– carriers;
– forms or physical properties;
– preparation or activation;

– regeneration or reactivation

of catalysts according to more than one of main groups B01J 21/00 to B01J 31/00 is made in the following general groups:

- B01J 32/00 for such carriers;
- B01J 35/00 for such forms or physical properties;
- B01J 37/00 for such preparation or activation;
- B01J 38/00 for such regeneration or reactivation. **[4,5]**

21/00 Catalysts comprising the elements, oxides or hydroxides of magnesium, boron, aluminium, carbon, silicon, titanium, zirconium or hafnium [2]

21/02 . Boron or aluminium; Oxides or hydroxides thereof **[2]**
21/04 . . Alumina **[2]**
21/06 . Silicon, titanium, zirconium or hafnium; Oxides or hydroxides thereof **[2]**
21/08 . . Silica **[2]**
21/10 . Magnesium; Oxides or hydroxides thereof **[2]**
21/12 . Silica and alumina **[2]**
21/14 . Silica and magnesia **[2]**
21/16 . Clays or other mineral silicates **[2]**
21/18 . Carbon **[2]**
21/20 . Regeneration or reactivation **[2]**

23/00 Catalysts comprising metals or metal oxides or hydroxides, not provided for in group B01J 21/00 (B01J 21/16 takes precedence) **[2]**

23/02 . of the alkali- or alkaline earth metals or beryllium **[2]**
23/04 . . Alkali metals **[2]**
23/06 . of zinc, cadmium or mercury **[2]**
23/08 . of gallium, indium or thallium **[2]**
23/10 . of rare earths **[2]**
23/12 . of actinides **[2]**
23/14 . of germanium, tin or lead **[2]**
23/16 . of arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[2]**
23/18 . . Arsenic, antimony or bismuth **[2]**
23/20 . . Vanadium, niobium or tantalum **[2]**
23/22 . . . Vanadium **[2]**
23/24 . . Chromium, molybdenum or tungsten **[2]**
23/26 . . . Chromium **[2]**
23/28 . . . Molybdenum **[2]**
23/30 . . . Tungsten **[2]**
23/31 . . . combined with bismuth **[3]**
23/32 . . Manganese, technetium or rhenium **[2]**
23/34 . . . Manganese **[2]**
23/36 . . . Rhenium **[2]**
23/38 . of noble metals **[2]**
23/40 . . of the platinum group metals **[2]**
23/42 . . . Platinum **[2]**
23/44 . . . Palladium **[2]**
23/46 . . . Ruthenium, rhodium, osmium or iridium **[2]**
23/48 . . Silver or gold **[2]**
23/50 . . . Silver **[2]**
23/52 . . . Gold **[2]**
23/54 . . combined with metals, oxides or hydroxides provided for in groups B01J 23/02 to B01J 23/36 **[2]**
23/56 . . . Platinum group metals **[2]**
23/58 . . . . with alkali- or alkaline earth metals or beryllium **[2,6]**
23/60 . . . . with zinc, cadmium or mercury **[2]**
23/62 . . . . with gallium, indium, thallium, germanium, tin or lead **[2]**
23/63 . . . . with rare earths or actinides **[6]**
23/64 . . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[2]**
23/644 . . . . . Arsenic, antimony or bismuth **[6]**
23/648 . . . . . Vanadium, niobium or tantalum **[6]**
23/652 . . . . . Chromium, molybdenum or tungsten **[6]**
23/656 . . . . . Manganese, technetium or rhenium **[6]**
23/66 . . . Silver or gold **[2]**
23/68 . . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[2]**
23/70 . of the iron group metals or copper **[2]**
23/72 . . Copper **[2]**
23/74 . . Iron group metals **[2]**
23/745 . . . Iron **[6]**
23/75 . . . Cobalt **[6]**
23/755 . . . Nickel **[6]**
23/76 . . combined with metals, oxides or hydroxides provided for in groups B01J 23/02 to B01J 23/36 **[2]**
23/78 . . . with alkali- or alkaline earth metals or beryllium **[2,6]**
23/80 . . . with zinc, cadmium or mercury **[2]**
23/825 . . . with gallium, indium or thallium **[6]**
23/83 . . . with rare earths or actinides **[6]**
23/835 . . . with germanium, tin or lead **[6]**
23/84 . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[2]**
23/843 . . . . Arsenic, antimony or bismuth **[6]**
23/847 . . . . Vanadium, niobium or tantalum **[6]**
23/85 . . . . Chromium, molybdenum, or tungsten **[3]**
23/86 . . . . . Chromium **[2,3]**
23/88 . . . . . Molybdenum **[2,3]**
23/881 . . . . . and iron **[6]**
23/882 . . . . . and cobalt **[6]**
23/883 . . . . . and nickel **[6]**
23/885 . . . . . and copper **[6]**
23/887 . . . . . containing in addition other metals, oxides or hydroxides provided for in groups B01J 23/02 to B01J 23/36 **[6]**
23/888 . . . . . Tungsten **[6]**
23/889 . . . . Manganese, technetium or rhenium **[6]**
23/89 . . combined with noble metals **[3]**
23/90 . Regeneration or reactivation **[2]**
23/92 . . of catalysts comprising metals, oxides or hydroxides provided for in groups B01J 23/02 to B01J 23/36 **[2]**
23/94 . . of catalysts comprising metals, oxides or hydroxides of the iron group metals or copper **[2]**
23/96 . . of catalysts comprising metals, oxides or hydroxides of the noble metals **[2]**

25/00 Catalysts of the Raney type [2]

25/02 . Raney nickel **[2]**
25/04 . Regeneration or reactivation **[2]**

27/00 Catalysts comprising the elements or compounds of halogens, sulfur, selenium, tellurium, phosphorus or nitrogen; Catalysts comprising carbon compounds [4]

Note

Metal catalysts or metal oxide catalysts activated or conditioned by halogens, sulfur or phosphorus, or compounds thereof are classified in the appropriate groups for metal catalysts or metal oxide catalysts. **[2,5]**

27/02 . Sulfur, selenium or tellurium; Compounds thereof **[4]**
27/04 . . Sulfides **[2]**
27/043 . . . with iron group metals or platinum group metals **[4]**
27/045 . . . . Platinum group metals **[4]**
27/047 . . . with chromium, molybdenum, tungsten or polonium **[4]**
27/049 . . . . with iron group metals or platinum group metals **[4]**
27/051 . . . . Molybdenum **[4]**
27/053 . . Sulfates **[4]**
27/055 . . . with alkali metals, copper, gold or silver **[4]**
27/057 . . Selenium or tellurium; Compounds thereof **[4]**
27/06 . Halogens; Compounds thereof **[4]**
27/08 . . Halides **[2]**
27/10 . . . Chlorides **[2]**
27/12 . . . Fluorides **[2]**
27/122 . . . of copper **[4]**
27/125 . . with scandium, yttrium, aluminium, gallium, indium or thallium **[4]**
27/128 . . with iron group metals or platinum group metals **[4]**
27/13 . . . Platinum group metals **[4]**
27/132 . . with chromium, molybdenum, tungsten or polonium **[4]**
27/135 . . with titanium, zirconium, hafnium, germanium, tin or lead **[4]**
27/138 . . with alkaline earth metals, magnesium, beryllium, zinc, cadmium or mercury **[4]**
27/14 . Phosphorus; Compounds thereof **[4]**
27/16 . . containing oxygen **[2]**
27/18 . . . with metals **[2]**
27/182 . . with silicon **[4]**
27/185 . . with iron group metals or platinum group metals **[4]**
27/186 . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[5]**
27/187 . . . with manganese, technetium or rhenium **[5]**
27/188 . . . with chromium, molybdenum, tungsten or polonium **[4,5]**
27/19 . . . . Molybdenum **[4,5]**
27/192 . . . . . with bismuth **[4,5]**
27/195 . . . with vanadium, niobium or tantalum **[4,5]**
27/198 . . . . Vanadium **[4,5]**
27/199 . . . . . with chromium, molybdenum, tungsten or polonium **[5]**
27/20 . Carbon compounds **[2]**
27/22 . . Carbides **[2]**
27/224 . . . Silicon carbide **[4]**
27/228 . . . . with phosphorus, arsenic, antimony or bismuth **[4]**
27/232 . . Carbonates **[4]**
27/236 . . . Hydroxy carbonates **[4]**
27/24 . Nitrogen compounds **[2]**
27/25 . . Nitrates **[4]**
27/26 . . Cyanides **[2]**
27/28 . Regeneration or reactivation **[2]**
27/30 . . of catalysts comprising compounds of sulfur, selenium or tellurium **[2]**
27/32 . . of catalysts comprising compounds of halogens **[2]**

29/00 Catalysts comprising molecular sieves [2]

Note

In this group, the following term is used with the meaning indicated: **[6]**
– "zeolites" means: **[6]**
(i) crystalline aluminosilicates with base-exchange and molecular sieve properties, having three dimensional, microporous lattice framework structure of tetrahedral oxide units; **[6]**
(ii) compounds isomorphous to those of the former category, wherein the aluminium or silicon atoms in the framework are partly or wholly replaced by atoms of other elements, e.g. by gallium, germanium, phosphorus or boron. **[6]**

29/03 . not having base-exchange properties **[6]**
29/035 . . Crystalline silica polymorphs, e.g. silicalites **[6]**
29/04 . having base-exchange properties, e.g. crystalline zeolites, pillared clays **[2,6]**
29/06 . . Crystalline aluminosilicate zeolites; Isomorphous compounds thereof **[2]**
29/064 . . . containing iron group metals, noble metals or copper **[6]**
29/068 . . . . Noble metals **[6]**
29/072 . . . . Iron group metals or copper **[6]**
29/076 . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[6]**
29/08 . . . of the faujasite type, e.g. type X or Y **[2]**
29/10 . . . . containing iron group metals, noble metals or copper **[2]**
29/12 . . . . . Noble metals **[2]**
29/14 . . . . . Iron group metals or copper **[2]**
29/16 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[2]**
29/18 . . . of the mordenite type **[2]**
29/20 . . . . containing iron group metals, noble metals or copper **[2]**
29/22 . . . . . Noble metals **[2]**
29/24 . . . . . Iron group metals or copper **[2]**
29/26 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[2]**
29/40 . . . of the pentasil type, e.g. types ZSM-5, ZSM-8 or ZSM-11 **[6]**
29/42 . . . . containing iron group metals, noble metals or copper **[6]**
29/44 . . . . . Noble metals **[6]**
29/46 . . . . . Iron group metals or copper **[6]**

29/48 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[6]**
29/50 . . . of the erionite or offretite type, e.g. zeolite T **[6]**
29/52 . . . . containing iron group metals, noble metals or copper **[6]**
29/54 . . . . . Noble metals **[6]**
29/56 . . . . . Iron group metals or copper **[6]**
29/58 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[6]**
29/60 . . . of the type L **[6]**
29/61 . . . . containing iron group metals, noble metals or copper **[6]**
29/62 . . . . . Noble metals **[6]**
29/63 . . . . . Iron group metals or copper **[6]**
29/64 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[6]**
29/65 . . . of the ferrierite type, e.g. types ZSM-21, ZSM-35 or ZSM-38 **[6]**
29/66 . . . . containing iron group metals, noble metals or copper **[6]**
29/67 . . . . . Noble metals **[6]**
29/68 . . . . . Iron group metals or copper **[6]**
29/69 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[6]**
29/70 . . . of types characterised by their specific structure not provided for in groups B01J 29/08 to B01J 29/65 **[6]**
29/72 . . . . containing iron group metals, noble metals or copper **[6]**
29/74 . . . . . Noble metals **[6]**
29/76 . . . . . Iron group metals or copper **[6]**
29/78 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium **[6]**
29/80 . . . Mixtures of different zeolites **[6]**
29/82 . Phosphates **[6]**
29/83 . . Aluminophosphates (APO compounds) **[6]**
29/84 . . Aluminophosphates containing other elements, e.g. metals, boron **[6]**
29/85 . . . Silicoaluminophosphates (SAPO compounds) **[6]**
29/86 . Borosilicates; Aluminoborosilicates **[6]**
29/87 . Gallosilicates; Aluminogallosilicates; Galloborosilicates **[6]**
29/88 . Ferrosilicates; Ferroaluminosilicates **[6]**
29/89 . Silicates, aluminosilicates or borosilicates of titanium, zirconium or hafnium **[6]**
29/90 . Regeneration or reactivation **[6]**

31/00 Catalysts comprising hydrides, coordination complexes or organic compounds (catalyst compositions used only in polymerisation reactions C08) **[2]**

Note

In this group, the presence of water is disregarded for classification purposes. **[2]**

31/02 . containing organic compounds or metal hydrides **[2]**
31/04 . . containing carboxylic acids or their salts **[2]**
31/06 . . containing polymers **[2]**
31/08 . . . Ion-exchange resins **[2]**
31/10 . . . . sulfonated **[2]**
31/12 . . containing organo-metallic compounds or metal hydrides **[2]**
31/14 . . . of aluminium or boron **[2]**
31/16 . containing coordination complexes **[2]**
31/18 . . containing nitrogen, phosphorus, arsenic or antimony **[2]**
31/20 . . Carbonyls **[2]**
31/22 . . Organic complexes **[2]**
31/24 . . Phosphines **[2]**
31/26 . containing in addition, inorganic metal compounds not provided for in groups B01J 31/02 to B01J 31/24 **[2]**
31/28 . . of the platinum group metals, iron group metals or copper **[2]**
31/30 . . . Halides **[2]**
31/32 . . of manganese, technetium or rhenium **[2]**
31/34 . . of chromium, molybdenum or tungsten **[2]**
31/36 . . of vanadium, niobium or tantalum **[2]**
31/38 . . of titanium, zirconium or hafnium **[2]**
31/40 . Regeneration or reactivation **[2]**

(1) When classifying in groups B01J 32/00 to B01J 38/00, any part of a catalyst that is not identified by this classification, and which itself is determined to be novel and non-obvious, must also be classified in groups B01J 21/00 to B01J 31/00. Such a part of a catalyst can be either a single substance or a composition in itself. **[6,8]**

(2) Any part of a catalyst which is not identified by the classification according to Note (1) above, and which is considered to represent information of interest for search, may also be classified. This can, for example, be the case when it is considered of interest to enable searching of catalysts using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. **[8]**

32/00 Catalyst carriers in general [4]

33/00 Protection of catalysts, e.g. by coating [2]

35/00 Catalysts, in general, characterised by their form or physical properties [2]

35/02 . Solids **[2]**
35/04 . . Foraminous structures, sieves, grids, honeycombs **[2]**
35/06 . . Fabrics or filaments **[2]**
35/08 . . Spheres **[2]**

35/10 . . characterised by their surface properties or porosity **[2]**
35/12 . Liquids or melts **[2]**

37/00 Processes, in general, for preparing catalysts; **Processes, in general, for activation of catalysts [4]**
37/02 . Impregnation, coating or precipitation (protecting by coating B01J 33/00) **[2]**
37/025 . . using a distinct intermediate layer, e.g. substrate-support-active layer **[6]**
37/03 . . Precipitation; Co-precipitation **[4]**
37/04 . Mixing **[2]**
37/06 . Washing **[2]**
37/08 . Heat treatment **[2]**
37/10 . . in the presence of water, e.g. steam **[2]**
37/12 . Oxidising **[2]**
37/14 . . with gases containing free oxygen **[2]**
37/16 . Reducing **[2]**
37/18 . . with gases containing free hydrogen **[2]**
37/20 . Sulfiding **[2]**
37/22 . Halogenating **[2]**
37/24 . . Chlorinating **[2]**
37/26 . . Fluorinating **[2]**
37/28 . Phosphorising **[2]**
37/30 . Ion-exchange **[2]**
37/32 . Freeze drying, i.e. lyophilisation **[2]**
37/34 . Irradiation by, or application of, electric, magnetic or wave energy, e.g. ultrasonic waves **[2]**
37/36 . Biochemical methods **[2]**

38/00 Regeneration or reactivation of catalysts, in general [4]
38/02 . Heat treatment **[4]**
38/04 . Gas or vapour treating; Treating by using liquids vaporisable upon contacting spent catalyst **[4]**
38/06 . . using steam **[4]**
38/08 . . using ammonia or derivatives thereof **[4]**
38/10 . . using elemental hydrogen **[4]**
38/12 . . Treating with free oxygen-containing gas **[4]**
38/14 . . . with control of oxygen content in oxidation gas **[4]**
38/16 . . . Oxidation gas comprising essentially steam and oxygen **[4]**
38/18 . . . with subsequent reactive gas treating **[4]**
38/20 . . . Plural distinct oxidation stages **[4]**
38/22 . . . Moving bed, e.g. vertically or horizontally moving bulk **[4]**
38/24 . . . . having mainly transverse, i.e. lateral, flow of oxygen-containing gas and material **[4]**
38/26 . . . . having mainly counter-current flow of oxygen-containing gas and material **[4]**
38/28 . . . . having mainly concurrent flow of oxygen-containing gas and material **[4]**
38/30 . . . in gaseous suspension, e.g. fluidised bed **[4]**
38/32 . . . . Indirectly heating or cooling material within regeneration zone or prior to entry into regeneration zone **[4]**
38/34 . . . . with plural distinct serial combustion stages **[4]**
38/36 . . . . and with substantially complete oxidation of carbon monoxide to carbon dioxide within regeneration zone **[4]**
38/38 . . . and adding heat by solid heat carrier **[4]**
38/40 . . . and forming useful by-products **[4]**
38/42 . . using halogen-containing material **[4]**
38/44 . . . and adding simultaneously or subsequently free oxygen; using oxyhalogen compound **[4]**
38/46 . . . fluorine-containing **[4]**
38/48 . Liquid treating or treating in liquid phase, e.g. dissolved or suspended **[4]**
38/50 . . using organic liquids **[4]**
38/52 . . . oxygen-containing **[4]**
38/54 . . . halogen-containing **[4]**
38/56 . . . Hydrocarbons **[4]**
38/58 . . . and gas addition thereto **[4]**
38/60 . . using acids **[4]**
38/62 . . . organic **[4]**
38/64 . . using alkaline material; using salts **[4]**
38/66 . . . using ammonia or derivatives thereof **[4]**
38/68 . . including substantial dissolution or chemical precipitation of a catalyst component in the ultimate reconstitution of the catalyst **[4]**
38/70 . . Wet oxidation of material submerged in liquid **[4]**
38/72 . including segregation of diverse particles **[4]**
38/74 . utilising ion-exchange **[4]**

Ion-exchange [3]

(1) In groups B01J 39/00 to B01J 49/00:
– ion-exchange covers all processes whereby ions are exchanged between the solid exchanger and the liquid to be treated and wherein the exchanger is not soluble in the liquid to be treated; **[3]**
– ion-exchange processes cover also ion-exchange in combination with complex or chelate forming reactions. **[3]**

(2) In groups B01J 39/00 to B01J 49/00, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[3]**

39/00 Cation exchange; **Use of material as cation exchangers**; **Treatment of material for improving the cation exchange properties** (ion-exchange chromatography processes B01D 15/36) **[3,8]**
39/02 . Processes using inorganic exchangers **[3]**
39/04 . Processes using organic exchangers **[3]**
39/08 . Use of material as cation exchangers; Treatment of material for improving the cation exchange properties **[3]**
39/10 . . Oxides or hydroxides **[3]**
39/12 . . Compounds containing phosphorus **[3]**
39/14 . . Base exchange silicates, e.g. zeolites **[3]**
39/16 . . Organic material **[3]**
39/18 . . . Macromolecular compounds **[3]**
39/20 . . . . Macromolecular compounds obtained by reactions only involving unsaturated carbon-to-carbon bonds **[3]**
39/22 . . . . Cellulose or wood; Derivatives thereof **[3]**
39/24 . . Carbon, coal or tar **[3]**
39/26 . Cation exchangers for chromatographic processes **[8]**

41/00 Anion exchange; **Use of material as anion exchangers**; **Treatment of material for improving the anion exchange properties** (ion-exchange chromatography processes B01D 15/36) **[3,8]**
41/02 . Processes using inorganic exchangers **[3]**
41/04 . Processes using organic exchangers **[3]**
41/08 . Use of material as anion exchangers; Treatment of material for improving the anion exchange properties **[3]**

41/10 . . Inorganic material (carbon, coal or tar B01J 41/18) **[3]**

41/12 . . Macromolecular compounds **[3]**

41/14 . . . Macromolecular compounds obtained by reactions only involving unsaturated carbon-to-carbon bonds **[3]**

41/16 . . . Cellulose or wood; Derivatives thereof **[3]**

41/18 . . Carbon, coal or tar **[3]**

41/20 . Anion exchangers for chromatographic processes **[8]**

43/00 **Amphoteric ion-exchange, i.e. using ion-exchangers having cationic and anionic groups**; **Use of material as amphoteric ion-exchangers**; **Treatment of material for improving their amphoteric ion-exchange properties** (ion-exchange chromatography processes B01D 15/36) **[3,8]**

45/00 **Ion-exchange in which a complex or a chelate is formed**; **Use of material as complex or chelate forming ion-exchangers**; **Treatment of material for improving the complex or chelate forming ion-exchange properties** (ion-exchange chromatography processes B01D 15/36) **[3,8]**

47/00 **Ion-exchange processes in general**; **Apparatus therefor** (ion-exchange chromatography processes or apparatus B01D 15/08) **[3,8]**

47/02 . Column or bed processes **[3]**

47/04 . . Mixed-bed processes **[3]**

47/06 . . during which the ion-exchange material is subjected to a physical treatment, e.g. heat, electric current, irradiation, vibration (electrodialysis, electro-osmosis B01D 61/42) **[3]**

47/08 . . . subjected to a direct electric current **[3]**

47/10 . with moving ion-exchange material; with ion-exchange material in suspension or in fluidised-bed form **[3]**

47/12 . characterised by the use of ion-exchange material in the form of sheets, ribbons or filaments, e.g. membranes (electrodialysis, electro-osmosis B01D 61/42) **[3]**

47/14 . Controlling or regulating **[3]**

49/00 **Regeneration or reactivation of ion-exchangers**; **Apparatus therefor** (ion-exchange chromatography processes or apparatus B01D 15/08) **[3,8]**

49/02 . having devices which prevent back-flow of the ion-exchange mass during regenerating **[3]**

B01L **CHEMICAL OR PHYSICAL LABORATORY APPARATUS FOR GENERAL USE** (apparatus for medical or pharmaceutical purposes A61; apparatus for industrial purposes or laboratory apparatus whose construction and performance are comparable to that of similar industrial apparatus, see the relevant classes for industrial apparatus, particularly subclasses of B01 and C12; separating or distilling apparatus B01D; mixing or stirring devices B01F; atomisers B05B; sieves B07B; corks, bungs B65D; handling liquids in general B67; vacuum pumps F04; siphons F04F 10/00; taps, stop-cocks F16K; tubes, tube joints F16L; apparatus specially adapted for investigating or analysing materials G01, particularly G01N; electrical or optical apparatus, see the relevant classes in sections G and H)

Note

This subclass covers only laboratory apparatus which is either applicable solely to laboratory purposes or which, by reason of its simple construction and adaptability, is such as would not be suitable for industrial use.

1/00 **Enclosures**; **Chambers** (fume cupboards B08B; provided with manipulation devices, glove boxes B25J; cooling chambers F25D)

1/02 . Air-pressure chambers; Air-locks therefor

1/04 . Dust-free rooms or enclosures

3/00 **Containers or dishes for laboratory use, e.g. laboratory glassware** (bottles B65D; apparatus for enzymology or microbiology C12M 1/00); **Droppers** (receptacles for volumetric purposes G01F)

3/02 . Burettes; Pipettes

3/04 . Crucibles

3/06 . Crystallising dishes

3/08 . Flasks (specially adapted for distillation B01D)

3/10 . Wash bottles

3/12 . Gas jars or cylinders

3/14 . Test tubes

3/16 . Retorts

3/18 . Spatulas

5/00 **Gas handling apparatus** (gas jars or cylinders B01L 3/12; cold traps, cold baffles B01D 8/00; separation of gases or vapours B01D 53/00; gas generators B01J 7/00; steam traps F16T)

5/02 . Gas collection apparatus, e.g. by bubbling under water (for sampling G01N)

5/04 . Gas washing apparatus, e.g. by bubbling

7/00 **Heating or cooling apparatus** (evaporators B01D 1/00; drying gases or vapours, e.g. desiccators, B01D 53/26; autoclaves B01J 3/04; drying ovens F26B; furnaces, ovens F27); **Heat insulating devices [3]**

7/02 . Water baths; Sand baths; Air baths

7/04 . Heat insulating devices, e.g. jackets for flasks **[2010.01]**

9/00 **Supporting devices**; **Holding devices** (tweezers, tongs B25B)

9/02 . Laboratory benches or tables; Fittings therefor

9/04 . Retort stands; Retort clamps

9/06 . Test-tube stands; Test-tube holders

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

B02 CRUSHING, PULVERISING, OR DISINTEGRATING; PREPARATORY TREATMENT OF GRAIN FOR MILLING

B02B PREPARING GRAIN FOR MILLING; REFINING GRANULAR FRUIT TO COMMERCIAL PRODUCTS BY WORKING THE SURFACE (making dough from cereals directly A21C; preservation or sterilisation of cereals A23B; cleaning fruit A23N; preparation of malt C12C)

1/00 **Preparing grain for milling or like processes** (hulling, husking, decorticating, polishing, removing the awns, or degerming B02B 3/00)
1/02 . Dry treatment (sifting or sorting in general B07)
1/04 . Wet treatment, e.g. washing, wetting, softening
1/06 . . Devices with rotary parts
1/08 . Conditioning grain with respect to temperature or water content (air conditioning or ventilating of silos F24F; drying apparatus F26B; hygrometers G01N)

3/00 **Hulling**; **Husking**; **Decorticating** (decorticating textile fibres D01B 1/14); **Polishing**; **Removing the awns** (in threshing machines A01F 12/42); **Degerming**
3/02 . by means of discs
3/04 . by means of rollers
3/06 . by means of screws or worms
3/08 . by means of beaters or blades
3/10 . by means of brushes
3/12 . by means of fluid
3/14 . Producing flour or meal directly

5/00 **Grain treatment not otherwise provided for**
5/02 . Combined processes

7/00 **Auxiliary devices**
7/02 . Feeding or discharging devices

B02C CRUSHING, PULVERISING, OR DISINTEGRATING IN GENERAL; MILLING GRAIN (obtaining metallic powder by crushing, grinding or milling B22F 9/04)

Subclass index

1/00 **Crushing or disintegrating by reciprocating members**
1/02 . Jaw crushers or pulverisers
1/04 . . with single-acting jaws
1/06 . . with double-acting jaws
1/08 . . with jaws coacting with a rotating roller
1/10 . . Shape or construction of jaws
1/12 . Mills with non-rotating spiked members
1/14 . Stamping mills

2/00 **Crushing or disintegrating by gyratory or cone crushers**
2/02 . eccentrically moved
2/04 . . with vertical axis
2/06 . . . and with top bearing
2/08 . . with horizontal axis
2/10 . concentrically moved; Bell crushers

4/00 **Crushing or disintegrating by roller mills** (with milling members in the form of rollers or balls co-operating with rings or discs B02C 15/00; roller mills or roll refiners exclusively for chocolate A23G 1/10, A23G 1/12)
4/02 . with two or more rollers
4/04 . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
4/06 . . specially adapted for milling grain
4/08 . . with co-operating corrugated or toothed crushing-rollers
4/10 . with a roller co-operating with a stationary member
4/12 . . in the form of a plate
4/14 . . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
4/16 . . . specially adapted for milling grain
4/18 . . in the form of a bar
4/20 . . . wherein the roller is corrugated or toothed
4/22 . . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
4/24 . . . specially adapted for milling grain
4/26 . . in the form of a grid or grating
4/28 . Details
4/30 . . Shape or construction of rollers
4/32 . . Adjusting, applying pressure to, or controlling the distance between, milling members
4/34 . . . in mills wherein a roller co-operates with a stationary member
4/36 . . . in mills specially adapted for paste-like materials

4/38 . . . in grain mills
4/40 . . Detachers, e.g. scrapers
4/42 . . Driving mechanisms; Roller speed control
4/44 . . Cooling or heating rollers or bars

7/00 Crushing or disintegrating by disc mills (apparatus specially adapted for manufacture or treatment of cocoa or cocoa products exclusively A23G 1/04)
7/02 . with coaxial discs
7/04 . . with concentric circles of intermeshing teeth
7/06 . . with horizontal axis (B02C 7/04 takes precedence)
7/08 . . with vertical axis (B02C 7/04 takes precedence)
7/10 . with eccentric discs
7/11 . Details
7/12 . . Shape or construction of discs
7/13 . . . for grain mills
7/14 . . Adjusting, applying pressure to, or controlling distance between, discs
7/16 . . Driving mechanisms
7/17 . . Cooling or heating of discs
7/175 . Disc mills specially adapted for paste-like material, e.g. paint, chocolate, colloids
7/18 . Disc mills specially adapted for grain

9/00 Other milling methods or mills specially adapted for grain
9/02 . Cutting or splitting grain
9/04 . Systems or sequences of operations; Plant

11/00 Other auxiliary devices or accessories specially adapted for grain mills
11/02 . Breaking up amassed particles, e.g. flakes
11/04 . Feeding devices
11/06 . Arrangements for preventing fire or explosion (methods for preventing or extinguishing fires, devices therefor A62C)
11/08 . Cooling, heating, ventilating, conditioning with respect to temperature or water content (conditioning grain before milling B02B 1/08; air-conditioning or ventilating in general F24F)

13/00 Disintegrating by mills having rotary beater elements
13/02 . with horizontal rotor shaft (with axial flow B02C 13/10)
13/04 . . with beaters hinged to the rotor; Hammer mills
13/06 . . with beaters rigidly connected to the rotor
13/08 . . . and acting as a fan
13/09 . . . and throwing the material against an anvil or impact plate
13/10 . with horizontal rotor shaft and axial flow
13/12 . . with vortex chamber
13/13 . with horizontal rotor shaft and combined with sifting devices, e.g. for making powdered fuel
13/14 . with vertical rotor shaft, e.g. combined with sifting devices
13/16 . . with beaters hinged to the rotor
13/18 . . with beaters rigidly connected to the rotor
13/20 . with two or more co-operating rotors
13/22 . with intermeshing pins
13/24 . . arranged around a vertical axis
13/26 . Details
13/28 . . Shape or construction of beater elements
13/282 . . Shape or inner surface of mill-housings
13/284 . . . Built-in screens
13/286 . . Feeding or discharge
13/288 . . Ventilating, or influencing air circulation
13/30 . . Driving mechanisms
13/31 . . Safety devices or measures

15/00 Disintegrating by milling members in the form of rollers or balls co-operating with rings or discs
15/02 . Centrifugal pendulum-type mills
15/04 . Mills with pressed pendularly-mounted rollers, e.g. spring pressed **[4]**
15/06 . Mills with rollers forced against the interior of a rotary ring, e.g. under spring action (B02C 15/04 takes precedence) **[4]**
15/08 . Mills with balls or rollers centrifugally forced against the inner surface of a ring, the balls or rollers of which are driven by a centrally arranged member (B02C 15/02 takes precedence)
15/10 . Mills with balls or rollers centrifugally forced against the inner surface of a ring, the balls or rollers of which are driven by other means than a centrally-arranged member
15/12 . Mills with at least two discs and interposed balls or rollers mounted like ball or roller bearings **[4]**
15/14 . Edge runners, e.g. Chile mills
15/16 . with milling members essentially having different peripheral speeds and in the form of a hollow cylinder or cone and an internal roller or cone

17/00 Disintegrating by tumbling mills, i.e. mills having a container charged with the material to be disintegrated with or without special disintegrating members such as pebbles or balls (high-speed drum mills B02C 19/11)
17/02 . with perforated container
17/04 . with unperforated container
17/06 . . with several compartments
17/07 . . . in radial arrangement
17/08 . . with containers performing a planetary movement
17/10 . with one or a few disintegrating members arranged in the container
17/14 . Mills in which the charge to be ground is turned over by movements of the container other than by rotating, e.g. by swinging, vibrating, tilting
17/16 . Mills in which a fixed container houses stirring means tumbling the charge
17/18 . Details
17/20 . . Disintegrating members
17/22 . . Lining for containers
17/24 . . Driving mechanisms

18/00 Disintegrating by knives or other cutting or tearing members which chop material into fragments (slicing B26D); **Mincing machines or similar apparatus using worms or the like** (machines for domestic use not covered otherwise A47J 43/04; multi-purpose machines for preparing food A47J 44/00)
18/02 . with reciprocating knives
18/04 . . Details
18/06 . with rotating knives
18/08 . . within vertical containers
18/10 . . . with drive arranged above container
18/12 . . . with drive arranged below container
18/14 . . within horizontal containers
18/16 . . Details
18/18 . . . Knives; Mountings thereof
18/20 . . . . Sickle-shaped knives
18/22 . . . Feed or discharge means
18/24 . . . Drives
18/26 . with knives which both reciprocate and rotate

18/28 . with spiked cylinders
18/30 . Mincing machines with perforated discs and feeding worms
18/32 . . with sharpening devices
18/34 . . with means for cleaning the perforated discs
18/36 . . Knives or perforated discs
18/38 . . Drives

19/00 Other disintegrating devices or methods (for grain B02C 9/00)
19/06 . Jet mills
19/08 . Pestle and mortar
19/10 . Mills in which a friction block is towed along the surface of a cylindrical or annular member
19/11 . High-speed drum mills (for separating B04B)
19/16 . Mills provided with vibrators (tumbling mills B02C 17/14)
19/18 . Use of auxiliary physical effects, e.g. ultrasonics, irradiation, for disintegrating
19/20 . Disintegrating by grating
19/22 . Crushing mills with screw-shaped crushing means

21/00 Disintegrating plant with or without drying of the material (for grain B02C 9/04)
21/02 . Transportable disintegrating plant

23/00 Auxiliary methods or auxiliary devices or accessories specially adapted for crushing or disintegrating not provided for in groups B02C 1/00 to B02C 21/00 or not specially adapted to apparatus covered by one only of groups B02C 1/00 to B02C 21/00 (separating or sorting in general B03, B04, B07)
23/02 . Feeding devices (transport devices in general B65G)
23/04 . Safety devices (in general F16P)
23/06 . Selection or use of additives to aid disintegrating
23/08 . Separating or sorting of material, associated with crushing or disintegrating (B02C 23/18 takes precedence) **[2]**
23/10 . . with separator arranged in discharge path of crushing or disintegrating zone **[2]**
23/12 . . . with return of oversize material to crushing or disintegrating zone **[2]**
23/14 . . with more than one separator **[2]**
23/16 . . with separator defining termination of crushing or disintegrating zone, e.g. screen denying egress of oversize material **[2]**
23/18 . Adding fluid, other than for crushing or disintegrating by fluid energy (feeding devices B02C 23/02) **[2]**
23/20 . . after crushing or disintegrating **[2]**
23/22 . . . with recirculation of material to crushing or disintegrating zone **[2]**
23/24 . . Passing gas through crushing or disintegrating zone (B02C 23/38, B02C 23/40 take precedence) **[2]**
23/26 . . . characterised by point of gas entry or exit or by gas flow path **[2]**
23/28 . . . gas moving means being integral with, or attached to, crushing or disintegrating element **[2]**
23/30 . . . the applied gas acting to effect material separation (B02C 23/34 takes precedence) **[2]**
23/32 . . . with return of oversize material to crushing or disintegrating zone (B02C 23/34 takes precedence) **[2]**
23/34 . . . gas being recirculated to crushing or disintegrating zone **[2]**
23/36 . . the crushing or disintegrating zone being submerged in liquid **[2]**
23/38 . . in apparatus having multiple crushing or disintegrating zones **[2]**
23/40 . . with more than one means for adding fluid to the material being crushed or disintegrated **[2]**

25/00 Control arrangements specially adapted for crushing or disintegrating

B03 SEPARATION OF SOLID MATERIALS USING LIQUIDS OR USING PNEUMATIC TABLES OR JIGS; MAGNETIC OR ELECTROSTATIC SEPARATION OF SOLID MATERIALS FROM SOLID MATERIALS OR FLUIDS; SEPARATION BY HIGH-VOLTAGE ELECTRIC FIELDS [5]

B03B SEPARATING SOLID MATERIALS USING LIQUIDS OR USING PNEUMATIC TABLES OR JIGS (removing fluids from solids B01D; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high voltage electric fields B03C; flotation, differential sedimentation B03D; separating by dry methods B07; screening or sifting B07B; by picking B07C; separating peculiar to particular materials and provided for in other single classes, see the relevant classes)

Subclass index

1/00 Conditioning for facilitating separation by altering physical properties of the matter to be treated (pretreatment of ores in general C22B)

1/02 . Preparatory heating
1/04 . by additives
1/06 . by varying ambient atmospheric pressure

4/00 Separating by pneumatic tables or by pneumatic jigs (sink-float separation using dry heavy media B03B 5/46) **[2]**

4/02 . using swinging or shaking tables **[6]**
4/04 . using rotary tables or tables formed by travelling belts (separating solids from solids using gas currents and revolving drums B07B 4/06) **[6]**
4/06 . using fixed and inclined tables **[6]**

5/00 Washing granular, powdered or lumpy materials; Wet separating (separating by pneumatic tables or by pneumatic jigs B03B 4/00) **[2]**

5/02 . using shaken, pulsated or stirred beds as the principal means of separation (B03B 5/28, B03B 5/48 take precedence) **[2]**
5/04 . . on shaking tables (on vanners B03B 5/08) **[2]**
5/06 . . . Constructional details of shaking tables, e.g. riffling **[2]**
5/08 . . on vanners **[2]**
5/10 . . on jigs **[2]**
5/12 . . . using pulses generated mechanically in fluid **[2]**
5/14 . . . . Plunger jigs **[2]**
5/16 . . . . Diaphragm jigs **[2]**
5/18 . . . . Moving-sieve jigs **[2]**
5/20 . . . using pulses generated by air injection **[2]**
5/22 . . . using pulses generated by liquid injection **[2]**
5/24 . . . Constructional details of jigs, e.g. pulse control devices **[2]**
5/26 . . in sluices **[2]**
5/28 . by sink-float separation **[2]**
5/30 . . using heavy liquids or suspensions **[2]**
5/32 . . . using centrifugal force (centrifuges B04B; cyclones B04C) **[2]**
5/34 . . . . Applications of hydrocyclones **[2]**
5/36 . . . Devices therefor, other than using centrifugal force (jigs B03B 5/10) **[2]**
5/38 . . . . of conical receptacle type **[2]**
5/40 . . . . of trough type **[2]**
5/42 . . . . of drum or lifting wheel type **[2]**
5/44 . . . Application of particular media therefor **[2]**
5/46 . . using dry heavy media; Devices therefor **[2]**
5/48 . by mechanical classifiers (sink-float separation aspects B03B 5/28) **[2]**
5/50 . . Rake classifiers **[2]**
5/52 . . Spiral classifiers **[2]**
5/54 . . Drag classifiers **[2]**
5/56 . . Drum classifiers **[2]**
5/58 . . Bowl classifiers **[2]**
5/60 . by non-mechanical classifiers, e.g. slime tanks (using shaken, pulsated or stirred beds as the principal means of separation B03B 5/02; hydraulic classifiers B03B 5/62; water impulse classifiers B03B 5/68) **[2]**
5/62 . by hydraulic classifiers, e.g. of launder, tank, spiral or helical chute concentrator type **[2]**
5/64 . . of the free settling type **[2]**
5/66 . . of the hindered settling type **[2]**
5/68 . by water impulse (shaking tables B03B 5/04; jigs B03B 5/10; hydraulic classifiers B03B 5/62) **[2]**
5/70 . . on tables or strakes **[2]**
5/72 . . . which are movable **[2]**
5/74 . . . . Revolving tables **[2]**

7/00 Combinations of wet processes or apparatus with other processes or apparatus, e.g. for dressing ores or garbage

9/00 General arrangement of separating plant, e.g. flow sheets

9/02 . specially adapted for oil-sand, oil-chalk, oil-shales, ozokerite, bitumen, or the like
9/04 . specially adapted for furnace residues, smeltings, or foundry slags
9/06 . specially adapted for refuse

11/00 Feed or discharge devices integral with washing or wet-separating equipment (filling or emptying devices per se B65G 65/30)

13/00 Control arrangements specially adapted for wet-separating apparatus or for dressing plant, using physical effects (detecting, measuring, or analysing devices G01)

13/02 . using optical effects
13/04 . using electrical or electromagnetic effects
13/06 . using absorption or reflection of radioactive emanation

B03C MAGNETIC OR ELECTROSTATIC SEPARATION OF SOLID MATERIALS FROM SOLID MATERIALS OR FLUIDS; SEPARATION BY HIGH-VOLTAGE ELECTRIC FIELDS (filters making use of electricity or magnetism B01D 35/06; separating isotopes B01D 59/00; combinations of magnetic or electrostatic separation with separation of solids by other means B03B, B07B; separating sheets from piles B65H 3/00; magnets or magnet coils per se H01F) **[5]**

1/00 Magnetic separation

1/005 . Pretreatment specially adapted for magnetic separation **[6]**
1/01 . . by addition of magnetic adjuvants **[6]**
1/015 . . by chemical treatment imparting magnetic properties to the material to be separated, e.g. roasting, reduction, oxidation **[6]**
1/02 . acting directly on the substance being separated **[5]**
1/021 . . Separation using Meissner effect, i.e. deflection of superconductive particles in a magnetic field **[6]**
1/023 . . Separation using Lorentz force, i.e. deflection of electrically charged particles in a magnetic field **[6]**
1/025 . . High gradient magnetic separators **[5]**
1/027 . . . with reciprocating canisters **[6]**
1/029 . . . with circulating matrix or matrix elements (matrix elements B03C 1/034) **[6]**
1/03 . . . . rotating, e.g. of the carousel type **[5,6]**
1/031 . . . Component parts; Auxiliary operations **[6]**
1/032 . . . . Matrix cleaning systems **[6]**
1/033 . . . . characterised by the magnetic circuit **[6]**
1/034 . . . . . characterised by the matrix elements **[6]**
1/035 . . Open gradient magnetic separators, i.e. separators in which the gap is unobstructed, characterised by the configuration of the gap **[5]**
1/0355 . . . using superconductive coils **[6]**
1/04 . . with the material carriers in the form of trays or with tables
1/06 . . . with magnets moving during operation
1/08 . . . with non-movable magnets
1/10 . . with cylindrical material carriers (B03C 1/247 takes precedence) **[6]**
1/12 . . . with magnets moving during operation; with movable pole pieces
1/14 . . . with non-movable magnets
1/16 . . with material carriers in the form of belts
1/18 . . . with magnets moving during operation
1/20 . . . . in the form of belts, e.g. cross-belt type
1/22 . . . with non-movable magnets
1/23 . . with material carried by oscillating fields; with material carried by travelling fields, e.g. generated by stationary magnetic coils; Eddy-current separators, e.g. sliding ramp **[5]**
1/24 . . . with material carried by travelling fields **[5]**
1/247 . . . . obtained by a rotating magnetic drum **[6]**
1/253 . . . . obtained by a linear motor **[6]**
1/26 . . with free falling material (B03C 1/035 takes precedence) **[5]**
1/28 . . Magnetic plugs and dipsticks
1/30 . . Combinations with other devices, not otherwise provided for
1/32 . acting on the medium containing the substance being separated, e.g. magneto-gravimetric-, magnetohydrostatic-, or magnetohydrodynamic separation **[5]**

3/00 Separating dispersed particles from gases or vapour, e.g. air, by electrostatic effect (exhaust or silencing apparatus for machines or engines having means for removing solid constituents of exhaust, using electric or electrostatic separators F01N 3/01)

3/01 . Pretreatment of the gases prior to electrostatic precipitation
3/011 . . Prefiltering; Flow controlling **[6]**
3/013 . . Conditioning by chemical additives, e.g. with SO_3 **[6]**
3/014 . . Addition of water; Heat exchange, e.g. by condensation **[6]**
3/016 . . by acoustic or electromagnetic energy, e.g. ultra-violet light **[6]**
3/017 . Combinations of electrostatic separation with other processes, not otherwise provided for **[6]**
3/019 . Post-treatment of gases **[6]**
3/02 . Plant or installations having external electricity supply (electrode constructions B03C 3/40)
3/04 . . dry type
3/06 . . . characterised by presence of stationary tube electrodes
3/08 . . . characterised by presence of stationary flat electrodes arranged with their flat surfaces parallel to the gas stream
3/09 . . . characterised by presence of stationary flat electrodes arranged with their flat surfaces at right angles to the gas stream
3/10 . . . characterised by presence of electrodes moving during separating action
3/12 . . . characterised by separation of ionising and collecting stations
3/14 . . . characterised by the additional use of mechanical effects, e.g. gravity (B03C 3/32 takes precedence)
3/145 . . . . Inertia **[6]**
3/15 . . . . Centrifugal forces **[6]**
3/155 . . . . Filtration **[6]**
3/16 . . wet type
3/28 . Plant or installations without electricity supply, e.g. using electrets
3/30 . . in which electrostatic charge is generated by passage of the gases, i.e. tribo-electricity
3/32 . Transportable units, e.g. for cleaning room air (room air-conditioners having an electrostatic separating stage F24F)
3/34 . Constructional details or accessories or operation thereof
3/36 . . Controlling flow of gases or vapour
3/38 . . Particle charging or ionising stations, e.g. using electric discharge, radioactive radiation, flames (electrode constructions B03C 3/40; ionising gases H05H)
3/40 . . Electrode constructions
3/41 . . . Ionising-electrodes
3/43 . . . . radioactive
3/45 . . . Collecting-electrodes
3/47 . . . . flat, e.g. plates, discs, gratings
3/49 . . . . tubular

3/51 . . . . Catch-space electrodes, e.g. slotted-box form
3/53 . . . . Liquid, or liquid-film, electrodes
3/60 . . . Use of special materials other than liquids
3/62 . . . . ceramics
3/64 . . . . synthetic resins
3/66 . . Applications of electricity supply techniques
3/68 . . . Control systems therefor
3/70 . . . insulating in electric separators (B03C 3/53 takes precedence)
3/72 . . Emergency control systems
3/74 . . Cleaning the electrodes
3/76 . . . by using a mechanical vibrator, e.g. rapping gear
3/78 . . . by washing
3/80 . . . by gas or solid particle blasting
3/82 . . Housings
3/84 . . . Protective coatings
3/86 . . Electrode-carrying means (B03C 3/40 takes precedence)
3/88 . . Cleaning-out collected particles

5/00 **Separating dispersed particles from liquids by electrostatic effect** (combined with centrifuges B04B 5/10) **[2]**
5/02 . Separators

7/00 **Separating solids from solids by electrostatic effect**
7/02 . Separators
7/04 . . with material carriers in the form of trays, troughs, or tables
7/06 . . with cylindrical material carriers
7/08 . . with material carriers in the form of belts
7/10 . . with material falling in cascades
7/12 . . with material falling free

9/00 **Electrostatic separation not provided for in any single one of the other main groups of this subclass**

11/00 **Separation by high-voltage electrical fields, not provided for in other groups of this subclass [8]**

B03D **FLOTATION**; **DIFFERENTIAL SEDIMENTATION** (in combination with other separation of solids B03B; sink-float separation B03B 5/28)

1/00 **Flotation**
1/001 . Flotation agents **[5]**

(1) In this group in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**
(2) In this group, it is desirable to add the appropriate indexing code(s) from each of groups B03D 101/00 or B03D 103/00. **[5]**

1/002 . . Inorganic compounds **[5]**
1/004 . . Organic compounds **[5]**
1/006 . . . Hydrocarbons **[5]**
1/008 . . . containing oxygen **[5]**
1/01 . . . containing nitrogen **[5]**
1/012 . . . containing sulfur **[5]**
1/014 . . . containing phosphorus **[5]**
1/016 . . . Macromolecular compounds **[5]**
1/018 . . Mixtures of inorganic and organic compounds **[5]**
1/02 . Froth-flotation processes
1/04 . . by varying ambient atmospheric pressure
1/06 . . differential
1/08 . Subsequent treatment of concentrated product
1/10 . . Removing adhering liquid from separated materials
1/12 . Agent recovery
1/14 . Flotation machines (devices for feeding measured quantities of reagents B01J 4/02)
1/16 . . with impellers; Subaeration machines
1/18 . . . without air supply
1/20 . . . with internal air pumps
1/22 . . . with external blowers
1/24 . . pneumatic
1/26 . . . Air lift machines

3/00 **Differential sedimentation**
3/02 . Coagulation
3/04 . . assisted by vibrations
3/06 . Flocculation

Indexing scheme associated with group B03D 1/001, relating to the effects produced and the materials treated. [5]

101/00 **Specified effects produced by the flotation agents [5]**
101/02 . Collectors **[5]**
101/04 . Frothers **[5]**
101/06 . Depressants **[5]**

103/00 **Specified materials treated by the flotation agents [5]**
103/02 . Ores **[5]**
103/04 . . Non-sulfide ores **[5]**
103/06 . . . Phosphate ores **[5]**
103/08 . . . Coal ores **[5]**
103/10 . . . Potassium ores **[5]**

B04 CENTRIFUGAL APPARATUS OR MACHINES FOR CARRYING-OUT PHYSICAL OR CHEMICAL PROCESSES

Note

Attention is drawn to the Notes following the subsection title "SEPARATING; MIXING". **[4]**

B04B **CENTRIFUGES** (high-speed drum mills B02C 19/11; domestic spin driers D06F; analysing, measuring or monitoring physical or chemical properties of samples during centrifuging, see the relevant subclasses for these procedures, e.g. G01N)

Note

This subclass covers machines or apparatus for separating, mixing, drying, extracting, purifying, or like treating in which centrifugal effects are generated by rotary bowls or other rotors. Where such machines or apparatus involve pumping effects, such effects must be incidental or subsidiary to the treating.

Types of centrifuges; **Centrifuges characterised by discharging means**

1/00 **Centrifuges with rotary bowls provided with solid jackets for separating predominantly liquid mixtures with or without solid particles**

1/02 . without inserted separating walls

1/04 . with inserted separating walls

1/06 . . of cylindrical shape

1/08 . . of conical shape

1/10 . with discharging outlets in the plane of the maximum diameter of the bowl

1/12 . . with continuous discharge

1/14 . . with periodical discharge

1/16 . . . with discharging outlets controlled by the rotational speed of the bowl

1/18 . . . . controlled by the centrifugal force of an auxiliary liquid

1/20 . discharging solid particles from the bowl by a conveying screw coaxial with the bowl axis and rotating relatively to the bowl

3/00 **Centrifuges with rotary bowls in which solid particles or bodies become separated by centrifugal force and simultaneously sifting or filtering**

3/02 . discharging solid particles from the bowl by means co-axial with the bowl axis and moving to and fro, i.e. push-type centrifuges

3/04 . discharging solid particles from the bowl by a conveying screw co-axial with the bowl axis and rotating relatively to the bowl

3/06 . discharging solid particles by vibrating the bowl

3/08 . discharging solid particles by bowl walls in the form of endless bands

5/00 **Other centrifuges**

5/02 . Centrifuges consisting of a plurality of separate bowls rotating round an axis situated between the bowls

5/04 . Radial chamber apparatus for separating predominantly liquid mixtures, e.g. butyrometers

5/06 . Centrifugal counter-current apparatus

5/08 . Centrifuges for separating predominantly gaseous mixtures

5/10 . Centrifuges combined with other apparatus, e.g. electrostatic separators; Sets or systems of several centrifuges (B04B 5/12 takes precedence; magnetic or electrostatic separators B03C) **[2]**

5/12 . Centrifuges in which rotors other than bowls generate centrifugal effects in stationary containers

Elements; **Accessories**

7/00 **Elements of centrifuges** (drives B04B 9/00; feeding, charging, or discharging accessories or devices B04B 11/00)

7/02 . Casings; Lids (shock absorbers, vibration dampers F16F)

7/04 . . Casings facilitating discharge

7/06 . . Safety devices

7/08 . Rotary bowls (centrifugal casting machines B22D)

7/10 . . Bowls for shaping solids

7/12 . . Inserts, e.g. armouring plates

7/14 . . . for separating walls of conical shape

7/16 . . . Sieves or filters (filters in general B01D; sieves in general B07B)

7/18 . . formed or coated with sieving or filtering elements (filters in general B01D; sieves in general B07B)

9/00 **Drives specially designed for centrifuges**; **Arrangement or disposition of transmission gearing**; **Suspending or balancing rotary bowls**

9/02 . Electric motor drives

9/04 . . Direct drive

9/06 . Fluid drive

9/08 . Arrangement or disposition of transmission gearing

9/10 . Control of the drive; Speed regulating

9/12 . Suspending rotary bowls

9/14 . Balancing rotary bowls (balancing in general G01M)

11/00 **Feeding, charging, or discharging bowls** (B04B 1/00, B04B 3/00, B04B 7/04 take precedence)

11/02 . Continuous feeding or discharging; Control arrangements therefor

11/04 . Periodical feeding or discharging; Control arrangements therefor

11/05 . . Base discharge

11/06 . Arrangement of distributors or collectors in centrifuges

11/08 . Skimmers or scrapers for discharging

13/00 **Control arrangements specially designed for centrifuges**; **Programme control of centrifuges** (control arrangements for feed, charge, or discharge B04B 11/00)

15/00 **Other accessories for centrifuges**

15/02 . for cooling, heating, or heat insulating

15/04 . for suppressing the formation of foam

15/06 . for cleaning bowls, filters, sieves, inserts, or the like

15/08 . for ventilating or producing a vacuum in the centrifuge

15/10 . for forming a filtering layer in the rotary bowl

15/12 . for drying or washing the separated solid particles

B04C **APPARATUS USING FREE VORTEX FLOW, E.G. CYCLONES** (exhaust or silencing apparatus for machines or engines having means for removing solid constituents of exhaust, using inertial or centrifugal separators F01N 3/037; cyclonic type combustion apparatus F23)

Note

This subclass covers apparatus for separating, mixing or like treating in which centrifugal effects are generated by free vortex flow, otherwise than by rotary bowls, rotors or curved passages.

1/00 **Apparatus in which the main direction of flow follows a flat spiral**

3/00 **Apparatus in which the axial direction of the vortex remains unchanged**

3/02 . with heating or cooling, e.g. quenching, means

3/04 . Multiple arrangement thereof

3/06 . Construction of inlets or outlets to the vortex chamber

5/00 **Apparatus in which the axial direction of the vortex is reversed**

5/02 . Construction of inlets by which the vortex flow is generated

5/04 . . Tangential inlets

5/06 . . Axial inlets

5/08 . Vortex chamber constructions

5/081 . . Shapes or dimensions

5/085 . . with wear-resisting arrangements

5/087 . . with flexible gas-tight walls

5/10 . . with perforated walls

5/103 . . Bodies or members, e.g. bulkheads, guides, in the vortex chamber (cores B04C 5/107)

5/107 . . Cores; Devices for inducing an air-core in hydrocyclones (forming part of the outlet pipe B04C 5/13)

5/12 . Construction of the overflow ducting, e.g. diffusing or spiral exits

5/13 . . formed as a vortex finder and extending into the vortex chamber; Discharge from vortex finder otherwise than at the top of the cyclone; Devices for controlling the overflow

5/14 . Construction of the underflow ducting; Apex constructions; Discharge arrangements

5/15 . . with swinging flaps or revolving sluices; Sluices; Check-valves

5/16 . . with variable-size outlets from the underflow ducting

5/18 . . with auxiliary fluid assisting discharge

5/181 . . Bulkheads or central bodies in the discharge opening

5/185 . . Dust collectors

5/187 . . . forming an integral part of the vortex chamber

5/20 . with heating or cooling, e.g. quenching, means

5/22 . with cleaning means

5/23 . . using liquids

5/24 . Multiple arrangement thereof

5/26 . . for series flow

5/28 . . for parallel flow

5/30 . . Recirculation constructions in or with cyclones which accomplish a partial recirculation of the medium, e.g. by means of conduits

7/00 **Apparatus not provided for in group B04C 1/00, B04C 3/00 or B04C 5/00**; **Multiple arrangements not provided for in one of the groups B04C 1/00, B04C 3/00, or B04C 5/00**; **Combinations of apparatus covered by two or more of the groups B04C 1/00, B04C 3/00, or B04C 5/00**

9/00 **Combinations with other devices, e.g. fans** (with filters for separating particles from gases or vapour B01D 50/00; with dry electrostatic precipitation for separating particles from gases or vapour B03C 3/15)

11/00 **Accessories, e.g. safety or control devices, not otherwise provided for**

B05 SPRAYING OR ATOMISING IN GENERAL; APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL [2]

Note

In this class, the following terms or expressions are used with the meanings indicated:
- "other fluent materials" includes semiliquids, pastes, melts, solutions, dispersions, suspensions, particulate materials, gases or vapours; **[2]**
- "particulate materials" includes powders, granules, short fibres or chips; **[2]**
- "coating" means the materials applied. The coating may be a liquid having become solid after drying, e.g. paint. **[2]**

B05B SPRAYING APPARATUS; **ATOMISING APPARATUS**; **NOZZLES** (spray-mixers with nozzles B01F 5/20; processes for applying liquids or other fluent materials to surfaces by spraying B05D) **[2]**

(1) This subclass covers particularly apparatus for the release or projection of drops or droplets into the atmosphere or into a chamber to form a mist or the like. For this purpose, the materials to be projected may be suspended in a stream of gas or vapour. **[2]**

(2) Attention is drawn to the Note following the title of class B05. **[2]**

Subclass index

1/00 Nozzles, spray heads or other outlets, with or without auxiliary devices such as valves, heating means (B05B 3/00, B05B 5/00, B05B 7/00 take precedence; devices for applying liquids or other fluent materials to surfaces by contact B05C; nozzles for ink-jet printing mechanisms B41J 2/135; nozzles for liquid-dispensing, e.g. in vehicle service stations, B67D 7/42)

1/02 . designed to produce a jet, spray, or other discharge of particular shape or nature, e.g. in single drops (B05B 1/26, B05B 1/28, B05B 1/34 take precedence)

1/04 . . in flat form, e.g. fan-like, sheet-like

1/06 . . in annular, tubular or hollow conical form

1/08 . . of pulsating nature, e.g. delivering liquid in successive separate quantities

1/10 . . in the form of a fine jet, e.g. for use in wind-screen washers

1/12 . capable of producing different kinds of discharge, e.g. either jet or spray (B05B 1/16 takes precedence)

1/14 . with multiple outlet openings (B05B 1/02, B05B 1/26 take precedence); with strainers in or outside the outlet opening

1/16 . . having selectively-effective outlets

1/18 . . Roses; Shower heads

1/20 . . Perforated pipes or troughs, e.g. spray booms; Outlet elements therefor

1/22 . Spouts (anti-splash devices for water-taps E03C 1/08)

1/24 . incorporating means for heating the liquid or other fluent material, e.g. electrically

1/26 . with means for mechanically breaking-up or deflecting the jet after discharge, e.g. with fixed deflectors; Breaking-up the discharged liquid or other fluent material by impinging jets

1/28 . with integral means for shielding the discharged liquid or other fluent material, e.g. to limit area of spray; with integral means for catching drips or collecting surplus liquid or other fluent material (means for any of these purposes, per se, B05B 15/04)

1/30 . designed to control volume of flow, e.g. with adjustable passages (B05B 1/02 takes precedence)

1/32 . . in which a valve member forms part of the outlet opening

1/34 . designed to influence the nature of flow of the liquid or other fluent material, e.g. to produce swirl (B05B 1/30 takes precedence)

1/36 . Outlets for discharging by overflow

3/00 Spraying or sprinkling apparatus with moving outlet elements or moving deflecting elements (B05B 5/00 takes precedence)

3/02 . with rotating elements

3/04 . . driven by the liquid or other fluent material discharged, e.g. the liquid actuating a motor before passing to the outlet

3/06 . . . by jet reaction

3/08 . . in association with stationary outlet or deflecting elements

3/10 . . discharging over substantially the whole periphery of the rotating member

3/12 . . with spray booms or the like rotating around an axis by means independent of the liquid or other fluent material discharged

3/14 . with oscillating elements; with intermittent operation

3/16 . . driven or controlled by the liquid or other fluent material discharged, e.g. the liquid actuating a motor before passing to the outlet

3/18 . with elements moving in a straight line, e.g. along a track; Mobile sprinklers **[2]**

5/00 Electrostatic spraying apparatus; **Spraying apparatus with means for charging the spray electrically**; **Apparatus for spraying liquids or other fluent materials by other electric means**

5/025 . Discharge apparatus, e.g. electrostatic spray guns **[5]**

5/03 . . characterised by the use of gas **[5]**

5/035 . . characterised by gasless spraying **[5]**

5/04 . . characterised by having rotary outlet or deflecting elements

5/043 . . using induction-charging **[5]**

5/047 . . using tribo-charging **[5]**

5/053 . . Arrangements for supplying power, e.g. charging power **[5]**

5/057 . . Arrangements for discharging liquids or other fluent material without using a gun or nozzle **[5]**

5/06 . using electric arc

5/08 . Plant for applying liquids or other fluent materials to objects

5/10 . . Arrangements for supplying power, e.g. charging power (B05B 5/053 takes precedence) **[5]**

5/12 . . specially adapted for coating the interior of hollow bodies **[5]**

5/14 . . specially adapted for coating continuously moving elongated bodies, e.g. wires, strips, pipes **[5]**

5/16 . Arrangements for supplying liquids or other fluent material **[5]**

7/00 Spraying apparatus for discharge of liquids or other fluent materials from two or more sources, e.g. of liquid and air, of powder and gas (B05B 3/00, B05B 5/00 take precedence; outlets not specially modified for two media B05B 1/00)

7/02 . Spray pistols; Apparatus for discharge (B05B 7/14, B05B 7/16, B05B 7/24 take precedence)

7/04 . . with arrangements for mixing liquids or other fluent materials before discharge **[2]**

7/06 . . with one outlet orifice surrounding another approximately in the same plane (B05B 7/10 takes precedence)

7/08 . . with separate outlet orifices, e.g. to form parallel jets, to form intersecting jets

7/10 . . producing a swirling discharge

7/12 . . designed to control volume of flow, e.g. with adjustable passages

7/14 . designed for spraying particulate materials (B05B 7/16 takes precedence)

7/16 . incorporating means for heating the material to be sprayed

7/18 . . the material having originally the shape of a wire, rod, or the like

7/20 . . by flame or combustion

7/22 . . electrically, e.g. by arc

7/24 . with means, e.g. a container, for supplying liquid or other fluent material to a discharge device (B05B 7/14, B05B 7/16, B05B 11/00 take precedence)

7/26 . . Apparatus in which liquids or other fluent materials from different sources are brought together before entering the discharge device

7/28 . . . in which one liquid or other fluent material is fed or drawn through an orifice into a stream of a carrying fluid

7/30 . . . . the first liquid or other fluent material being fed by gravity, or sucked into the carrying fluid

7/32 . . . . the fed liquid or other fluent material being under pressure

9/00 Spraying apparatus for discharge of liquid or other fluent material without essentially mixing with gas or vapour (B05B 11/00 takes precedence) **[3]**

9/01 . Spray pistols (B05B 9/03 takes precedence) **[3]**

9/03 . characterised by means for supplying liquid or other fluent material **[3]**

9/04 . . with pressurised or compressible container (aerosol containers B65D 83/14); with pump **[3]**

9/043 . . . having pump readily separable from container **[2,3]**

9/047 . . . supply being effected by follower in container, e.g. membrane or floating piston **[2,3]**

9/06 . . . the delivery being related to the movement of a vehicle, e.g. the pump being driven by a vehicle wheel **[3]**

9/08 . . . Apparatus to be carried on or by a person, e.g. of knapsack type (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[3,4]**

11/00 Single-unit, i.e. unitary, hand-held apparatus in which flow of liquid or other fluent material is produced by the operator at the moment of use [2]

11/02 . the flow being effected by a follower, e.g. membrane, floating piston, in container for liquid or other fluent material **[2]**

11/04 . the flow being effected by deformation of container for liquid or other fluent material **[2]**

11/06 . the spray being effected by gas or vapour flow, e.g. from a compressible bulb **[2,3]**

12/00 Arrangements or special adaptations of delivery controlling means in spraying systems [2]

12/02 . for controlling time, or sequence, of delivery **[2]**

12/04 . . for sequential operation or multiple outlets **[2]**

12/06 . . for effecting pulsating flow **[2]**

12/08 . responsive to condition of liquid or other fluent material discharged, of ambient medium or of target **[2]**

12/10 . . responsive to temperature or viscosity of liquid or other fluent material discharged **[2]**

12/12 . . responsive to conditions of ambient medium or target, e.g. humidity, temperature **[2]**

12/14 . for supplying a selected one of a plurality of liquids or other fluent materials to a single spray outlet **[3]**

13/00 Machines or plants for applying liquids or other fluent materials to surfaces of objects or other work by spraying, not covered by groups B05B 1/00 to B05B 11/00 (processes for applying liquids or other fluent materials to surfaces in general B05D; means for supplying or discharging liquid or other fluent material for this purpose, see the relevant one of groups B05B 1/00 to B05B 12/00) **[3]**

13/02 . Means for supporting work; Arrangement or mounting of spray heads; Adaptation or arrangement of means for feeding work (B05B 13/06 takes precedence)

13/04 . . the spray heads being moved during operation

13/06 . specially designed for treating the inside of hollow bodies (spray heads B05B 1/00 to B05B 7/00)

15/00 **Details of spraying plant or apparatus not otherwise provided for**; **Accessories [4]**
15/02 . Arrangements or devices for cleaning discharge openings
15/04 . Control of spray area, e.g. masking, side shields; Means for collection or re-use of excess material (B05B 1/28 takes precedence)
15/06 . Mountings, supporting or holding means, or rests for spray heads or other outlets when in use or out of use (B05B 15/10 takes precedence)
15/08 . . Means for adjusting position of spray heads
15/10 . Arrangements for moving spray heads automatically to or from the working position
15/12 . Spray booths **[4]**

17/00 **Apparatus for spraying or atomising liquids or other fluent materials, not covered by any other group of this subclass** (dropping or releasing powdered, liquid or gaseous matter in flight B64D 1/16) **[2]**
17/04 . operating with special methods
17/06 . . using ultrasonic vibrations
17/08 . Fountains (drinking fountains E03B 9/20; wash fountains E03C 1/16)

B05C **APPARATUS FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL** (spraying apparatus, atomising apparatus, nozzles B05B; plant for applying liquids or other fluent materials to objects by electrostatic spraying B05B 5/08; processes for applying liquids or other fluent materials to surfaces B05D) **[2]**

(1) This subclass covers apparatus or hand tools, in general, for applying liquids or other fluent materials to a surface or a part thereof, by any mechanical or physical method, in particular apparatus for obtaining a uniform distribution of liquids or other fluent materials on a surface. **[2]**
(2) Hand tools or apparatus using hand-held tools are classified in group B05C 17/00. **[2009.01]**
(3) Attention is drawn to the Note following the title of class B05. **[2]**

Subclass index

1/00 **Apparatus in which liquid or other fluent material is applied to the surface of the work by contact with a member carrying the liquid or other fluent material, e.g. a porous member loaded with a liquid to be applied as a coating** (B05C 5/02, B05C 7/00, B05C 19/00 take precedence) **[2]**
1/02 . for applying liquid or other fluent material to separate articles
1/04 . for applying liquid or other fluent material to work of indefinite length
1/06 . . by rubbing contact, e.g. by brushes, by pads
1/08 . . using a roller **[2]**
1/10 . . . the liquid or other fluent material being supplied from inside the roller
1/12 . . . the work being fed round the roller (B05C 1/10 takes precedence)
1/14 . . using a travelling band **[2]**
1/16 . . only at particular parts of the work

3/00 **Apparatus in which the work is brought into contact with a bulk quantity of liquid or other fluent material** (B05C 19/00 takes precedence) **[2]**
3/02 . the work being immersed in the liquid or other fluent material
3/04 . . with special provision for agitating the work or the liquid or other fluent material
3/05 . . . by applying vibrations thereto
3/08 . . . the work and the liquid or other fluent material being agitated together in a container, e.g. tumbled (B05C 3/05 takes precedence)
3/09 . . for treating separate articles
3/10 . . . the articles being moved through the liquid or other fluent material (conveying articles through baths B65G, e.g. B65G 49/02)
3/109 . . . Passing liquids or other fluent materials into or through chambers containing stationary articles
3/12 . . for treating work of indefinite length
3/132 . . . supported on conveying means
3/15 . . . not supported on conveying means (web or filament feeding arrangements B65H)
3/152 . . . . the work passing in zig-zag fashion over rollers
3/172 . . . . in endless form
3/18 . only one side of the work coming into contact with the liquid or other fluent material (B05C 3/02 takes precedence) **[2]**
3/20 . for applying liquid or other fluent material only at particular parts of the work (B05C 3/02 takes precedence) **[2]**

5/00 **Apparatus in which liquid or other fluent material is projected, poured or allowed to flow on to the surface of the work** (B05C 7/00, B05C 19/00 take precedence; essentially involving spraying or electrostatic projection B05B)
5/02 . from an outlet device in contact, or almost in contact, with the work (B05C 5/04 takes precedence) **[3]**
5/04 . the liquid or other fluent material being supplied to the apparatus in a solid state and melted before application **[3]**

7/00 **Apparatus specially designed for applying liquid or other fluent material to the inside of hollow work** (B05C 19/00 takes precedence)

7/02 . the liquid or other fluent material being projected

7/04 . the liquid or other fluent material flowing or being moved through the work; the work being filled with liquid or other fluent material and emptied

7/06 . by devices moving in contact with the work

7/08 . . for applying liquids or other fluent materials to the inside of tubes

9/00 **Apparatus or plant for applying liquid or other fluent material to surfaces by means not covered by groups B05C 1/00 to B05C 7/00, or in which the means of applying the liquid or other fluent material is not important** (B05C 19/00 takes precedence)

9/02 . for applying liquid or other fluent material to surfaces by single means not covered by groups B05C 1/00 to B05C 7/00, whether or not also using other means

9/04 . for applying liquid or other fluent material to opposite sides of the work

9/06 . for applying two different liquids or other fluent materials, or the same liquid or other fluent material twice, to the same side of the work

9/08 . for applying liquid or other fluent material and performing an auxiliary operation **[2]**

9/10 . . the auxiliary operation being performed before the application (B05C 9/14 takes precedence)

9/12 . . the auxiliary operation being performed after the application (B05C 9/14 takes precedence)

9/14 . . the auxiliary operation involving heating

11/00 **Component parts, details or accessories not specifically provided for in groups B05C 1/00 to B05C 9/00** (B05C 19/00 takes precedence; means for manipulating or holding work B05C 13/00; enclosures for apparatus, booths B05C 15/00; spray booths B05B 15/12) **[2]**

11/02 . Apparatus for spreading or distributing liquids or other fluent materials already applied to a surface (B05C 7/00 takes precedence; hand tools for such purposes B05C 17/10); Control of the thickness of a coating (controlling supply of liquid or other fluent material B05C 11/10) **[2]**

11/04 . . with blades

11/06 . . with a blast of gas or vapour **[2]**

11/08 . . Spreading liquid or other fluent material by manipulating the work, e.g. tilting

11/10 . Storage, supply or control of liquid or other fluent material; Recovery of excess liquid or other fluent material

11/105 . . by capillary action, e.g. using wicks

11/11 . Vats or other containers for liquids or other fluent materials

11/115 . . Sealing means for work inlet or outlet

13/00 **Means for manipulating or holding work, e.g. for separate articles [2]**

13/02 . for particular articles **[2]**

15/00 **Enclosures for apparatus**; **Booths** (spray booths B05B 15/12) **[4]**

17/00 **Hand tools or apparatus using hand-held tools, for applying liquids or other fluent materials to, for spreading applied liquids or other fluent materials on, or for partially removing applied liquids or other fluent materials from, surfaces** (brushes A46B; absorbent pads, e.g. swabs, for applying media to the human body A61F 13/15; implements or apparatus for removing dry paint from surfaces B44D 3/16) **[2]**

17/005 . for discharging material through an outlet orifice by pressure (B05C 17/02 takes precedence; containers or packages with special means for dispensing fluent material by means of a piston or the like B65D 83/76; grease guns F16N 3/12) **[5]**

17/01 . . with mechanically or electrically actuated piston or the like **[5]**

17/015 . . with pneumatically actuated piston or the like **[5]**

17/02 . Rollers **[2]**

17/025 . . with self-contained reservoir **[5]**

17/03 . . with feed system for supplying material from an external source **[5]**

17/035 . . . direct to the outer surface of the roller **[5]**

17/04 . . Stencil rollers **[2]**

17/06 . Stencils (B05C 17/04 takes precedence; stencils used in connection with printing plates or foils B41N 1/24; drawing accessories B43L 13/00) **[2]**

17/08 . . Stencil holders **[2]**

17/10 . Hand tools for removing partially or for spreading or redistributing applied liquids or other fluent materials, e.g. colour touchers **[2]**

17/12 . Other hand tools for producing patterns **[2]**

19/00 **Apparatus specially adapted for applying particulate materials to surfaces [2]**

19/02 . using fluidised-bed technique (fluidised-bed technique in general B01J 8/24) **[2]**

19/04 . the particulate material being projected, poured or allowed to flow onto the surface of the work (B05C 19/02 takes precedence; involving spraying or electrostatic projection B05B) **[5]**

19/06 . Storage, supply or control of the application of particulate material; Recovery of excess particulate material **[5]**

21/00 **Accessories or implements for use in connection with applying liquids or other fluent materials to surfaces, not provided for in groups B05C 1/00 to B05C 19/00** (accessories or implements for use in connection with painting or artistic drawing and fully provided for in B44D 3/02 to B44D 3/38, see subgroups of group B44D 3/00) **[2]**

B05D **PROCESSES FOR APPLYING LIQUIDS OR OTHER FLUENT MATERIALS TO SURFACES, IN GENERAL** (apparatus for applying liquids or other fluent materials to surfaces B05B, B05C; conveying articles or workpieces through baths of liquid B65G, e.g. B65G 49/02) **[2]**

(1) This subclass covers:
- processes for applying liquids or other fluent materials to a surface or part of a surface, in general, by any mechanical or physical method and particularly processes producing a uniform distribution of liquids or other fluent materials on a surface;
- pretreatment of surfaces to which liquids or other fluent materials are to be applied;

– after-treatment of applied coatings. **[2]**

(2) Attention is drawn to the Note following the title of class B05. **[2]**

Subclass index

1/00 Processes for applying liquids or other fluent materials (B05D 5/00, B05D 7/00 take precedence) **[2]**

1/02 . performed by spraying **[2]**
1/04 . . involving the use of an electrostatic field **[2]**
1/06 . . . Applying particulate materials **[2]**
1/08 . . Flame spraying **[2]**
1/10 . . . Applying particulate materials **[2]**
1/12 . . Applying particulate materials (B05D 1/06, B05D 1/10 take precedence) **[2]**
1/14 . . . Flocking **[2]**
1/16 . Flocking otherwise than by spraying **[2]**
1/18 . performed by dipping **[2]**
1/20 . . substances to be applied floating on a fluid **[2]**
1/22 . . using fluidised-bed technique (fluidised-bed technique in general B01J 8/24) **[2]**
1/24 . . . Applying particulate materials **[2]**
1/26 . performed by applying the liquid or other fluent material from an outlet device in contact with, or almost in contact with, the surface **[2]**
1/28 . performed by transfer from the surfaces of elements carrying the liquid or other fluent material, e.g. brushes, pads, rollers **[2]**
1/30 . performed by gravity only, i.e. flow coating **[2]**
1/32 . using means for protecting parts of a surface not to be coated, e.g. using stencils, resists **[2]**
1/34 . Applying different liquids or other fluent materials simultaneously **[2]**
1/36 . Successively applying liquids or other fluent materials, e.g. without intermediate treatment **[2]**
1/38 . . with intermediate treatment (intermediate treatment per se B05D 3/00) **[2]**
1/40 . Distributing applied liquids or other fluent materials by members moving relatively to surface **[2]**
1/42 . . by non-rotary members **[2]**

3/00 Pretreatment of surfaces to which liquids or other fluent materials are to be applied; **After-treatment of applied coatings, e.g. intermediate treating of an applied coating preparatory to subsequent applications of liquids or other fluent materials** (successively applying liquids or other fluent materials B05D 1/36; drying ovens F26B) **[2]**

3/02 . by baking **[2]**
3/04 . by exposure to gases **[2]**
3/06 . by exposure to radiation (B05D 3/02 takes precedence) **[2]**
3/08 . by flames **[2]**
3/10 . by other chemical means **[2]**
3/12 . by mechanical means **[2]**
3/14 . by electrical means **[2]**

5/00 Processes for applying liquids or other fluent materials to surfaces to obtain special surface effects, finishes or structures [2]

5/02 . to obtain a matt or rough surface **[2]**
5/04 . to obtain a surface receptive to ink or other liquid (B05D 5/02 takes precedence) **[2]**
5/06 . to obtain multicolour or other optical effects (B05D 5/02 takes precedence) **[2]**
5/08 . to obtain an anti-friction or anti-adhesive surface (rendering particulate materials free flowing in general, e.g. making them hydrophobic, B01J 2/30) **[2]**
5/10 . to obtain an adhesive surface **[2]**
5/12 . to obtain a coating with specific electrical properties **[2]**

7/00 Processes, other than flocking, specially adapted for applying liquids or other fluent materials to particular surfaces or for applying particular liquids or other fluent materials [2]

7/02 . to macromolecular substances, e.g. rubber (treatment or coating of shaped articles made of macromolecular substances C08J 7/00) **[2]**
7/04 . . to surfaces of films or sheets (producing layered products by applying coatings of pasty or pulverulent plastics B29C 41/00, B32B 37/00) **[2]**
7/06 . to wood **[2]**
7/08 . . using synthetic lacquers or varnishes **[2]**
7/10 . . . based on cellulose derivatives **[2]**
7/12 . to leather (chemical treatment of leather C14C; dyeing leather D06P) **[2]**
7/14 . to metal, e.g. car bodies (involving a chemical reaction between the metal and the coating C23) **[2]**
7/16 . . using synthetic lacquers or varnishes **[2]**
7/18 . . . based on cellulose derivatives **[2]**
7/20 . to wires (for insulating electric cables H01B 13/16) **[2]**
7/22 . to internal surfaces, e.g. of tubes **[2]**
7/24 . for applying particular liquids or other fluent materials **[2]**
7/26 . . synthetic lacquers or varnishes (B05D 7/08, B05D 7/16 take precedence) **[2]**

B06 GENERATING OR TRANSMITTING MECHANICAL VIBRATIONS IN GENERAL

B06B **GENERATING OR TRANSMITTING MECHANICAL VIBRATIONS IN GENERAL** (for particular physical or chemical processes, see the relevant subclasses, e.g. B07B 1/40, B22C 19/06, B23Q 17/12, B24B 31/06, E01C 19/22; measurement of mechanical vibrations, including the combination of generation and measurement, G01H; systems using reflection or reradiation of acoustic waves G01S 15/00; generating seismic energy for prospecting G01V 1/02; control of mechanical vibrations G05D 19/00; methods or devices for transmitting, conducting or directing sound, in general G10K 11/00; synthesis of acoustic waves G10K 15/02; piezo-electric, electrostrictive or magnetostrictive elements H01L 41/00; motors with vibrating magnet, armature or coil H02K 33/00; motors using piezo-electric effect, electrostriction or magnetostriction H02N 2/00; generation of electrical oscillations H03B; electromechanical resonators as resonant circuit elements H03H; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R) **[2]**

(1) This subclass covers arrangements for generating mechanical vibrations in solids, e.g. for the purpose of performing mechanical work. **[6]**

(2) This subclass does not cover arrangements for generating mechanical vibrations in fluids, which are covered by subclass G10K. **[6]**

1/00 **Processes or apparatus for generating mechanical vibrations of infrasonic, sonic or ultrasonic frequency**

1/02 . making use of electrical energy (B06B 1/18, B06B 1/20 take precedence)

1/04 . . operating with electromagnetism (dynamo-electric motors with vibrating magnet, armature or coil system H02K 33/00)

1/06 . . operating with piezo-electric effect or with electrostriction (piezo-electric or electrostrictive elements in general H01L 41/00)

1/08 . . operating with magnetostriction (magnetostrictive elements in general H01L 41/00)

1/10 . making use of mechanical energy (B06B 1/18, B06B 1/20 take precedence)

1/12 . . operating with systems involving reciprocating masses

1/14 . . . the masses being elastically coupled

1/16 . . operating with systems involving rotary unbalanced masses

1/18 . wherein the vibrator is actuated by pressure fluid (B06B 1/20 takes precedence)

1/20 . making use of a vibrating fluid

3/00 **Processes or apparatus specially adapted for transmitting mechanical vibrations of infrasonic, sonic or ultrasonic frequency**

3/02 . involving a change of amplitude

3/04 . involving focusing or reflecting

B07 SEPARATING SOLIDS FROM SOLIDS; SORTING

B07B **SEPARATING SOLIDS FROM SOLIDS BY SIEVING, SCREENING, OR SIFTING OR BY USING GAS CURRENTS; OTHER SEPARATING BY DRY METHODS APPLICABLE TO BULK MATERIAL, E.G. LOOSE ARTICLES FIT TO BE HANDLED LIKE BULK MATERIAL** (wet separating processes, sorting by processes using fluent material in the same way as liquid B03; combinations of dry separating apparatus with wet separating apparatus B03B; using liquids B03B, B03D; sorting by magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high voltage electric fields B03C; centrifuges or vortex apparatus for carrying out physical processes B04; hand sorting, postal sorting, sorting by switching or other devices actuated in response to detection or measurement of some feature of articles or samples of material B07C)

Note

This subclass covers:
- any sorting or grading of bulk material or loose articles fit to be handled like bulk material which results automatically from the construction of the apparatus and properties of the material, e.g. by a trap opening under an object of a certain minimum weight, by an aperture of graduated size;
- sorting of articles in so far as the same conditions apply, e.g. sorting of timber by passing it over successively longer openings; the articles may or may not be orientated for the purpose of sorting.

Subclass index

1/00 **Sieving, screening, sifting, or sorting solid materials using networks, gratings, grids, or the like**

1/02 . Hand screens
1/04 . Stationary flat screens
1/06 . Cone or disc shaped screens
1/08 . Screens rotating within their own plane
1/10 . Screens in the form of endless moving bands
1/12 . Apparatus having only parallel elements
1/14 . . Roller screens
1/15 . . . using corrugated, grooved or ribbed rollers **[2]**
1/16 . . the elements being movable and in other than roller form
1/18 . Drum screens
1/20 . . Stationary drums with moving interior agitators
1/22 . . Revolving drums
1/24 . . . with fixed or moving interior agitators
1/26 . . . with additional axial or radial movement of the drum
1/28 . Moving screens not otherwise provided for, e.g. swinging, reciprocating, rocking, tilting, or wobbling screens

Note

Group B07B 1/40 takes precedence over groups B07B 1/30 to B07B 1/38.

1/30 . . jigging or moving to-and-fro in or approximately in the direction of conveyance
1/32 . . jigging or moving to-and-fro within their own plane transverse to the direction of conveyance
1/34 . . jigging or moving to-and-fro perpendicularly or approximately perpendicularly to the plane of the screen
1/36 . . jigging or moving to-and-fro in more than one direction
1/38 . . oscillating in a circular arc in their own plane; Plansifters
1/40 . . Resonant vibration screens
1/42 . Drive mechanisms, regulating or controlling devices, or balancing devices, specially adapted for screens
1/44 . . Balancing devices
1/46 . Constructional details of screens in general; Cleaning or heating of screens
1/48 . . Stretching devices for screens
1/49 . . . stretching more than one screen or screen section by the same or different stretching means **[2]**
1/50 . . Cleaning
1/52 . . . with brushes or scrapers
1/54 . . . with beating devices
1/55 . . . with fluid jets **[3]**
1/56 . . Heated screens
1/58 . . . heated by heated fluid
1/60 . . . heated by flame heating
1/62 . . . heated by direct electric heating

Separating solids from solids using gas currents

4/00 **Separating solids from solids by subjecting their mixture to gas currents** (using tables or jigs B03B)

4/02 . while the mixtures fall
4/04 . . in cascades
4/06 . . using revolving drums
4/08 . while the mixtures are supported by sieves, screens, or like mechanical elements

7/00 **Selective separation of solid materials carried by, or dispersed in, gas currents** (sieves or filters for separating dispersed particles from gases or vapours B01D)

7/01 . using gravity

7/02 . by reversal of direction of flow
7/04 . by impingement against baffle separators
7/06 . by impingement against sieves
7/08 . using centrifugal force
7/083 . . generated by rotating vanes, discs, drums, or brushes
7/086 . . generated by the winding course of the gas stream
7/10 . . having air recirculating within the apparatus
7/12 . with pulsating air currents

9/00 Combinations of apparatus for screening or sifting or for separating solids from solids using gas currents; General arrangement of plant, e.g. flow sheets
9/02 . Combinations of similar or different apparatus for separating solids from solids using gas currents

11/00 Arrangement of accessories in apparatus for separating solids from solids using gas currents
11/02 . Arrangement of air or material conditioning accessories
11/04 . Control arrangements
11/06 . Feeding or discharging arrangements
11/08 . Cleaning arrangements

Other separating, e.g. grading, resulting automatically from the construction of the apparatus used and properties of the material concerned; Combinations

13/00 Grading or sorting solid materials by dry methods, not otherwise provided for; Sorting articles otherwise than by indirectly controlled devices
13/02 . Apparatus for grading using pockets for taking out particles from aggregates
13/04 . according to size
13/05 . . using material mover cooperating with retainer, deflector or discharger (B07B 13/065 to B07B 13/075 take precedence) **[3]**
13/065 . . Apparatus for grading or sorting using divergent conveyer belts or cables **[3]**
13/07 . . Apparatus in which aggregates or articles are moved along or past openings which increase in size in the direction of movement **[3]**
13/075 . . Apparatus comprising moving article-receiving openings, the size of which varies as they move **[3]**
13/08 . according to weight (B07B 13/10 takes precedence)
13/10 . using momentum effects
13/11 . . involving travel of particles over surfaces which separate by centrifugal force or by relative friction between particles and such surfaces, e.g. helical sorters **[2]**
13/14 . Details or accessories
13/16 . . Feed or discharge arrangements
13/18 . . Control

15/00 Combinations of apparatus for separating solids from solids by dry methods applicable to bulk material, e.g. loose articles fit to be handled like bulk material (using gas currents B07B 9/00)

B07C POSTAL SORTING; SORTING INDIVIDUAL ARTICLES, OR BULK MATERIAL FIT TO BE SORTED PIECE-MEAL, E.G. BY PICKING (specially adapted for a specific purpose covered by another class, see the relevant place, e.g. A43D 33/06, B23Q 7/12)

Note

This subclass covers sorting of materials or articles by hand or by devices actuated, manually or automatically, as a result of inspection or of detection or measurement of some feature of the material or articles.

Subclass index

Postal sorting; Similar sorting of documents, e.g. cheques

1/00 Measures preceding sorting of mail or documents according to destination
1/02 . Forming articles into a stream; Arranging articles in a stream, e.g. spacing, orientating
1/04 . . Forming a stream from a bulk; Regulating the stream, e.g. spacing the articles
1/06 . . Orientating; Aligning
1/10 . Sorting according to size or flexibility
1/12 . . Separating letters from parcels
1/14 . . Sorting according to length or width
1/16 . . Sorting according to thickness or stiffness
1/18 . Orientating articles other than in a stream
1/20 . Sorting according to orientation, e.g. according to position of stamp

3/00 Sorting of mail or documents according to destination
3/02 . Apparatus characterised by the means used for distribution
3/04 . . Drum-type sorting machines
3/06 . . Linear sorting machines in which articles are removed from a stream at selected points
3/08 . . using arrangements of conveyers

3/10 . Apparatus characterised by the means used for detection of the destination (methods or arrangements for reading and recognising printed or written characters or geometric figures G06K 9/00)
3/12 . . using electric or electronic detecting means (B07C 3/14 takes precedence)
3/14 . . using light-responsive detecting means
3/16 . . using magnetic detecting means
3/18 . Devices or arrangements for indicating destination, e.g. by code marks
3/20 . Arrangements for facilitating the visual reading of addresses, e.g. display arrangements

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5/00 Sorting according to a characteristic or feature of the articles or material being sorted, e.g. by control effected by devices which detect or measure such characteristic or feature; **Sorting by manually actuated devices, e.g. switches** (sorting by hand only B07C 7/00; separating solids from solids by sieving, screening, or sifting or by using gas currents or other separating by dry methods applicable to bulk material B07B; sorting of coins G07D) **[3]**

5/02 . Measures preceding sorting, e.g. arranging articles in a stream, orientating
5/04 . Sorting according to size
5/06 . . measured mechanically
5/07 . . . by calipering using relatively moving article-engaging means, e.g. clamps **[2]**
5/08 . . measured electrically or electronically (B07C 5/10 takes precedence)
5/10 . . measured by light-responsive means
5/12 . . characterised by the application to particular articles, not otherwise provided for (sorting eggs A01K 43/00)
5/14 . . . Sorting timber or logs
5/16 . Sorting according to weight (sorting eggs A01K 43/00; weighing apparatus per se G01G)
5/18 . . using a single stationary weighing mechanism
5/20 . . . for separating articles of less than a predetermined weight from those of more than that weight
5/22 . . using a plurality of stationary weighing mechanisms
5/24 . . using moving weighing mechanisms, e.g. moving along a circular path
5/26 . . . wherein the counterbalancing effect of the weighing mechanisms is varied during such movement
5/28 . . using electrical control means
5/30 . . with associated counting means
5/32 . . with associated check-weighing means
5/34 . Sorting according to other particular properties
5/342 . . according to optical properties, e.g. colour
5/344 . . according to electric or electromagnetic properties
5/346 . . according to radioactive properties
5/36 . Sorting apparatus characterised by the means used for distribution
5/38 . . Collecting or arranging articles in groups

7/00 Sorting by hand only

7/02 . Compartmented furniture, e.g. pigeon-holes (storage racks B65G)
7/04 . Apparatus or accessories for hand picking

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

B08 CLEANING

B08B **CLEANING IN GENERAL**; **PREVENTION OF FOULING IN GENERAL** (brushes A46; devices for domestic or like cleaning A47L; separation of particles from liquids or gases B01D; separation of solids B03, B07; spraying or applying liquids or other fluent materials to surfaces in general B05; cleaning devices for conveyers B65G 45/10; concurrent cleaning, filling and closing of bottles B67C 7/00; inhibiting corrosion or incrustation in general C23; cleaning streets, permanent ways, beaches or land E01H; parts, details or accessories of swimming or splash baths or pools, specially adapted for cleaning E04H 4/16; preventing or removing electrostatic charges H05F)

(1) This subclass covers only cleaning, which is usually classified according to one (or more) of the aspects mentioned below, if it is not fully classifiable in a subclass providing for any of the following aspects:
- the articles cleaned, e.g. bed-pans, urinal or other sanitary devices for bed-ridden persons A61G 9/02, filters, semi-permeable membranes B01D, castings and moulds B22D 29/00, vehicles B60S, coke ovens C10B 43/00, building forms E04G, boilers F22, combustion apparatus F23J, furnaces F27;
- the general nature of the cleaning, e.g. preparing for sugar manufacture A23N, domestic cleaning A47L, treatment of textiles D06, laundry D06F, air-conditioning F24F;
- the particular operation performed, e.g. filtering B01D, separating of solids B03, B07, sand-blasting B24C;
- the particular apparatus or device, e.g. brushes A46B, mops A47L, centrifuges B04, hand tools B25;
- the substance cleaned, e.g. metals B21C, C23, water C02, glass C03B, leather C14B, textile fibres D01;
- the substance removed (or prevented from depositing or forming), e.g. implements or apparatus for removing dry paint from surfaces B44D 3/16, chemical paint-removers C09D 9/00, preventing rust C23F;
- the substance used, e.g. macromolecular compounds or compositions C08, anti-icing materials C09K, detergents C11D;
- the operation in connection with which cleaning is done, e.g. metal rolling B21B, metal boring B23B, soldering B23K, textile fabrication D01G, D01H, D03J, D04B;
- the surroundings of a surface to be cleaned or kept clean, e.g. water in a boiler C02F, air in a room F24F.

(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 **Cleaning by methods involving the use of tools, brushes, or analogous members** (B08B 3/12, B08B 6/00, B08B 9/00 take precedence) **[2]**

1/02 . Cleaning travelling work, e.g. a web, articles on a conveyer

1/04 . using rotary operative members (B08B 1/02 takes precedence)

3/00 **Cleaning by methods involving the use or presence of liquid or steam** (B08B 9/00 takes precedence)

3/02 . Cleaning by the force of jets or sprays

3/04 . Cleaning involving contact with liquid

3/06 . . using perforated drums in which the article or material is placed

3/08 . . the liquid having chemical or dissolving effect (substances used, see the relevant classes)

3/10 . . with additional treatment of the liquid or of the object being cleaned, e.g. by heat, by electricity, by vibration

3/12 . . . by sonic or ultrasonic vibrations (washing or rinsing machines for crockery or tableware using sonic or ultrasonic waves A47L 15/13; of natural teeth, of prostheses using ultrasonic techniques similar to those used for natural teeth A61C 17/20; application of ultrasonic vibrations to chemical, physical, or physico-chemical processes in general B01J 19/10) **[2,5]**

3/14 . . . Removing waste, e.g. labels, from cleaning liquid (treatment of water in general C02F) **[5]**

5/00 **Cleaning by methods involving the use of air flow or gas flow** (B08B 6/00, B08B 9/00 take precedence) **[2,7]**

5/02 . Cleaning by the force of jets, e.g. blowing-out cavities

5/04 . Cleaning by suction, with or without auxiliary action (suction cleaners A47L)

6/00 **Cleaning by electrostatic means** (domestic cleaning implements functioning electrostatically A47L 13/40; cleaning of grooved record carriers G11B 3/58) **[2]**

7/00 **Cleaning by methods not provided for in a single other subclass or a single group in this subclass**

7/02 . by distortion, beating, or vibration of the surface to be cleaned

7/04 . by a combination of operations

9/00 **Cleaning hollow articles by methods or apparatus specially adapted thereto** (B08B 3/12, B08B 6/00 take precedence) **[2]**

9/02 . Cleaning pipes or tubes or systems of pipes or tubes (apparatus for cleaning metal pipes by chemical methods C23G 3/04) **[5]**

9/023 . . Cleaning the external surfaces **[7]**

9/027 . . Cleaning the internal surfaces; Removal of blockages **[7]**

9/032 . . . by the mechanical action of a moving fluid, e.g. by flushing (B08B 9/04 takes precedence) **[7]**

9/035 . . . . by suction **[7]**

9/04 . . . using cleaning devices introduced into and moved along the pipes **[1,7]**

9/043 . . . . moved by externally powered mechanical linkage, e.g. pushed or drawn through the pipes **[7]**

9/045 . . . . . the cleaning devices being rotated while moved (B08B 9/047 takes precedence) **[7]**

9/047 . . . . . the cleaning devices having motors for powering cleaning tools **[7]**

9/049 . . . . having self-contained propelling means for moving the cleaning devices along the pipes **[7]**

9/051 . . . . . the cleaning devices having motors for powering cleaning tools **[7]**

9/053 . . . . moved along the pipes by a fluid, e.g. by fluid pressure or by suction **[7]**

9/055 . . . . . the cleaning devices conforming to, or being conformable to, substantially the cross-section of the pipes, e.g. pigs or moles **[7]**

9/057 . . . . . the cleaning devices being entrained discrete elements, e.g. balls, grinding elements, brushes **[7]**

9/08 . Cleaning of containers, e.g. tanks

9/087 . . by methods involving the use of tools, e.g. brushes, scrapers (B08B 9/20 takes precedence) **[5]**

9/093 . . by the force of jets or sprays (B08B 9/20 takes precedence) **[5]**

9/20 . . by using apparatus into or on to which containers, e.g. bottles, jars, cans, are brought **[5]**

9/22 . . . the apparatus cleaning by soaking alone **[5]**

9/24 . . . . and having conveyers **[5]**

9/26 . . . . . Rotating conveyers **[5]**

9/28 . . . the apparatus cleaning by splash, spray or jet application, with or without soaking **[5]**

9/30 . . . . and having conveyers **[5]**

9/32 . . . . . Rotating conveyers **[5]**

9/34 . . . . Arrangement of conduits or nozzles **[5]**

9/36 . . . the apparatus cleaning by using brushes **[5]**

9/38 . . . the apparatus cleaning by using scrapers, chains, grains of shot, sand or other abrasive means (abrasive blasting in general B24C) **[5]**

9/40 . . . the apparatus cleaning by burning out **[5]**

9/42 . . . the apparatus being characterised by means for conveying or carrying containers therethrough **[5]**

9/44 . . . . the means being for loading or unloading the apparatus **[5]**

9/46 . . Inspecting cleaned containers for cleanliness **[5]**

11/00 **Cleaning flexible or delicate articles by methods or apparatus specially adapted thereto** (B08B 3/12, B08B 6/00 take precedence) **[2]**

11/02 . Devices for holding articles during cleaning

11/04 . specially adapted for plate glass, e.g. prior to manufacture of windshields (cleaning the gap between permanently secured panes E06B 3/677)

13/00 **Accessories or details of general applicability for machines or apparatus for cleaning**

15/00 **Preventing escape of dirt or fumes from the area where they are produced**; **Collecting or removing dirt or fumes from that area** (parts, details or accessories of cooking-vessels for withdrawing or condensing cooking vapours from such vessels A47J 36/38; refuse disposal B65F; devices for conducting smoke or fumes, e.g. flues, F23J 11/00; removing cooking fumes from domestic stoves or ranges F24C 15/20; air-conditioning, ventilation F24F) **[5]**

15/02 . using chambers or hoods covering the area

15/04 . from a small area, e.g. a tool

17/00 **Methods preventing fouling**

17/02 . Preventing deposition of fouling or of dust

17/04 . . by using removable coverings

17/06 . . by giving articles subject to fouling a special shape for arrangement

B09 DISPOSAL OF SOLID WASTE; RECLAMATION OF CONTAMINATED SOIL [3,6]

B09B DISPOSAL OF SOLID WASTE [3]

(1) This subclass covers only single or combined, e.g. multistage, operations not fully classifiable in a single other subclass. **[3]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:

– "disposal" means the discarding, e.g. dumping, or destroying of waste or its transformation into something useful or harmless; **[3]**

– "solid waste" includes waste which, although it has liquid content, is for practical purposes handled as solid. **[3]**

(3) Attention is drawn to the following places:

A23J	1/16	Obtaining proteins from waste water of starch-manufacturing plants or like wastes
A23K	1/06	Animal feeding-stuffs from distillers' or brewers' waste
A23K	1/08	Animal feeding-stuffs from waste products of dairy plants
A23K	1/10	Animal feeding-stuffs from kitchen waste
A43B	1/12	Footwear made of rubber waste
A61L	11/00	Disinfection or sterilisation methods specially adapted for refuse
A62D	3/00	Processes for making harmful chemical substances harmless, or less harmful, by effecting a chemical change in the substances
B01D	53/34	Chemical or biological purification of waste gases
B02C	18/00	Disintegrating by knives or other cutting or tearing members which chop material into fragments
B03B	7/00	Combinations of wet processes or apparatus with other processes or apparatus, e.g. for dressing ores or garbage
B03B	9/06	General arrangement of separating plant, e.g. flow sheets, specially adapted for refuse
B05B	15/04	Control of spray area of spraying plant, e.g. masking, side shields; Means for collection or re-use of excess material
B08B	15/00	Preventing escape of dirt or fumes from the area where they are produced; Collecting or removing dirt or fumes from that area
B22F	8/00	Manufacture of articles from scrap or waste metal particles
B23D	25/14	Machines or arrangements for shearing stock while the latter is travelling otherwise than in the direction of the cut without regard to the exact dimensions of the resulting material, e.g. for cutting up scrap
B24B	55/12	Devices for recovering materials resulting from grinding or polishing
B27B	33/20	Edge trimming saw blades or tools combined with means to disintegrate waste
B29B	17/00	Recovery of plastics or other constituents of waste material containing plastics
B30B	9/32	Presses for consolidating scrap metal or for compacting used cars
B62D	67/00	Systematic disassembly of vehicles for recovery of salvageable components, e.g. for recycling
B63B	17/06	Refuse discharge from vessels, e.g. for ash
B63J	4/00	Arrangements of installations for treating waste water or sewage on vessels
B65F	1/00	Refuse receptacles
B65F	3/00	Vehicles particularly adapted for collecting refuse
B65F	5/00	Gathering or removal of refuse otherwise than by receptacles or vehicles
B65F	7/00	Cleaning or disinfecting devices combined with refuse receptacles or refuse vehicles
C03C	1/00	Ingredients generally applicable to manufacture of glasses, glazes or vitreous enamels
C04B	7/24	Hydraulic cements from oil shales, residues or waste other than slag
C04B	11/26	Calcium sulfate cements made from phosphogypsum or from waste, e.g. purification products of smoke
C04B	18/04	Waste material or refuse used as fillers for mortars, concrete, artificial stone or the like
C04B	33/132	Waste materials or refuse used as compounding ingredients for clay-wares
C05F		Fertilisers from waste or refuse
C08B	16/00	Regeneration of cellulose
C08J	9/33	Agglomerating foam fragments, e.g. waste foam
C08J	11/00	Recovery of waste materials of macromolecular substances
C08L	17/00	Compositions of reclaimed rubber
C09K	11/01	Recovery of luminescent materials
C10B	53/00	Destructive distillation, specially adapted for particular solid raw materials or solid raw materials in special form
C10B	57/00	Other processes not covered before; Features of destructive distillation processes in general
C10G	1/10	Production of liquid hydrocarbon mixtures from rubber or rubber waste
C10G	73/23	Recovery of used solvents
C10L	5/46	Solid fuels essentially based on sewage, house or town refuse
C10L	5/48	Solid fuels essentially based on industrial residues and waste materials
C10M	175/02	Working-up used lubricants based on mineral oils
C11B	13/00	Recovery of fats, fatty oils, or fatty acids from waste materials
C11D	19/00	Recovery of glycerol from a saponification liquor
C12F	3/00	Recovery of by-products
C12F	3/08	Recovery of alcohol from press residues or other waste material
C12P	7/08	Biochemical production of ethanol from waste

C22B	7/00	Working-up raw materials other than ores, e.g. scrap, to produce non-ferrous metals or compounds thereof
C22B	19/28	Obtaining zinc or zinc oxide from muffle furnace residues
C22B	19/30	Obtaining zinc or zinc oxide from metallic residues or scraps
C22B	25/06	Obtaining tin from scrap
C25D	13/24	Regeneration of process liquids used in electrophoretic coating
C25D	21/16	Regeneration of process solutions used in electrolytic coating
D01B		Mechanical treatment of natural fibrous or filamentary material to obtain fibres or filaments, e.g. for spinning
D01C	5/00	Carbonising rags to recover animal fibres
D01F	13/00	Recovery of starting material, waste material or solvents during the manufacture of artificial filaments or the like
D01G	11/00	Disintegrating fibre-containing articles to obtain fibres for re-use
D01H	11/00	Arrangements for confining or removing dust, fly, or the like
D06L	1/10	Regeneration of used chemical baths used for dry-cleaning or washing fibres, fabrics or the like
D21B	1/08	Dry treatment of waste paper or rags for making paper or for the production of cellulose
D21B	1/32	Defibrating waste paper
D21C	5/02	Processes for obtaining cellulose by working-up waste paper
D21C	11/14	Regeneration of pulp liquors by wet combustion
D21F	1/66	Re-use of pulp-water in wet end machines for making continuous webs of paper
D21H	17/01	Waste products added to the pulp or used in paper-impregnating material
E03F		Sewers, cesspools
E04F	17/10	Arrangements in buildings for the disposal of refuse
F23G		Consuming waste by combustion
F23J		Removal or treatment of combustion products or combustion residues
G03C	11/24	Removing emulsion from waste photographic material
G03G	21/10	Collecting or recycling waste developer used in electrography, electrophotography, magnetography
G21F	9/28	Treating radioactively contaminated solids
H01B	15/00	Apparatus or processes for salvaging material from electric cables
H01J	9/52	Recovery of material from discharge tubes or lamps
H01M	6/52	Reclaiming serviceable parts of waste cells or batteries
H01M	10/54	Reclaiming serviceable parts of waste accumulators.

1/00 **Dumping solid waste [3]**

3/00 **Destroying solid waste or transforming solid waste into something useful or harmless [3]**

5/00 **Operations not covered by a single other subclass or by a single other group in this subclass [3]**

B09C **RECLAMATION OF CONTAMINATED SOIL** (gatherers for removing stones or the like from the soil A01B 43/00; sterilising soil by steam A01G 11/00; separation in general B01D; cleaning beaches E01H 12/00; removing undesirable matter, e.g. rubbish, from the land E01H 15/00) **[6]**

(1) In this subclass, the following term is used with the meaning indicated: **[6]**
– "reclamation" means the partial or total elimination or the fixing of contaminants in soil. **[6]**

(2) Processes using enzymes or micro-organisms in order to: **[6]**
(i) liberate, separate or purify a pre-existing compound or composition, or to **[6]**
(ii) treat textiles or clean solid surfaces of materials **[6]**
are further classified in subclass C12S. **[6]**

1/00 **Reclamation of contaminated soil** (processes for making harmful chemical substances harmless or less harmful by affecting a chemical change in the substances A62D 3/00) **[6]**

1/02 **.** Extraction using liquids, e.g. washing, leaching **[6]**

1/04 **.** Flotation **[6]**

1/06 **.** thermally (incinerators for contaminated soil F23G 7/14) **[6]**

1/08 **.** chemically **[6]**

1/10 **.** microbiologically or by using enzymes **[6]**

SHAPING

B21 MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL

(1) This class does not cover:
- combinations of operations covered by different subclasses of class B21, which are covered by subclass B23P;
- combinations of operations covered by any particular subclass of class B21 with operations covered by other classes, e.g. with operations involving removal of material, which are also covered by subclass B23P, except that if the operations covered by the other classes are subsidiary to the operations properly covered by a single subclass of B21 the combination is classified in that subclass.

(2) Processes of a kind covered by this class but applied to non-metallic materials are classified in this class if they are applicable to metal and cannot be classified fully in another class.

B21B **ROLLING OF METAL** (auxiliary operations used in connection with metal-working operations covered in B21, see B21C; bending by rolling B21D; manufacture of particular objects, e.g. screws, wheels, rings, barrels, balls, by rolling B21H; pressure welding by means of a rolling mill B23K 20/04)

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
- "rolling" means rolling operations in which plastic deformations occur;
- "continuous process" means a process employing a mill train designed to have the workpiece enter one pair of rolls before leaving the preceding pair. **[2]**

Subclass index

1/00 **Metal rolling methods or mills for making semi-finished products of solid or profiled cross-section** (B21B 17/00 to B21B 23/00 take precedence; with respect to composition of material to be rolled B21B 3/00; extending closed shapes of metal bands by simultaneous rolling at two or more zones B21B 5/00; metal-rolling stands as units B21B 13/00; continuous casting into moulds having walls formed by moving rolls B22D 11/06); **Sequence of operations in milling trains**; **Layout of rolling-mill plant, e.g. grouping of stands**; **Succession of passes or of sectional pass alternations**

1/02 . for rolling heavy work, e.g. ingots, slabs, billets, in which the cross-sectional form is unimportant

1/04 . . in a continuous process

1/06 . . in a non-continuous process

1/08 . for rolling work of special cross-section, e.g. angle steel (rolling metal of indefinite length in repetitive shapes specially designed for the manufacture of particular objects B21H 8/00) **[1,8]**

1/082 . . Piling sections having lateral edges specially adapted for interlocking with each other in order to build a wall **[8]**

1/085 . . Rail sections **[8]**

1/088 . . H- or I-sections **[8]**

1/09 . . L-sections **[8]**

1/092 . . T-sections **[8]**

1/095 . . U- or channel sections **[8]**

1/098 . . Z-sections **[8]**

1/10 . . in a single two-high or universal rolling mill

1/12 . . in a continuous process

1/14 . . in a non-continuous process

1/16 . for rolling wire or material of like small cross-section

1/18 . . in a continuous process

1/20 . . in a non-continuous process

1/22 . for rolling bands or sheets of indefinite length (B21B 1/42 takes precedence)

1/24 . . in a continuous process

1/26 . . . by hot-rolling

1/28 . . . by cold-rolling
1/30 . . in a non-continuous process
1/32 . . . in reversing mills, e.g. with intermediate storage reels for accumulating work
1/34 . . . . by hot-rolling
1/36 . . . . by cold-rolling
1/38 . for rolling sheets of limited length, e.g. folded sheets, superimposed sheets (B21B 1/40 takes precedence; folding sheets before, or separating layers after, rolling B21B 47/00) **[2]**
1/40 . for rolling foils which present special problems, e.g. because of thinness
1/42 . for step-by-step or planetary rolling (making tubes by pilgrim-step rolling B21B 21/00)
1/46 . for rolling metal immediately subsequent to continuous casting (metal-rolling stands B21B 13/22; continuous casting B22D 11/00, e.g. into moulds with rolls B22D 11/06) **[3]**

3/00 Rolling materials of special alloys so far as the composition of the alloy requires or permits special rolling methods or sequences (altering special metallurgical properties of alloys, other than structure consolidation or mechanical properties resulting therefrom C21D, C22F)
3/02 . Rolling special iron alloys

5/00 Extending closed shapes of metal bands by rolling (manufacture of circular shapes, e.g. wheel rims, B21H 1/06)

9/00 Measures for carrying out rolling operations under special conditions, e.g. in vacuum or inert atmosphere to prevent oxidation of work; **Special measures for removing fumes from rolling mills**

11/00 Subsidising the rolling processes by subjecting rollers or work to vibrations

13/00 Metal-rolling stands, i.e. an assembly composed of a stand frame, rolls, and accessories (B21B 17/00 to B21B 23/00 take precedence; details, component parts, accessories, auxiliary means, procedures in connection with metal rolling, see the relevant groups)
13/02 . with axes of rolls arranged horizontally
13/04 . . Three-high arrangement
13/06 . with axes of rolls arranged vertically
13/08 . with differently-directed roll axes, e.g. for the so-called “universal” rolling process
13/10 . . all axes being arranged in one plane
13/12 . . axes being arranged in different planes
13/14 . having counter-pressure devices acting on rolls to inhibit deflection of same under load (counter-pressure devices as such B21B 29/00)
13/16 . with alternatively operative rolls
13/18 . for step-by-step or planetary rolling (methods B21B 1/42; making tubes by pilgrim-step rolling B21B 21/00)
13/20 . . for planetary rolling
13/22 . for rolling metal immediately subsequent to continuous casting (methods therefor B21B 1/46; continuous casting B22D 11/00, e.g. into moulds with rolls B22D 11/06)

15/00 Arrangements for performing additional metal-working operations specially combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills
15/02 . in which work is subjected to permanent internal twisting, e.g. for producing reinforcement bars for concrete

Rolling methods or mills specially designed for making or processing tubes

17/00 Tube-rolling by rollers of which the axes are arranged essentially perpendicular to the axis of the work, e.g. ”axial” tube-rolling
17/02 . with mandrel (B21B 17/08 takes precedence) **[2]**
17/04 . . in a continuous process
17/06 . . in a discontinuous process
17/08 . with mandrel having one or more protrusions **[2]**
17/10 . . in a continuous process
17/12 . . in a discontinuous process
17/14 . without mandrel

19/00 Tube-rolling by rollers arranged outside the work and having their axes not perpendicular to the axis of the work (straightening by rollers B21D)
19/02 . the axes of the rollers being arranged essentially diagonally to the axis of the work, e.g. ”cross” tube-rolling
19/04 . . Rolling basic material of solid, i.e. non-hollow, structure; Piercing
19/06 . . Rolling hollow basic material (B21B 19/04 takes precedence; separating work from mandrel B21C 45/00)
19/08 . . . Enlarging tube diameter
19/10 . . . Finishing, e.g. smoothing, sizing
19/12 . the axes of the rollers being arranged essentially parallel to the axis of the work
19/14 . . Rolling tubes by means of additional rollers arranged inside the tubes
19/16 . . Rolling tubes without additional rollers arranged inside the tubes

21/00 Pilgrim-step tube-rolling
21/02 . Rollers therefor
21/04 . Pilgrim-step feeding mechanisms (B21B 21/06 takes precedence)
21/06 . Devices for revolving work between the steps

23/00 Tube-rolling not restricted to methods provided for in only one of groups B21B 17/00 to B21B 21/00, e.g. combined processes (B21B 25/00 takes precedence)

25/00 Mandrels for metal tube rolling mills, e.g. mandrels of the types used in the methods covered by group B21B 17/00; **Accessories or auxiliary means therefor**
25/02 . Guides, supports, or abutments for mandrels, e.g. carriages; Adjusting devices for mandrels
25/04 . Cooling or lubricating mandrels during operation **[2]**
25/06 . Interchanging mandrels

27/00 Rolls (shape of working surfaces required by special processes B21B 1/00); **Lubricating, cooling or heating rolls while in use**
27/02 . Shape or construction of rolls (for rolling metal of indefinite length in repetitive shapes specially designed for the manufacture of particular objects B21H 8/02)

27/03 . . Sleeved rolls **[5]**
27/05 . . . with deflectable sleeves **[5]**
27/06 . Lubricating, cooling, or heating rolls
27/08 . . internally
27/10 . . externally

28/00 Maintaining rolls or rolling equipment in effective condition (lubricating, cooling or heating rolls while in use B21B 27/06) **[2]**
28/02 . Maintaining rolls in effective condition, e.g. reconditioning **[2]**
28/04 . . while in use, e.g. polishing **[2]**

29/00 Counter-pressure devices acting on rolls to inhibit deflection of same under load, e.g. backing rolls

31/00 Rolling stand structures; **Mounting, adjusting, or interchanging rolls, roll mountings, or stand frames**
31/02 . Rolling stand frames; Roll mountings
31/04 . . with tie rods, e.g. prestressed tie rods
31/06 . . Fastening stands or frames to foundation, e.g. to the sole plate (in general F16M)
31/07 . Adaptation of roll bearings (bearings in general F16C) **[2]**
31/08 . Interchanging rolls, roll mountings, or stand frames **[2]**
31/10 . . by horizontally displacing
31/12 . . by vertically displacing
31/14 . . by pivotally displacing
31/16 . Adjusting rolls (control devices B21B 37/00)
31/18 . . by moving rolls axially
31/20 . . by moving rolls perpendicularly to roll axis
31/22 . . . mechanically
31/24 . . . . by screws
31/26 . . . . Adjusting eccentrically-mounted roll bearings
31/28 . . . . by toggle-lever mechanisms
31/30 . . . . by wedges or their equivalent
31/32 . . . by liquid pressure

33/00 Safety devices not otherwise provided for (safety devices in general F16P); **Breaker blocks**; **Devices for freeing jammed rolls [2]**
33/02 . Preventing fracture of rolls **[2]**

35/00 Drives for metal-rolling mills
35/02 . for continuously-operating mills (B21B 35/10, B21B 35/12 take precedence)
35/04 . . each stand having its own motor or motors
35/06 . for non-continuously-operating mills or for single stands (B21B 35/10, B21B 35/12 take precedence)
35/08 . . for reversing rolling mills
35/10 . Driving arrangements for rolls which have only a low-power drive; Driving arrangements for rolls which receive power from the shaft of another roll **[2]**
35/12 . Toothed-wheel gearings specially adapted for metal-rolling mills; Housings or mountings therefor
35/14 . Couplings, driving spindles, or spindle carriers specially adapted for or specially arranged in metal-rolling mills (couplings or shafts in general F16)

37/00 Control devices or methods specially adapted for metal-rolling mills or the work produced thereby (methods or devices for measuring specially adapted for metal-rolling mills B21B 38/00)
37/16 . Control of thickness, width, diameter or other transverse dimensions (B21B 37/58 takes precedence) **[6]**
37/18 . . Automatic gauge control **[6]**
37/20 . . . in tandem mills **[6]**
37/22 . . Lateral spread control; Width control, e.g. by edge rolling **[6]**
37/24 . . Automatic variation of thickness according to a predetermined programme **[6]**
37/26 . . . for obtaining one strip having successive lengths of different constant thickness **[6]**
37/28 . Control of flatness or profile during rolling of strip, sheets or plates **[6]**
37/30 . . using roll camber control **[6]**
37/32 . . . by cooling, heating or lubricating the rolls **[6]**
37/34 . . . by hydraulic expansion of the rolls **[6]**
37/36 . . . by radial displacement of the roll sleeve on a stationary roll beam by means of hydraulic supports **[6]**
37/38 . . using roll bending (B21B 37/42 takes precedence) **[6]**
37/40 . . using axial shifting of the rolls (B21B 37/42 takes precedence) **[6]**
37/42 . . using a combination of roll bending and axial shifting of the rolls **[6]**
37/44 . . using heating, lubricating or water-spray cooling of the product **[6]**
37/46 . Roll speed or drive motor control (B21B 37/52, B21B 37/60 take precedence) **[6]**
37/48 . Tension control; Compression control **[6]**
37/50 . . by looper control **[6]**
37/52 . . by drive motor control **[6]**
37/54 . . . including coiler drive control, e.g. reversing mills **[6]**
37/56 . Elongation control **[6]**
37/58 . Roll-force control; Roll-gap control **[6]**
37/60 . . by control of a motor which drives an adjusting screw **[6]**
37/62 . . by control of a hydraulic adjusting device **[6]**
37/64 . . Mill spring or roll spring compensation systems, e.g. control of prestressed mill stands **[6]**
37/66 . . Roll eccentricity compensation systems **[6]**
37/68 . Camber or steering control for strip, sheets or plates, e.g. preventing meandering **[6]**
37/70 . Length control (B21B 37/56 takes precedence) **[6]**
37/72 . Rear end control; Front end control **[6]**
37/74 . Temperature control, e.g. by cooling or heating the rolls or the product (B21B 37/32, B21B 37/44 take precedence) **[6]**
37/76 . . Cooling control on the run-out table **[6]**
37/78 . Control of tube rolling **[6]**

38/00 Methods or devices for measuring specially adapted for metal-rolling mills, e.g. position detection, inspection of the product [6]
38/02 . for measuring flatness or profile of strips **[6]**
38/04 . for measuring thickness, width, diameter or other transverse dimensions of the product **[6]**
38/06 . for measuring tension or compression **[6]**
38/08 . for measuring roll-force **[6]**
38/10 . for measuring roll-gap, e.g. pass indicators **[6]**
38/12 . for measuring roll camber **[6]**

39/00 Arrangements for moving, supporting, or positioning work, or controlling its movement, combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills (guiding, conveying, or accumulating easily-flexible work in loops or curves B21B 41/00; specially associated with cooling-beds B21B 43/00; conveying or transporting in general B65G)

39/02 . Feeding or supporting work; Braking or tensioning arrangements

39/04 . . Lifting or lowering work for conveying purposes, e.g. tilting tables arranged immediately in front of or behind the pass (turn-over or like manipulating means as such B21B 39/20)

39/06 . . Pushing or forcing work into pass

39/08 . . Braking or tensioning arrangements

39/10 . . Arrangement or installation of feeding rollers in rolling stands

39/12 . . Arrangement or installation of roller tables in relation to a roll stand

39/14 . Guiding, positioning or aligning work (B21B 43/12 takes precedence; guides in which work is subjected to permanent internal twisting B21B 15/02)

39/16 . . immediately before entering or after leaving the pass

39/18 . . Switches for directing work in metal-rolling mills or trains

39/20 . Revolving, turning-over, or like manipulation of work (guides in which work is subjected to permanent internal twisting B21B 15/02)

39/22 . . by tipping, e.g. by lifting one side by levers or wedges (B21B 39/26, B21B 39/28 take precedence)

39/24 . . by tongs or grippers

39/26 . . by members, e.g. grooved, engaging opposite sides of the work and moved relatively to each other to revolve the work

39/28 . . by means of guide members shaped to revolve the work during its passage

39/30 . . by lodging it in a rotating ring manipulator or ring segment manipulator

39/32 . . Devices specially adapted for turning sheets

39/34 . Arrangements or constructional combinations specifically designed to perform functions covered by more than one of groups B21B 39/02, B21B 39/14, B21B 39/20

41/00 Guiding, conveying, or accumulating easily-flexible work, e.g. wire, sheet metal bands, in loops or curves; **Loop lifters**

41/02 . Returning work to repeat the pass or passes

41/04 . . above or underneath the rolling stand or rolls

41/06 . in which the direction of movement of the work is turned through approximately 180°

41/08 . without overall change in the general direction of movement of the work

41/10 . . Loop deflectors

41/12 . Arrangements of interest only with respect to provision for indicating or controlling operations

43/00 Cooling beds, whether stationary or moving; **Means specially associated with cooling beds, e.g. for braking work or for transferring it to or from the bed** (conveying means in general B65G)

43/02 . Cooling beds comprising rakes or bars (B21B 43/10 takes precedence) **[2]**

43/04 . Cooling beds comprising rolls or worms

43/06 . Cooling beds comprising carriages (B21B 43/08 takes precedence)

43/08 . Cooling beds comprising revolving drums or recycling chains

43/10 . Cooling beds with other work-shifting elements projecting through the bed

43/12 . Devices for positioning workpieces "flushed", i.e. with all their axial ends arranged in line on cooling beds or on co-operating conveyers **[2]**

45/00 Devices for surface treatment of work, specially combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills (B21B 15/00 takes precedence; technical features of scaling-off devices B21C 43/00)

45/02 . for lubricating, cooling, or cleaning

45/04 . for de-scaling

45/06 . . of strip material (B21B 45/08 takes precedence)

45/08 . . hydraulically

47/00 Auxiliary arrangements, devices or methods in connection with rolling of multi-layer sheets of metal (soaking pits C21D 9/70) **[2]**

47/02 . for folding sheets before rolling

47/04 . for separating layers after rolling

99/00 Subject matter not provided for in other groups of this subclass [8]

B21C MANUFACTURE OF METAL SHEETS, WIRE, RODS, TUBES, PROFILES OR LIKE SEMI-MANUFACTURED PRODUCTS OTHERWISE THAN BY ROLLING; AUXILIARY OPERATIONS USED IN CONNECTION WITH METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL

Subclass index

Metal drawing

1/00 Manufacture of metal sheets, wire, rods, tubes or like semi-manufactured products by drawing

1/02 . Drawing metal wire or like flexible metallic material by drawing machines or apparatus in which the drawing action is effected by drums

1/04 . . with two or more dies operating in series

1/06 . . . in which the material slips on the drums

1/08 . . . in which the material does not slip on the drums

1/10 . . . . with accumulation of material between consecutively-arranged dies

1/12 . . Regulating or controlling speed of drawing drums, e.g. to influence tension; Drives; Stop or relief mechanisms (couplings for drums B21C 1/14; design or construction of electrical equipment, see the relevant classes)

1/14 . . Drums, e.g. capstans (capstans or winches in general B66D); Connection of grippers thereto; Grippers specially adapted for drawing machines or apparatus of the drum type; Couplings specially adapted for these drums

1/16 . Metal drawing by machines or apparatus in which the drawing action is effected by means other than drums, e.g. by a longitudinally-moved carriage pulling or pushing the work or stock for making metal sheets, rods or tubes

1/18 . . from stock of limited length (B21C 1/22 takes precedence)

1/20 . . from stock of essentially unlimited length (B21C 1/22 takes precedence)

1/22 . . specially adapted for making tubular articles (bending sheet metal into tubular form by drawing B21D 5/10)

1/24 . . . by means of mandrels (mandrels B21C 3/16)

1/26 . . . . Push-bench drawing

1/27 . . Carriages; Drives

1/28 . . . Carriages; Connections of grippers thereto; Grippers (for drawing machines of the drum type B21C 1/14)

1/30 . . . Drives, e.g. carriage-traversing mechanisms; Driving elements, e.g. drawing chains; Controlling the drive

1/32 . . Feeding or discharging the material or mandrels

1/34 . . Guiding or supporting the material or mandrels

3/00 Profiling tools for metal drawing; **Combinations of dies and mandrels for metal drawing**

3/02 . Dies; Selection of material therefor; Cleaning thereof

3/04 . . with non-adjustable section (B21C 3/08 takes precedence)

3/06 . . with adjustable section (B21C 3/08 takes precedence)

3/08 . . with section defined by rollers, balls, or the like

3/10 . . with hydraulic forces acting immediately on work

3/12 . . Die holders; Rotating dies

3/14 . . . Die holders combined with devices for guiding the drawing material or combined with devices for cooling, heating, or lubricating

3/16 . Mandrels (separating mandrels from work B21C 45/00); Mounting or adjusting same

3/18 . Making tools by operations not covered by a single other subclass; Repairing

5/00 Pointing or push-pointing drawn work or drawing material

9/00 Cooling, heating or lubricating drawing material (B21C 3/14 takes precedence)

9/02 . Selection of compositions therefor

19/00 Devices for straightening wire or like work combined with or specially adapted for use in connection with drawing or winding machines or apparatus

Metal extruding

23/00 Extruding metal; **Impact extrusion**

23/01 . starting from material of particular form or shape, e.g. mechanically pre-treated (B21C 23/22 takes precedence; heat treatment or combinations thereof with mechanical treatments, see appropriate classes)

23/02 . Making uncoated products

23/03 . . by both direct and backward extrusion

23/04 . . by direct extrusion

23/06 . . . Making sheets

23/08 . . . Making wire, rods or tubes

23/10 . . . . Making finned tubes

23/12 . . . . Extruding bent tubes or rods

23/14 . . . Making other products

23/16 . . . . Making turbo blades or propellers

23/18 . . by impact extrusion **[2]**

23/20 . . by backward extrusion

23/21 . Presses specially adapted for extruding metal (extrusion presses in general B30B 11/22)

23/22 . Making metal-coated products; Making products from two or more metals

23/24 . . Covering indefinite lengths of metal or non-metal material with a metal coating

23/26 . . . Applying metal coats to cables, e.g. to insulated electric cables

23/28 . . . . on intermittently-operating extrusion presses

23/30 . . . . on continuously-operating extrusion presses

23/32 . Lubrication of metal being extruded or of dies, or the like, e.g. physical state of lubricant, location where lubricant is applied (chemical composition, see appropriate classes)

25/00 Profiling tools for metal extruding

25/02 . Dies

25/04 . Mandrels

25/06 . Press heads, dies, or mandrels for coating work

25/08 . Dies or mandrels with section variable during extruding, e. g for making tapered work; Controlling variation

25/10 . Making tools by operations not covered by a single other subclass

26/00 Rams or plungers for metal extruding; **Discs therefor [2]**

27/00 Containers for metal to be extruded (B21C 29/02 takes precedence)

27/02 . for making coated work

27/04 . Venting metal-container chamber

29/00 Cooling or heating extruded work or parts of the extrusion press

29/02 . of containers for metal to be extruded

29/04 . of press heads, dies, or mandrels

31/00 **Control devices for metal extruding, e.g. for regulating the pressing speed or temperature of metal** (B21C 25/08 takes precedence); **Measuring devices, e.g. for temperature of metal, combined with or specially adapted for use in connection with extrusion presses** (measuring devices of more general interest within subclass B21C, see group B21C 51/00)

33/00 **Feeding extrusion presses with metal to be extruded**

33/02 . the metal being in liquid form

35/00 **Removing work or waste from extruding presses**; **Drawing-off extruded work** (in connection with the extruding of bent tubes or rods B21C 23/12); **Cleaning dies, ducts, containers, or mandrels for metal extruding [2]**

35/02 . Removing or drawing-off work

35/03 . . Straightening the work (metal straightening in general B21D)

35/04 . Cutting-off or removing waste

35/06 . Cleaning dies, ducts, containers or mandrels **[2]**

37/00 **Manufacture of metal sheets, rods, wire, tubes, profiles or like semi-manufactured products, not otherwise provided for** (by rolling B21B; by working or processing semi-finished sheet metal, profiles, tubes, or wire B21D, B21F; by casting B22; by material-removing machine tools B23; by welding, e.g. cladding or plating, B23K; by grinding or polishing B24; by electroforming C25D 1/00); **Manufacture of tubes of special shape [2]**

37/02 . of sheets

37/04 . of rods or wire

37/06 . of tubes or metal hoses; Combined procedures for making tubes, e.g. for making multi-wall tubes (bending sheets for making tubes B21D 5/00; seaming by folding B21D 39/02)

37/08 . . Making tubes with welded or soldered seams (involving only a soldering or welding operation B23K)

37/083 . . . Supply, or operations combined with supply, of strip material

37/087 . . . using rods or strips of soldering material

37/09 . . . of coated strip material

37/10 . . Making tubes with riveted seams

37/12 . . Making tubes or metal hoses with helically arranged seams

37/14 . . Making tubes from doubled flat material

37/15 . . Making tubes of special shape; Making the fittings

37/16 . . . Making tubes with varying diameter in longitudinal direction

37/18 . . . . conical tubes

37/20 . . . Making helical or similar guides in or on tubes without removing material, e.g. by drawing same over mandrels, by pushing same through dies

37/22 . . . Making finned or ribbed tubes by fixing strip or like material to tubes (making heat exchangers B21D 53/02)

37/24 . . . . annularly-ribbed tubes

37/26 . . . . helically-ribbed tubes

37/28 . . . Making tube fittings for connecting pipes, e.g. U-pieces

37/29 . . . . Making branched pieces, e.g. T-pieces

37/30 . . Finishing tubes, e.g. sizing, burnishing

43/00 **Devices for cleaning metal products combined with or specially adapted for use with machines or apparatus provided for in this subclass**

43/02 . combined with or specially adapted for use in connection with drawing or winding machines or apparatus

43/04 . . Devices for de-scaling wire or like flexible work

Auxiliary operations used in connection with metal working without essentially removing material

45/00 **Separating mandrels from work or vice versa**

47/00 **Winding-up, coiling or winding-off metal wire, metal band or other flexible metal material characterised by features relevant to metal processing only** (coiling wire into particular forms B21F 3/00; hot coilers in connection with heat-treatment apparatus C21D 9/68)

47/02 . Winding-up or coiling

47/04 . . on or in reels or drums, without using a moving guide (reels or drums B21C 47/28)

47/06 . . . with loaded rollers, bolts, or equivalent means holding the material on the reel or drum

47/08 . . without making use of a reel or drum, the first turn being formed by a stationary guide

47/10 . . by means of a moving guide

47/12 . . . the guide moving parallel to the axis of the coil (B21C 47/14 takes precedence)

47/14 . . . by means of a rotating guide, e.g. laying the material around a stationary reel or drum

47/16 . Unwinding or uncoiling

47/18 . . from reels or drums

47/20 . . . the unreeled material moving transversely to the tangent line of the drum, e.g. axially, radially

47/22 . . Unwinding coils without reels or drums

47/24 . Transferring coils to or from winding apparatus or to or from operative position therein; Preventing uncoiling during transfer

47/26 . Special arrangements with regard to simultaneous or subsequent treatment of the material

47/28 . Drums or other coil-holders (gripping means B21C 47/32)

47/30 . . expansible or contractible

47/32 . Tongs or gripping means specially adapted for reeling operations

47/34 . Feeding or guiding devices not specially adapted to a particular type of apparatus

49/00 **Devices for temporarily accumulating material**

51/00 **Measuring, gauging, indicating, counting, or marking devices specially adapted for use in the production or manipulation of material in accordance with subclasses B21B to B21F**

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B21D **WORKING OR PROCESSING OF SHEET METAL OR METAL TUBES, RODS OR PROFILES WITHOUT ESSENTIALLY REMOVING MATERIAL**; **PUNCHING** (operations of the kind involved in the manufacture of such products B21B, B21C; working or processing of wire B21F; cutting or severing devices or machines in general B26; presses in general B30B)

(1) This subclass covers cutting or perforating of sheet metal or other stock material.
(2) This subclass does not cover the working of metal foils in a manner analogous to the working of paper, which is covered by classes B26, B31.

Subclass index

Straightening; **Restoring form**; **Bending**; **Corrugating**; **Flanging**

1/00 **Straightening, restoring form or removing local distortions of sheet metal or specific articles made therefrom** (B21D 3/00 takes precedence); **Stretching sheet metal combined with rolling** (working sheet metal of limited length by stretching B21D 25/00; by localised hammering B21D 31/06) **[2]**

1/02 . by rollers (B21D 1/06 takes precedence)
1/05 . Stretching combined with rolling **[2]**
1/06 . Removing local distortions
1/08 . . of hollow bodies made from sheet metal (of substantially open bodies B21D 1/10)
1/10 . . of specific articles made from sheet metal, e.g. mudguards
1/12 . Straightening vehicle body parts or bodies (B21D 1/14 takes precedence)
1/14 . Straightening frame structures

3/00 **Straightening or restoring form of metal rods, metal tubes, metal profiles, or specific articles made therefrom, whether or not in combination with sheet metal parts** (straightening of well casings in situ E21B)

3/02 . by rollers
3/04 . . arranged on axes skew to the path of the work
3/05 . . arranged on axes rectangular to the path of the work **[2]**
3/06 . . arranged inclined to a revolving flier rolling frame
3/08 . . which move in an orbit without rotating round the work
3/10 . between rams and anvils or abutments
3/12 . by stretching with or without twisting (by twisting only B21D 11/14)
3/14 . Recontouring
3/16 . of specific articles made from metal rods, tubes, or profiles, e.g. crankshafts, by specially-adapted methods or means

5/00 **Bending sheet metal along straight lines, e.g. to form simple curves** (B21D 11/06 to B21D 11/18 take precedence; corrugating sheet metal B21D 13/00; as edge treatment B21D 19/00)

5/01 . between rams and anvils or abutments
5/02 . on press brakes without making use of clamping means
5/04 . on brakes making use of clamping means on one side of the work
5/06 . by drawing procedure making use of dies or forming-rollers, e.g. making profiles
5/08 . . making use of forming-rollers (B21D 5/12 takes precedence)
5/10 . . for making tubes
5/12 . . . making use of forming-rollers
5/14 . by passing between rollers (B21D 5/06 takes precedence)
5/16 . Folding; Pleating

7/00 **Bending rods, profiles, or tubes** (B21D 11/02 to B21D 11/18 take precedence; using mandrels or the like B21D 9/00)

7/02 . over a stationary forming member; by use of a swinging forming member or abutment **[2]**
7/022 . . over a stationary forming member only **[2]**
7/024 . . by a swinging forming member
7/025 . . . and pulling or pushing the ends of the work
7/028 . . . and altering the profile at the same time, e.g. forming bumpers
7/03 . . Apparatus with means to keep the profile in shape
7/04 . over a movably-arranged forming member (B21D 7/02 takes precedence)
7/06 . in press brakes or between rams and anvils or abutments; Pliers with forming dies
7/08 . by passing between rollers or through a curved die

7/10 . by abutting members and flexible bending means, e.g. with chains, ropes
7/12 . with programme control
7/14 . combined with measuring of bends or lengths
7/16 . Auxiliary equipment, e.g. for heating or cooling of bends

9/00 Bending tubes using mandrels or the like (B21D 11/02 to B21D 11/18 take precedence)
9/01 . the mandrel being flexible and engaging the entire tube length
9/03 . . and built-up from loose elements, e.g. series of balls
9/04 . the mandrel being rigid **[2]**
9/05 . co-operating with forming members
9/07 . . with one or more swinging forming members engaging tube ends only
9/08 . in press brakes or between rams and anvils or abutments; Pliers with forming dies
9/10 . by passing between rollers
9/12 . by pushing over a curved mandrel; by pushing through a curved die
9/14 . Wrinkle-bending, i.e. bending by corrugating
9/15 . using filling material of indefinite shape, e.g. sand, plastic material (filling of tubes with such material B21D 9/16) **[2]**
9/16 . Auxiliary equipment, e.g. machines for filling tubes with sand
9/18 . . for heating or cooling of bends

11/00 Bending not restricted to forms of material mentioned in only one of groups B21D 5/00, B21D 7/00, B21D 9/00; **Bending not provided for in groups B21D 5/00 to B21D 9/00** (corrugating or bending into wave form B21D 13/00, B21D 15/00; flanging B21D 19/00); **Twisting [2]**
11/02 . Bending by stretching or pulling over a die (working sheet metal of limited length by stretching B21D 25/00)
11/06 . Bending into helical or spiral form; Forming a succession of return bends, e.g. serpentine form (making helically seamed tubing B21C 37/12)
11/07 . . Making serpentine-shaped articles by bending essentially in one plane
11/08 . Bending by altering the thickness of part of the cross-section of the work (B21D 11/06 takes precedence)
11/10 . Bending specially adapted to produce specific articles, e.g. leaf springs
11/12 . . the articles being reinforcements for concrete
11/14 . Twisting
11/15 . . Reinforcing rods for concrete
11/16 . . Crankshafts
11/18 . Joggling
11/20 . Bending sheet metal, not otherwise provided for
11/22 . Auxiliary equipment, e.g. positioning devices

13/00 Corrugating sheet metal, rods or profiles; **Bending sheet metal, rods or profiles into wave form** (tubes B21D 15/00)
13/02 . by pressing
13/04 . by rolling
13/06 . by drawing
13/08 . by combined methods
13/10 . into a peculiar profiling shape

15/00 Corrugating tubes (wrinkle-bending using mandrels or the like B21D 9/14) **[2]**
15/02 . longitudinally
15/03 . . by applying fluid pressure
15/04 . transversely, e.g. helically
15/06 . . annularly
15/10 . . by applying fluid pressure
15/12 . Bending tubes into wave form

17/00 Forming single grooves in sheet metal or tubular or hollow articles
17/02 . by pressing (grooving or notching of bolts, studs, or the like B21K 1/54)
17/04 . by rolling

19/00 Flanging or other edge treatment, e.g. of tubes (connecting by making use of folds B21D 39/00; flaring out tube ends B21D 41/02)
19/02 . by continuously-acting tools moving along the edge (edge-curling B21D 19/12)
19/04 . . shaped as rollers
19/06 . . . working inwardly
19/08 . by single or successive action of pressing tools, e.g. vice jaws
19/10 . . working inwardly
19/12 . Edge-curling
19/14 . . Reinforcing edges, e.g. armouring same
19/16 . Reverse flanging of tube ends

21/00 Combined processes according to methods covered by groups B21D 1/00 to B21D 19/00

Stamping; **Spinning**; **Deep-drawing**; **Working sheet metal of limited length by stretching**; **Punching**

22/00 Shaping without cutting, by stamping, spinning, or deep-drawing (otherwise than using rigid devices or tools or yieldable or resilient pads B21D 26/00)
22/02 . Stamping using rigid devices or tools
22/04 . . for dimpling (combined with perforating B21D 28/24)
22/06 . . having relatively-movable die parts
22/08 . . with die parts on rotating carriers
22/10 . Stamping using yieldable or resilient pads
22/12 . . using enclosed flexible chambers
22/14 . Spinning
22/16 . . over shaping mandrels or formers
22/18 . . using tools guided to produce the required profile
22/20 . Deep-drawing (special deep-drawing arrangements in, or in connection with, presses B21D 24/00)
22/21 . . without fixing the border of the blank **[2]**
22/22 . . with devices for holding the edge of the blanks (B21D 22/24 to B21D 22/30 take precedence; shaping over a die without external former B21D 11/02)
22/24 . . involving two drawing operations having effects in opposite directions with respect to the blank
22/26 . . for making peculiarly, e.g. irregularly, shaped articles
22/28 . . of cylindrical articles using consecutive dies
22/30 . . to finish articles formed by deep-drawing

24/00 Special deep-drawing arrangements in, or in connection with, presses
24/02 . Die-cushions
24/04 . Blank holders; Mounting means therefor
24/06 . . Mechanically spring-loaded blank holders
24/08 . . Pneumatically or hydraulically loaded blank holders

24/10 . Devices controlling or operating blank holders independently, or in conjunction with dies
24/12 . . mechanically
24/14 . . pneumatically or hydraulically
24/16 . Additional equipment in association with the tools, e.g. for shearing, for trimming

25/00 Working sheet metal of limited length by stretching, e.g. for straightening [2]
25/02 . by pulling over a die **[2]**
25/04 . Clamping arrangements **[2]**

26/00 Shaping without cutting otherwise than using rigid devices or tools or yieldable or resilient pads, i.e. applying fluid pressure or magnetic forces (stamping using resilient pads B21D 22/10)
26/02 . *by applying fluid pressure* **[2,2011.01]**
26/021 . . *Deforming sheet bodies* **[2011.01]**
26/023 . . . *including an additional treatment performed by fluid pressure, e.g. perforating* **[2011.01]**
26/025 . . . *Means for controlling the clamping or opening of the moulds* **[2011.01]**
26/027 . . . *Means for controlling fluid parameters, e.g. pressure or temperature* **[2011.01]**
26/029 . . . *Closing or sealing means* **[2011.01]**
26/031 . . . *Mould construction (B21D 26/025 to B21D 26/029 take precedence)* **[2011.01]**
26/033 . . *Deforming tubular bodies (corrugating tubes by applying fluid pressure B21D 15/03, B21D 15/10)* **[2011.01]**
26/035 . . . *including an additional treatment performed by fluid pressure, e.g. perforating* **[2011.01]**
26/037 . . . *Forming branched tubes* **[2011.01]**
26/039 . . . *Means for controlling the clamping or opening of the moulds* **[2011.01]**
26/041 . . . *Means for controlling fluid parameters, e.g. pressure or temperature* **[2011.01]**
26/043 . . . *Means for controlling the axial pusher* **[2011.01]**
26/045 . . . *Closing or sealing means* **[2011.01]**
26/047 . . . *Mould construction (B21D 26/037 to B21D 26/045 take precedence)* **[2011.01]**
26/049 . . . *Deforming bodies having a closed end* **[2011.01]**
26/051 . . . *Deforming double-walled bodies* **[2011.01]**
26/053 . . *characterised by the material of the blanks* **[2011.01]**
26/055 . . . *Blanks having super-plastic properties* **[2011.01]**
26/057 . . . *Tailored blanks* **[2011.01]**
26/059 . . . *Layered blanks* **[2011.01]**
26/06 . . by shock waves
26/08 . . . generated by explosives, e.g. chemical explosives
26/10 . . . generated by evaporation, e.g. of wire, of liquids
26/12 . . . initiated by spark discharge **[2]**
26/14 . applying magnetic forces

28/00 Shaping by press-cutting; **Perforating**
28/02 . Punching blanks or articles with or without obtaining scrap (cutting nails or pins from strips or sheet material B21G 3/26); Notching
28/04 . . Centering the work; Positioning the tools
28/06 . . Making more than one part out of the same blank; Scrapless working
28/08 . . . Zig-zag sequence working
28/10 . . Incompletely punching in such a manner that the parts are still coherent with the work
28/12 . . Punching using rotatable carriers
28/14 . . Dies (ejecting or stripping-off devices arranged in punching machines or tools B21D 45/00)
28/16 . . Shoulder or burr prevention
28/18 . . Yieldable, e.g. rubber, punching pads
28/20 . . Applications of drives
28/22 . . Notching the peripheries of circular blanks, e.g. laminations for dynamo-electric machines
28/24 . Perforating, i.e. punching holes
28/26 . . in sheets or flat parts
28/28 . . in tubes or other hollow bodies
28/30 . . in annular parts, e.g. rims
28/32 . . in other articles of special shape
28/34 . . Perforating tools; Die holders
28/36 . . using rotatable work or tool holders

31/00 Other methods for working sheet metal, metal tubes, metal profiles (deforming one surface of tubes helically by rolling B21H 3/00; upsetting B21J 5/08; working metal by removing material therefrom B23; embossing B44B)
31/02 . Stabbing or piercing, e.g. for making sieves (dimpling B21D 22/04; perforating by punching B21D 28/24)
31/04 . Expanding other than provided for in groups B21D 1/00 to B21D 28/00, e.g. for making expanded metal (B21D 47/00 takes precedence; enlarging tube ends B21D 41/02) **[2]**
31/06 . Deforming sheet metal, tubes or profiles by sequential impacts, e.g. hammering, beating, peen forming (forging hammers B21J 7/00)

33/00 Special measures in connection with working metal foils, e.g. gold foils (cutting or perforating of metal foil analogous to paper B26)

35/00 Combined processes according to methods covered by groups B21D 1/00 to B21D 31/00 (B21D 21/00 takes precedence)

37/00 Tools as parts of machines covered by this subclass (forms or constructions of tools uniquely adapted for particular operations, see in the relevant groups for the operations)
37/01 . Selection of materials **[2]**
37/02 . Die constructions enabling assembly of the die parts in different ways (B21D 37/06 takes precedence)
37/04 . Movable or exchangeable mountings for tools
37/06 . . Pivotally-arranged tools, e.g. disengageable (die sets with dies pivoted to one another B21D 37/12)
37/08 . Dies with different parts for several steps in a process
37/10 . Die sets; Pillar guides
37/12 . . Particular guiding equipment; Special arrangements for interconnection or cooperation of dies
37/14 . Particular arrangements for handling and holding in place complete dies
37/16 . Heating or cooling
37/18 . Lubricating
37/20 . Making tools by operations not covered a single other subclass

39/00 **Application of procedures in order to connect objects or parts, e.g. coating with sheet metal otherwise than by plating** (riveting B21J; uniting components by forging or pressing to form integral members B21K 25/00; welding B23K; press-fitting, force-fitting, or shrinking in general B23P 11/00, B23P 19/00; by adhesives F16B 11/00); **Tube expanders**

39/02 . of sheet metal by folding, e.g. connecting edges of a sheet to form a cylinder

39/03 . of sheet metal otherwise than by folding **[2]**

39/04 . of tubes with tubes; of tubes with rods

39/06 . of tubes in openings, e.g. rolling-in

39/08 . Tube expanders

39/10 . . with rollers for expanding only

39/12 . . with rollers for expanding and flanging

39/14 . . with balls

39/16 . . with torque limiting devices

39/18 . . Rollers of special shape

39/20 . . with mandrels, e.g. expandable **[2]**

41/00 **Application of procedures in order to alter the diameter of tube ends** (B21D 39/00 takes precedence)

41/02 . Enlarging

41/04 . Reducing; Closing

43/00 **Feeding, positioning or storing devices combined with, or arranged in, or specially adapted for use in connection with, apparatus for working or processing sheet metal, metal tubes or metal profiles**; **Associations therewith of cutting devices** (cutting devices associated with the tool, see the relevant group for the tool)

43/02 . Advancing work in relation to the stroke of the die or tool

43/04 . . by means in mechanical engagement with the work

43/05 . . . specially adapted for multi-stage presses

43/06 . . . by positive or negative engaging parts co-operating with corresponding parts of the sheet or the like to be processed, e.g. carrier bolts or grooved section in the carriers

43/08 . . . by rollers

43/09 . . . . by one or more pairs of rollers for feeding sheet or strip material **[2]**

43/10 . . . by grippers

43/11 . . . . for feeding sheet or strip material **[2]**

43/12 . . . by chains or belts

43/13 . . . by linearly moving tables **[2]**

43/14 . . . by turning devices, e.g. turn-tables

43/16 . . by gravity, e.g. chutes

43/18 . . by means in pneumatic or magnetic engagement with the work

43/20 . Storage arrangements; Piling or unpiling (in general B65G)

43/22 . . Devices for piling sheets

43/24 . . Devices for removing sheets from a stack

43/26 . Stops

43/28 . Associations of cutting devices therewith

45/00 **Ejecting or stripping-off devices arranged in machines or tools dealt with in this subclass**

45/02 . Ejecting devices **[2]**

45/04 . . interrelated with motion of tool **[2]**

45/06 . Stripping-off devices **[2]**

45/08 . . interrelated with motion of tool **[2]**

45/10 . Combined ejecting and stripping-off devices **[2]**

Processing sheet metal or metal tubes, or processing metal profiles according to any of groups B21D 1/00 to B21D 45/00, in the manufacture of finished or semi-finished articles

47/00 **Making rigid structural elements or units, e.g. honeycomb structures**

47/01 . beams or pillars **[2]**

47/02 . . by expanding **[2]**

47/04 . composite sheet metal profiles

49/00 **Sheathing or stiffening objects** (by winding wire or tape thereon B65H 54/00, B65H 81/00; specially adapted for manufacturing conductors or cables H01B 13/26)

51/00 **Making hollow objects** (from thick-walled or non-uniform tubes B21K 21/00)

51/02 . characterised by the structure of the objects

Note

Making hollow objects characterised both by their structure and by their use is classified only in group B21D 51/16. **[2009.01]**

51/04 . . built-up objects, e.g. objects with rigidly-attached bottom or cover

51/06 . . folded objects

51/08 . . ball-shaped objects

51/10 . . conically or cylindrically shaped objects

51/12 . . objects with corrugated walls

51/14 . . Flattening hollow objects for transport or storage; Re-forming same (making tubes from doubled flat material B21C 37/14)

51/16 . characterised by the use of the objects (making heat exchangers B21D 53/02)

51/18 . . vessels, e.g. tubs, vats, tanks, sinks, or the like

51/20 . . . barrels

51/22 . . . pots, e.g. for cooking

51/24 . . high-pressure containers, e.g. boilers, bottles

51/26 . . cans or tins; Closing same in a permanent manner (making outlet arrangements B21D 51/38; welding or soldering B23K) **[2]**

51/28 . . . Folding the longitudinal seam

51/30 . . . Folding the circumferential seam

51/32 . . . . by rolling

51/34 . . . . by pressing

51/36 . . collapsible or like thin-walled tubes, e.g. for toothpaste

51/38 . . Making inlet or outlet arrangements of cans, tins, baths, bottles or other vessels; Making can ends; Making closures

51/40 . . . Making outlet openings, e.g. bung holes

51/42 . . . . Making or attaching spouts

51/44 . . . Making closures, e.g. caps (folded of thin metal foils in the way of making paper caps B31D 5/00; making closures in conjunction with applying same B67B)

51/46 . . . . Placing sealings or sealing material

51/48 . . . . Making crown caps

51/50 . . . . Making screw caps

51/52 . . boxes, cigarette cases, or the like

51/54 . . cartridge cases, e.g. for ammunition, for letter carriers in pneumatic-tube plants

53/00 **Making other particular articles** (making wire fabrics B21F; making chains or chain parts B21L)
53/02 . heat exchangers, e.g. radiators, condensers (making finned or ribbed tubes by fixing strip material or the like to tubes B21C 37/22) **[2]**
53/04 . . of sheet metal
53/06 . . of metal tubes
53/08 . . of both metal tubes and sheet metal (connecting tubes in openings B21D 39/06)
53/10 . parts of bearings; sleeves; valve seats or the like
53/12 . . cages for bearings
53/14 . belts, e.g. machine-gun belts
53/16 . rings, e.g. barrel hoops
53/18 . . of hollow or C-shaped cross-section, e.g. for curtains, for eyelets
53/20 . . washers, e.g. for sealing
53/22 . . . with means for preventing rotation
53/24 . nuts or like thread-engaging members
53/26 . wheels or the like
53/28 . . gear wheels
53/30 . . wheel rims
53/32 . . wheel covers
53/34 . . brake drums
53/36 . clips, clamps, or like fastening or attaching devices, e.g. for electric installation
53/38 . locksmith's goods, e.g. handles
53/40 . . hinges, e.g. door hinge plates
53/42 . . keys
53/44 . fancy goods, e.g. jewellery products
53/46 . haberdashery, e.g. buckles, combs; pronged fasteners, e.g. staples
53/48 . . buttons, e.g. press-buttons, snap fasteners
53/50 . . metal slide-fastener parts
53/52 . . . fastener elements; Attaching such elements so far as this procedure is combined with the process for making the elements
53/54 . . . slides
53/56 . . . stops
53/58 . end-pieces for laces or ropes
53/60 . cutlery wares; garden tools or the like
53/62 . . spoons; table forks
53/64 . . knives; scissors; cutting blades (B21D 53/72 takes precedence; handle portions B21D 53/70)
53/66 . . spades; shovels (handle portions B21D 53/70)
53/68 . . rakes, garden forks, or the like (handle portions B21D 53/70)
53/70 . . handle portions (B21D 53/72 takes precedence)
53/72 . . sickles; scythes
53/74 . frames for openings, e.g. for windows, doors, handbags
53/76 . writing or drawing instruments, e.g. writing pens, erasing pens
53/78 . propeller blades; turbine blades
53/80 . dustproof covers; safety covers
53/82 . perforated music sheets; pattern sheets, e.g. for control purposes, stencils
53/84 . other parts for engines, e.g. connecting-rods
53/86 . other parts for bicycles or motorcycles
53/88 . other parts for vehicles, e.g. cowlings, mudguards
53/90 . . axle-housings
53/92 . other parts for aircraft

55/00 **Safety devices protecting the machine or the operator, specially adapted for apparatus or machines dealt with in this subclass** (for presses in general B30B; safety devices in general F16P)

B21F **WORKING OR PROCESSING OF WIRE** (rolling of metal B21B; by drawing, auxiliary operations used in connection with metal-working without essentially removing material B21C; bundling articles B65B 13/00)

Subclass index

Wire working characterised by operations performed

1/00 **Bending wire other than coiling**; **Straightening wire**
1/02 . Straightening
1/04 . Undulating
1/06 . Bending wire-eyes

3/00 **Coiling wire into particular forms**
3/02 . helically
3/027 . . with extended ends formed in a special shape, e.g. for clothes-pegs
3/04 . . externally on a mandrel or the like
3/06 . . internally on a hollow form
3/08 . to flat spiral
3/10 . to spirals other than flat, e.g. conical
3/12 . of interconnected helical springs

5/00 **Upsetting wire** (in the manufacture of nails or pins B21G 3/12)

7/00 **Twisting wire**; **Twisting wire together** (for connections of limited size B21F 15/04)

9/00 **Straining wire** (straining prestressing wires for concrete E04G 21/12; connections or attachments adapted for straining F16G 11/00)

9/02 . by tools adapted also for making connections

11/00 **Cutting wire** (hand-held metal-shearing or metal-cutting devices B23D 29/00; hand cutting tools with two jaws which come into abutting contact B26B 17/00)

13/00 **Splitting wire**

15/00 **Connecting wire to wire or other metallic material or objects**; **Connecting parts by means of wire** (tools for both straining and connecting B21F 9/00; jacketing or reinforcing B21F 17/00; manufacture of wire network B21F 27/00; in making bands B21F 43/00)

15/02 . wire with wire

15/04 . . without additional connecting elements or material, e.g. by twisting

15/06 . . with additional connecting elements or material

15/08 . . . making use of soldering or welding

15/10 . wire with sheet metal

17/00 **Jacketing or reinforcing articles with wire** (by winding B65H 54/00, B65H 81/00; by braiding D04C)

19/00 **Metallic coating of wire** (by extruding B21C 23/24; by soldering or welding, e.g. cladding or plating, B23K; by other non-mechanical means C23; electroplating C25D)

23/00 **Feeding wire in wire-working machines or apparatus** (applicable also to feeding rods or strips B21D 43/00)

Wire working characterised by the particular articles produced

25/00 **Making barbed wire**

27/00 **Making wire network, i.e. wire nets** (meshed-ring network B21F 31/00; in making bands B21F 43/00; using looms D03D)

27/02 . without additional connecting elements or material at crossings, e.g. connected by knitting

27/04 . . Manufacturing on machines with rotating blades or formers

27/06 . . Manufacturing on twister-gear machines

27/08 . with additional connecting elements or material at crossings

27/10 . . with soldered or welded crossings

27/12 . Making special types or portions of network by methods or means specially adapted therefor

27/14 . . Specially bending or deforming free wire ends

27/16 . . for spring mattresses

27/18 . . of meshed work for filters or sieves

27/20 . . of plaster-carrying network

27/22 . . of network for wire-reinforced glass or the like

29/00 **Making fencing or like material made partly of wire** (B21F 25/00, B21F 27/00 take precedence) **[2]**

29/02 . comprising bars or the like connected by wires

31/00 **Making meshed-ring network from wire**

33/00 **Tools or devices specially designed for handling or processing wire fabrics or the like**

33/02 . Mounting of wire network on frames

33/04 . Connecting ends of helical springs for mattresses

35/00 **Making springs from wire** (by coiling wire B21F 3/00; making resilient rings B21F 37/02)

35/02 . Bending or deforming ends of coil springs to special shape

35/04 . Making flat springs, e.g. sinus springs

37/00 **Manufacture of rings from wire** (in chain making B21L; producing bead-rings or bead-cores for tyres B29D 30/48)

37/02 . or resilient rings, e.g. key-rings

37/04 . of washers (B21F 37/02 takes precedence)

39/00 **Making wheel spokes from wire**

41/00 **Making umbrella frames or members from wire**

43/00 **Making bands, e.g. bracelets, or wire** (making chains B21L; using looms D03D)

45/00 **Wire-working in the manufacture of other particular articles** (of pins, needles, nails, hairpins B21G; of chains B21L)

45/02 . of clothes hangers

45/04 . of elements, e.g. levers or links, for bottle stoppers

45/06 . of flexible shafts or hollow conduits, e.g. for Bowden mechanisms

45/08 . of loom heddles

45/10 . of cards for fabric-napping machines

45/12 . of fishing hooks

45/14 . of end-pieces for laces or ropes

45/16 . of devices for fastening or securing purposes

45/18 . . of slide fastener elements

45/20 . . of spring hooks; of spring safety hooks

45/22 . . of paper fasteners or clips (staples B21F 45/24)

45/24 . . of staples; of belt-fastening elements

45/26 . . of buttons

45/28 . . . of “patent-fastener” or press-button type

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B21G MAKING NEEDLES, PINS, OR NAILS

1/00 **Making needles used for performing operations** (forming heads on pin-like needles B21G 3/12; making U-shaped hairpins B21G 7/04)

Note

Group B21G 1/12 takes precedence over groups B21G 1/02 to B21G 1/10.

1/02 . of needles with eyes, e.g. sewing-needles, sewing-awls

1/04 . . of needles specially adapted for use in machines or tools

1/06 . of needles with hook or barb, e.g. crochet hooks
1/08 . of hollow needles or needles with hollow end, e.g. hypodermic needles, larding-needles (B21G 1/10 takes precedence)
1/10 . equipped with locking means for the material to be drawn through, e.g. for repairing tubeless tyres
1/12 . Securing, cleaning-off burrs, reconditioning, polishing, grinding

3/00 Making pins, nails, or the like (of pins with individual caps B21G 5/00; of U-like shape B21G 7/00; of split-pins B21G 7/08) **[2]**
3/02 . of pins of the kind used in the tailoring trade or the household
3/04 . . with locking or shielding device for the pin point, e.g. safety-pins
3/06 . of nails with shoulders
3/08 . of nails with head and two or more shanks or split shanks
3/10 . of undulated nails or pins
3/12 . Upsetting; Forming heads
3/14 . Reducing diameter of parts otherwise than by rolling
3/16 . Pointing, with or without cutting
3/18 . by operations not restricted to one of the groups B21G 3/12 to B21G 3/16 (B21G 3/06 to B21G 3/10 take precedence)
3/20 . . from wire of indefinite length (by rolling B21G 3/30)
3/22 . . . in pairs arranged head to head
3/24 . . . by simultaneously forming the head of one nail and the adjacent point of another
3/26 . . by cutting from strip or sheet material
3/28 . . by forging or pressing
3/30 . . by rolling
3/32 . Feeding material to be worked to nail or pin making machines

5/00 Making pins or nails with attached caps or with coated heads
5/02 . of drawing-pins or pins of drawing-pin type

7/00 Making pins of U-like shape or split-pins (of paper fasteners or staples B21D 53/46, B21F 45/16)
7/02 . of U-like shape
7/04 . . of hairpins
7/06 . . . of undulated hairpins
7/08 . of split-pins, e.g. cotter-pins

B21H MAKING PARTICULAR METAL OBJECTS BY ROLLING, E.G. SCREWS, WHEELS, RINGS, BARRELS, BALLS (essentially from sheet metal B21D)

Note

This subclass covers only rolling operations which are specially adapted for use in the manufacture of particular objects and which are not essentially combined with any different metal-working operation unless the latter is a subsidiary operation performed in the same machine.

1/00 Making articles shaped as bodies of revolution (rolling tubes B21B 17/00 to B21B 25/00)
1/02 . discs; disc wheels
1/04 . . with rim, e.g. railway wheels
1/06 . rings of restricted axial length (extending closed shapes of metal bands by simultaneous rolling at two or more zones B21B 5/00)
1/08 . . railway wheel rims
1/10 . . rims for pneumatic tyres
1/12 . . rings for ball or roller bearings
1/14 . balls, rollers, cone rollers, or like bodies
1/16 . . for bearings
1/18 . cylinders, e.g. rolled transversely
1/20 . . rolled longitudinally
1/22 . characterised by use of rolls having circumferentially varying profile **[2]**

3/00 Making helical bodies or bodies having parts of helical shape (helical gears B21H 5/00; bending strip or the like helically B21D 11/06; forming tubes or tube walls into helical shape B21D 15/04)
3/02 . external screw-threads
3/04 . . Making by means of profiled rolls
3/06 . . Making by means of profiled members other than rolls, e.g. jaws, moved longitudinally or curvilinearly with respect to each other
3/08 . internal screw-threads
3/10 . twist-drills; screw-taps
3/12 . articles with helicoidal surface

5/00 Making gear wheels
5/02 . with cylindrical outline
5/04 . bevel gears

7/00 Making articles not provided for in groups B21H 1/00 to B21H 5/00, e.g. agricultural tools, dinner forks, knives, spoons (nails, pins B21G 3/30)
7/02 . spades; shovels
7/04 . hoes
7/06 . ploughshares; axes
7/08 . forks; rakes
7/10 . knives; sickles; scythes
7/12 . horse-shoes; articles of like shape, e.g. wear-resisting attachments for shoes
7/14 . knurled articles
7/16 . turbine blades; compressor blades; propeller blades
7/18 . grooved pins; Rolling grooves, e.g. oil grooves, in articles

8/00 Rolling metal of indefinite length in repetitive shapes specially designed for the manufacture of particular objects
8/02 . Rolls of special shape

9/00 Feeding arrangements for rolling machines or apparatus manufacturing articles dealt with in this subclass
9/02 . for screw-rolling machines

B21J **FORGING**; **HAMMERING**; **PRESSING**; **RIVETING**; **FORGE FURNACES** (rolling of metal B21B; making particular products by forging or pressing B21K; cladding or plating B23K; finishing surfaces by hammering B23P 9/04; compacting surfaces by blasting with particulate material B24C 1/10; general features of presses, presses for consolidating scrap B30B; furnaces in general F27)

Subclass index

1/00 **Preparing metal stock**

1/02 . Preliminary treatment of metal stock without particular shaping, e.g. salvaging segregated zones, forging or pressing in the rough (modifying the physical properties by deformation C21D 7/00, C22F 1/00)

1/04 . Shaping in the rough solely by forging or pressing

1/06 . Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations

3/00 **Lubricating during forging or pressing** (lubricating in general F16N)

5/00 **Methods for forging, hammering, or pressing** (for working sheet metal or metal tubes, rods, or profiles B21D; for working wire B21F); **Special equipment or accessories therefor**

5/02 . Die forging; Trimming by making use of special dies

5/04 . by directly applied fluid pressure or explosive action

5/06 . for performing particular operations

5/08 . . Upsetting

5/10 . . Piercing billets (in combination with extrusion B21C 23/00)

5/12 . . Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering B21K)

7/00 **Hammers**; **Forging machines with hammers or die jaws acting by impact** (hand hammers B25D; electrical features section H)

7/02 . Special design or construction

7/04 . . Power hammers

7/06 . . Drop hammers

7/08 . . . with rigidly-guided hammer

7/10 . . with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers

7/12 . . . the lever being a spring, i.e. spring hammers

7/14 . . Forging machines working with several hammers

7/16 . . . in rotary arrangements

7/18 . . Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction, e.g. for swaging

7/20 . Drives for hammers; Transmission means therefor

7/22 . . for power hammers

7/24 . . . operated by steam, air, or other gaseous pressure

7/26 . . . . operated by internal combustion

7/28 . . . operated by hydraulic or liquid pressure

7/30 . . . operated by electro-magnets

7/32 . . . operated by rotary drive, e.g. electric motor

7/34 . . . operating both the hammer and the anvil, so-called counter-tup

7/36 . . for drop hammers

7/38 . . . driven by steam, air, or other gaseous pressure

7/40 . . . driven by hydraulic or liquid pressure

7/42 . . . operated by rotary drive, e.g. electric motors

7/44 . . . . equipped with belts, ropes, cables, chains

7/46 . . Control devices specially adapted to forging hammers, not restricted to one of the preceding subgroups

9/00 **Forging presses**

9/02 . Special design or construction

9/04 . . Piercing presses

9/06 . . Swawing presses; Upsetting presses

9/08 . . . equipped with devices for heating the workpiece (electric heating elements H05B)

9/10 . Drives for forging presses

9/12 . . operated by hydraulic or liquid pressure

9/14 . . . in conjunction with electric power

9/16 . . . in conjunction with steam or gas power

9/18 . . operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars

9/20 . . Control devices specially adapted to forging presses not restricted to one of the preceding subgroups

11/00 **Forging hammers combined with forging presses**; **Forging machines with provision for hammering and pressing**

13/00 **Details of machines for forging, pressing, or hammering**

13/02 . Dies or mountings therefor **[2]**

13/03 . . Die mountings **[2]**

13/04 . Frames; Guides

13/06 . Hammer tups; Anvils; Anvil blocks

13/08 . Accessories for handling work or tools

13/10 . . Manipulators (in general B25J)

13/12 . . . Turning means

13/14 . . Ejecting devices

15/00 **Riveting**

15/02 . Riveting procedures

15/04 . . Riveting hollow rivets mechanically

15/06 . . Riveting hollow rivets by means of hydraulic, liquid, or gas pressure

15/08 . . Riveting by applying heat to the end parts of the rivets to enable heads to be formed

15/10 . Riveting machines (electric heating elements H05B)

15/12 . . with tools or tool parts having a movement additional to the feed movement, e.g. spin
15/14 . . specially adapted for riveting specific articles, e.g. brake lining machines
15/16 . . Drives for riveting machines; Transmission means therefor
15/18 . . . operated by air pressure or other gas pressure, e.g. explosion pressure
15/20 . . . operated by hydraulic or liquid pressure
15/22 . . . operated by both hydraulic or liquid pressure and gas pressure
15/24 . . . operated by electro-magnets
15/26 . . . operated by rotary drive, e.g. by electric motor
15/28 . . Control devices specially adapted to riveting machines not restricted to one of the preceding subgroups
15/30 . . Particular elements, e.g. supports; Suspension equipment specially adapted for portable riveters
15/32 . . . Devices for inserting or holding rivets in position with or without feeding arrangements
15/34 . . . . for installing tubular rivets
15/36 . . Rivet sets, i.e. tools for forming heads; Mandrels for expanding parts of hollow rivets
15/38 . Accessories for use in connection with riveting, e.g. pliers for upsetting; Hand tools for riveting
15/40 . . for forming rivet heads
15/42 . . Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
15/44 . . Rivet hole positioners
15/46 . . Positioners for rivets for making tube joints
15/48 . . Devices for caulking rivets
15/50 . . Removing or cutting devices for rivets

17/00 **Forge furnaces** (furnaces for heat treatment C21D 9/00; furnaces in general F27)
17/02 . electrically heated (electric heating elements H05B)

19/00 **Blacksmiths' requisites not otherwise provided for**
19/02 . Hearths; Air supply arrangements specially adapted therefor
19/04 . Anvils; Associated items

B21K **MAKING FORGED OR PRESSED PRODUCTS, E.G. HORSE-SHOES, RIVETS, BOLTS, WHEELS** (making particular articles by working sheet metal without essentially removing material B21D; processing wire B21F; making pins, needles or nails B21G; making particular articles by rolling B21H; forging machines, pressing machines, hammering machines, in general B21J; making chains B21L; plating B23K)

Note

This subclass covers only forging, pressing, or hammering operations which are specially adapted for use in the manufacture of particular objects and which are not essentially combined with any different metal-working operation unless the latter is a subsidiary operation performed in the same machine.

Subclass index

Making particular articles by forging, pressing, or hammering; Equipment therefor

1/00 **Making machine elements**
1/02 . balls, rolls, or rollers, e.g. for bearings
1/04 . ball-races
1/05 . cages for bearings **[2]**
1/06 . axles or shafts
1/08 . . crankshafts
1/10 . . of cylindrical form
1/12 . . of specially-shaped cross-section
1/14 . fittings
1/16 . . parts of pipe or hose couplings
1/18 . pistons or plungers
1/20 . valve parts
1/22 . . poppet valves, e.g. for internal-combustion engines
1/24 . . valve bodies; valve seats
1/26 . housings or supporting parts, e.g. axle housings, engine mountings
1/28 . wheels; discs
1/30 . . with gear-teeth
1/32 . . discs, e.g. disc wheels
1/34 . . wheels with spokes
1/36 . . with blades
1/38 . . rims; tyres
1/40 . . hubs
1/42 . . pulleys, e.g. cable pulleys
1/44 . bolts, studs, or the like (making screw-thread B21K 1/56; making U-bolts B21K 1/74)
1/46 . . with heads
1/48 . . . Machines working with hammers, e.g. beating in a radial direction, for forming heads
1/50 . . . Trimming or shearing formed heads, e.g. working with dies
1/52 . . double-ended, e.g. with heads on both ends (forming heads B21K 1/46)
1/54 . . with grooves or notches
1/56 . screw-threaded elements **[2]**
1/58 . rivets
1/60 . . hollow or semi-hollow rivets
1/62 . . special rivets, e.g. with electrical contacts

1/64 . nuts (making screw-thread B21K 1/56)
1/66 . . from strip bars
1/68 . . from round or profiled bars
1/70 . . of special shape, e.g. self-locking nuts, wing nuts
1/72 . hooks, e.g. crane hooks, railway track spikes (making nails in general B21G)
1/74 . forked members or members with two or more limbs, e.g. U-bolts, anchors
1/76 . elements not mentioned in one of the preceding groups

3/00 Making engine or like machine parts not covered by B21K 1/00; **Making propellers or the like**
3/02 . cylinder heads
3/04 . blades, e.g. for turbines; Upsetting of blade roots

5/00 Making tools or tool parts, e.g. pliers
5/02 . drilling-tools or other tools for making or working on holes
5/04 . . twisting-tools, e.g. drills, reamers
5/06 . . Dressing, e.g. sharpening rock drills
5/08 . . drifting tools
5/10 . . Forming drill-bit shanks
5/12 . other cutting tools (cutlery wares B21K 11/00)
5/14 . hand hammers
5/16 . tools for turning nuts
5/18 . handles or parts therefor
5/20 . Making working faces of dies, either recessed or outstanding

7/00 Making railway appurtenances; **Making vehicle parts**
7/02 . parts for permanent way (spikes B21K 1/72)
7/04 . . switch tongues
7/06 . . sleepers
7/08 . . base plates for rails, e.g. chairs
7/10 . . rail joints
7/12 . parts for locomotives or vehicles, e.g. frames, underframes
7/14 . . brake rigging or brake parts **[2]**

9/00 Reconditioning railroad accessories, e.g. rails

11/00 Making cutlery wares; **Making garden tools or the like**
11/02 . knives
11/04 . spoons; table forks
11/06 . scissors
11/08 . sickles; scythes
11/10 . axes; picks
11/12 . spades; shovels
11/14 . rakes; garden forks

13/00 Making locksmiths' goods, e.g. handles for cases
13/02 . hinges

15/00 Making blacksmiths' goods
15/02 . horse-shoes; accessories therefor
15/04 . . caulks
15/06 . metal attachments for footwear, e.g. wear-resisting plates

17/00 Making sport articles, e.g. skates

19/00 Making articles for agricultural machinery
19/02 . plough blades; ploughshares

21/00 Making hollow articles not covered by any single one of groups B21K 1/00 to B21K 19/00 (essentially from sheet-metal or uniform thin-walled tubes B21D, e.g. B21D 41/00, B21D 51/00)
21/02 . Producing blanks in the shape of discs or cups as semi-finished articles for making hollow articles, e.g. to be deep-drawn or extruded
21/04 . Shaping thin-walled hollow articles, e.g. cartridges
21/06 . Shaping thick-walled hollow articles, e.g. projectiles
21/08 . Shaping hollow articles with different cross-section in longitudinal direction, e.g. nozzles, spark-plugs
21/10 . . cone-shaped or bell-shaped articles, e.g. insulator caps
21/12 . Shaping end portions of hollow articles
21/14 . . closed or substantially-closed ends, e.g. cartridge bottoms
21/16 . Remodelling hollow bodies with respect to the shape of the cross-section (remodelling end portions only B21K 21/12)

23/00 Making other articles
23/02 . members of endless tracks, e.g. track guides, shoes (making from sheet-metal B21D)
23/04 . flanged articles (B21K 1/28 takes precedence; flanging tubes B21D)

25/00 Uniting components to form integral members, e.g. turbine wheels and shafts, caulks with inserts, with or without shaping of the components (uniting by interference- or press-fitting B23P 11/02, B23P 19/02)

Accessories; **Auxiliary devices**

27/00 Handling devices, e.g. for feeding, aligning, discharging; **Cutting-off means**; **Arrangement thereof**
27/02 . Feeding devices for rods, wire, or strips
27/04 . . allowing successive working steps
27/06 . Cutting-off means; Arrangement thereof

29/00 Arrangements for heating or cooling during processing (for preparing metal stock to be forged or pressed B21J 1/06; heating equipment in general, see the appropriate subclasses, e.g. H05B)

31/00 Control devices specially adapted for positioning tool carriers

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B21L MAKING CHAINS (making chains or chain links by casting B22D 25/02; chains in general F16G)

Subclass index

1/00 **Making chains or chain links by bending workpieces of rod, wire, or strip to form links of oval or other simple shape** (B21L 3/00, B21L 7/00 take precedence)

1/02 . by bending the ends of the workpieces to abut

1/04 . by bending and interconnecting the ends of the workpieces with or without separate jointing members

3/00 **Making chains or chain links by bending the chain links or link parts and subsequently welding or soldering the abutting ends** (B21L 7/00 takes precedence)

3/02 . Machines or devices for welding chain links

3/04 . . by making use of forge or pressure welding

5/00 **Making chains or chain links by working the starting material in such a way that integral, i.e. jointless, chain links are formed**

5/02 . in such a way that interconnected links are formed

7/00 **Making chains or chain links by cutting single loops or loop-parts from coils, assembling the cut parts and subsequently subjecting same to twisting with or without welding**

9/00 **Making chains or chain links, the links being composed of two or more different parts, e.g. drive chains** (B21L 1/04, B21L 7/00, B21L 11/14, B21L 13/00 take precedence)

9/02 . of roller-chain or other plate-link type

9/04 . . Punching or bending the different parts of the chain links

9/06 . . Sorting, feeding, assembling, riveting, or finishing parts of chains

9/08 . . Combining the chain links with auxiliary parts, e.g. welding-on wear-resistant parts

11/00 **Making chains or chain links of special shape**

11/02 . each link being formed of a single member of which both ends are bent or shaped to engage the middle portion of the next link

11/04 . . the ends being pierced or punched to form eyes

11/06 . . . the workpiece being of thin strip metal

11/08 . . the ends being interengaged with other parts of the same link

11/10 . the chain links having opposed correspondingly shaped cylindrical and hook-like parts of which one part forms a hinge-like support for the adjacent link (B21L 11/02 takes precedence)

11/12 . Forming bead chains

11/14 . Making chain links with inserted or integrally-formed studs

13/00 **Making terminal or intermediate chain links of special shape**; **Making couplings for chains, e.g. swivels, shackles**

15/00 **Finishing or dressing chains or chain links, e.g. removing burr material, calibrating** (B21L 9/06 takes precedence)

15/02 . Twisting already closed links

19/00 **Appurtenances for chain-making not restricted to any particular process**

21/00 **Tools or implements for repairing chains using metal-working operations, e.g. for detaching deformed chain links**

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B22 CASTING; POWDER METALLURGY

B22C FOUNDRY MOULDING (moulding refractory materials in general B28B)

Note

This subclass covers:
- the making of moulds for casting metals or of other refractory moulds;
- selection or preparation of materials therefor;
- the necessary patterns, processes, machines, accessory devices or tools.

Subclass index

1/00 Compositions of refractory mould or core materials; **Grain structures thereof** (refractory materials in general C04B 35/00); **Chemical or physical features in the formation or manufacture of moulds**

1/02 . characterised by additives for special purposes, e.g. indicators, breakdown additives

1/04 . . for protection of the casting, e.g. against decarbonisation

1/06 . . . for casting extremely oxidisable metals

1/08 . . for decreasing shrinkage of the mould, e.g. for investment casting

1/10 . . for influencing the hardening tendency of the mould material (influencing the hardening tendency of the binding agent only B22C 1/16)

1/12 . . for manufacturing permanent moulds or cores

1/14 . . for separating the pattern from the mould

1/16 . characterised by the use of binding agents; Mixtures of binding agents

1/18 . . of inorganic agents

1/20 . . of organic agents

1/22 . . . of resins or rosins

1/24 . . . of oily or fatty substances; of distillation residues therefrom

1/26 . . . of carbohydrates; of distillation residues therefrom

3/00 Selection of compositions for coating the surfaces of moulds, cores, or patterns

3/02 . specially adapted for vacuum-sealed moulding **[6]**

5/00 Machines or devices specially designed for dressing or handling the mould material so far as specially adapted for that purpose (of general applicability, see the relevant places, e.g. for material with water-setting properties B28C)

5/02 . Dressing by centrifuging essentially or additionally

5/04 . by grinding, blending, mixing, kneading, or stirring

5/06 . by sieving or magnetic separating

5/08 . by sprinkling, cooling, or drying

5/10 . by dust separating

5/12 . for filling flasks (in combination with compacting B22C 15/20 to B22C 15/28)

5/13 . . during vacuum-sealed moulding **[6]**

5/14 . Equipment for storing or handling the dressed mould material, forming part of a plant for preparing such material

5/16 . . with conveyers or other equipment for feeding the material

5/18 . Plants for preparing mould materials

7/00 Patterns; **Manufacture thereof so far as not provided for in other classes**

7/02 . Lost patterns

7/04 . Pattern plates

7/05 . . for vacuum-sealed moulding **[6]**

7/06 . Core boxes

9/00 Moulds or cores (uniquely adapted to particular casting processes B22D); **Moulding processes** (processes involving the use of particular moulding machines, see the relevant groups for these machines)

9/02 . Sand moulds or like moulds for shaped castings

9/03 . . formed by vacuum-sealed moulding **[6]**

9/04 . . Use of lost patterns

9/06 . Permanent moulds for shaped castings (moulds for ingots B22D 7/06)

9/08 . Features with respect to supply of molten metal, e.g. ingates, circular gates, skim gates

9/10 . Cores; Manufacture or installation of cores

9/11 . . for vacuum-sealed moulding **[6]**

9/12 . Treating moulds or cores, e.g. drying, hardening

9/14 . . Equipment or plant specially adapted for drying moulds or cores (B22C 13/08 takes precedence)

9/16 . . . Movable drying equipment

9/18 . Finishing

9/20 . Stack moulds, i.e. arrangement of multiple moulds or flasks

9/22 . Moulds for peculiarly-shaped castings

9/24 . . for hollow articles

9/26 . . . for ribbed tubes; for radiators

9/28 . . for wheels, rolls, or rollers

9/30 . . for chains

Moulding machines for making moulds or cores

11/00 Moulding machines for making moulds or cores, characterised by the relative arrangement of their parts

11/02 . Machines in which the moulds are moved during a cycle of successive operations

11/04 . . by a horizontal rotary table or carrier

11/06 . . by a vertical rotary carrier
11/08 . . by non-rotary conveying means, e.g. by travelling platforms
11/10 . with one or more flasks forming part of the machine, from which only the sand moulds made by compacting are removed
11/12 . Moulding machines able to travel

13/00 Moulding machines for making moulds or cores of particular shapes
13/02 . equipped with templates, e.g. for sweeping operation
13/04 . . with rotary templates, e.g. arranged on a pillar
13/06 . . with non-rotary template and rotary flask
13/08 . for shell moulds or shell cores
13/10 . for pipes or elongated hollow articles
13/12 . for cores
13/14 . . by sweeping, turning, or coating
13/16 . . by pressing through a die

15/00 Moulding machines for making moulds or cores, characterised by the compacting mechanism; **Accessories therefor**
15/02 . Compacting by pressing devices only
15/04 . . involving muscle power, e.g. hand-operated levers
15/06 . . involving mechanical gearings, e.g. crank gears (B22C 15/04 takes precedence)
15/08 . . involving pneumatic or hydraulic mechanisms
15/10 . Compacting by jarring devices only
15/12 . . involving mechanical gearings
15/14 . . involving pneumatic or hydraulic mechanisms
15/16 . . . the machine having special provision for reducing shock to its frame
15/18 . . . . by means of separate shock-absorbers
15/20 . Compacting by centrifugal forces only, e.g. in sand slingers
15/23 . Compacting by gas pressure or vacuum **[6]**
15/24 . . involving blowing devices in which the mould material is supplied in the form of loose particles
15/26 . . involving propulsion devices in which the mould material is supplied in the shape of a compacted column or the like
15/264 . . Compacting after charge of the mould material **[6]**
15/268 . . . involving explosive combustion **[6]**
15/272 . . . involving the storage of gas under pressure **[6]**
15/276 . . . by vacuum, e.g. vacuum-sealed moulding processes **[6]**
15/28 . Compacting by different means acting simultaneously or successively, e.g. preliminary blowing and finally pressing
15/30 . . by both pressing and jarring devices
15/32 . . . involving mechanical gearing only
15/34 . . . involving pneumatic or hydraulic mechanisms only

17/00 Moulding machines for making moulds or cores, characterised by the mechanism for separating the pattern from the mould or for turning over the flask or the pattern plate
17/02 . Moulding machines with pin lifting arrangement
17/04 . Drop-plate moulding machines
17/06 . Moulding machines using stripping plates; Stripping plates
17/08 . Moulding machines with mechanisms to turn over the pattern plate or the mould around a horizontal axis
17/10 . . Turning-over pattern plate and flask only (B22C 17/14 takes precedence)
17/12 . . Turning-over pattern plate, flask, and compacting device as a unit (B22C 17/14 takes precedence)
17/14 . . arranged to one side of the mould table, so-called roll-over table moulding machines

19/00 Components or accessories for moulding machines for making moulds or cores
19/01 . Devices for applying sealing coating **[6]**
19/02 . Mould tables
19/04 . Controlling devices specially designed for moulding machines
19/06 . Devices for rapping or loosening the pattern

21/00 Flasks; **Accessories therefor** (stripping plates B22C 17/06)
21/01 . for vacuum-sealed moulding **[6]**
21/02 . Sectional flasks, i.e. with divided, articulated, or interchangeable side sections
21/04 . Upset frames; Bottom boards or mould boards (pattern plates B22C 7/04)
21/06 . . Bottom boards or mould boards
21/08 . Clamping equipment
21/10 . Guiding equipment
21/12 . Accessories
21/14 . . for reinforcing or securing moulding materials or cores, e.g. gaggers, chaplets, pins, bars

23/00 Tools; **Devices not mentioned before for moulding**
23/02 . Devices for coating moulds or cores

25/00 Foundry moulding plants (for preparing mould materials B22C 5/18; in combination with casting plants B22D 47/02)

B22D CASTING OF METALS; **CASTING OF OTHER SUBSTANCES BY THE SAME PROCESSES OR DEVICES** (shaping of plastics or substances in a plastic state B29C; metallurgical processing, selection of substances to be added to metal C21, C22)

Note

In this subclass, any material to be cast is referred to as metal.

Subclass index

1/00 **Treatment of fused masses in the ladle or the supply runners before casting** (features relating to gas injection, provided on closures of the sliding-gate type B22D 41/42, provided on pouring-nozzles B22D 41/58)

2/00 **Arrangement of indicating or measuring devices, e.g. for temperature or viscosity of the fused mass [3]**

Casting of pigs, i.e. metal castings suitable for subsequent melting; **Similar casting**

3/00 **Pig or like casting** (equipment for conveying molten metal B22D 35/00)

3/02 . Moulding of beds

5/00 **Machines or plants for pig or like casting**

5/02 . with rotary casting tables

5/04 . with endless casting conveyers

Casting of ingots, i.e. metal castings suitable for subsequent rolling or forging

7/00 **Casting ingots** (equipment for conveying molten metal B22D 35/00)

7/02 . Casting compound ingots of two or more different metals in the molten state, i.e. integrally cast

7/04 . Casting hollow ingots

7/06 . Ingot moulds or their manufacture

7/08 . . Divided ingot moulds

7/10 . . Hot tops therefor

7/12 . Accessories, e.g. for sintering, for preventing splashing

9/00 **Machines or plants for casting ingots**

Particular casting processes; **Machines or apparatus therefor**

11/00 **Continuous casting of metals, i.e. casting in indefinite lengths** (metal drawing, metal extruding B21C)

11/01 . without moulds, e.g. on molten surfaces **[2]**

11/04 . into open-ended moulds (B22D 11/06, B22D 11/07 take precedence; plants for continuous casting, e.g. for upwardly drawing the strand, B22D 11/14) **[3]**

11/041 . . for vertical casting (B22D 11/043, B22D 11/049 to B22D 11/059 take precedence) **[7]**

11/043 . . Curved moulds (B22D 11/049 to B22D 11/059 take precedence) **[7]**

11/045 . . for horizontal casting (B22D 11/049 to B22D 11/059 take precedence) **[7]**

11/047 . . . Means for joining tundish to mould **[7]**

11/049 . . for direct chill casting, e.g. electromagnetic casting **[7]**

11/05 . . into moulds having adjustable walls **[7]**

11/051 . . into moulds having oscillating walls **[7]**

11/053 . . Means for oscillating the moulds **[7]**

11/055 . . Cooling the moulds **[7]**

11/057 . . Manufacturing or calibrating the moulds **[7]**

11/059 . . Mould materials or platings **[7]**

11/06 . into moulds with travelling walls, e.g. with rolls, plates, belts, caterpillars (B22D 11/07 takes precedence) **[3]**

11/07 . Lubricating the moulds **[3]**

11/08 . Accessories for starting the casting procedure

11/10 . Supplying or treating molten metal (B22D 41/00 takes precedence) **[1,7]**

11/103 . . Distributing the molten metal, e.g. using runners, floats, distributors **[7]**

11/106 . . Shielding the molten jet **[7]**

11/108 . . Feeding additives, powders, or the like **[7]**

11/11 . . Treating the molten metal **[7]**

11/111 . . . by using protecting powders **[7]**

11/112 . . . by accelerated cooling **[7]**

11/113 . . . by vacuum treating **[7]**

11/114 . . . by using agitating or vibrating means (B22D 11/117 takes precedence) **[7]**

11/115 . . . . by using magnetic fields **[7]**

11/116 . . . Refining the metal **[7]**

11/117 . . . . by treating with gases (B22D 11/118, B22D 11/119 take precedence) **[7]**

11/118 . . . . by circulating the metal under, over or around weirs (B22D 11/119 takes precedence) **[7]**

11/119 . . . . by filtering **[7]**

11/12 . Accessories for subsequent treating or working cast stock in situ (rolling immediately subsequent to continuous casting B21B 1/46, B21B 13/22) **[3]**

11/124 . . for cooling **[2]**

11/126 . . for cutting **[2]**

11/128 . . for removing **[2]**

11/14 . Plants for continuous casting, e.g. for upwardly drawing the strand

11/16 . Controlling or regulating processes or operations **[2]**

11/18 . . for pouring (B22D 11/20 takes precedence) **[4]**

11/20 . . for removing cast stock **[4]**

11/22 . . for cooling cast stock or mould **[4]**

13/00 **Centrifugal casting**; **Casting by using centrifugal force**

13/02 . of elongated solid or hollow bodies, e.g. pipes, in moulds rotating around their longitudinal axis

13/04 . of shallow solid or hollow bodies, e.g. wheels or rings, in moulds rotating around their axis of symmetry

13/06 . of solid or hollow bodies in moulds rotating around an axis arranged outside of the mould

13/08 . in which a stationary mould is fed from a rotating mass of liquid metal

13/10 . Accessories for centrifugal casting apparatus, e.g. moulds, linings therefor, means for feeding molten metal, cleansing moulds, removing castings (making or lining moulds B22C)

13/12 . Controlling, supervising, specially adapted to centrifugal casting, e.g. for safety reasons **[3]**

15/00 Casting using a mould or core of which a part significant to the process of high thermal conductivity, e.g. chill casting; **Moulds or accessories specially adapted therefor** (continuous casting of metals into open-ended moulds for direct chill casting B22D 11/049) **[1,7]**

15/02 . of cylinders, pistons, bearing shells or like thin-walled objects

15/04 . Machines or apparatus for chill casting (B22D 15/02 takes precedence)

17/00 Pressure die casting or injection die casting, i.e. casting in which the metal is forced into a mould under high pressure [3]

17/02 . Hot chamber machines, i.e. with heated press chamber in which metal is melted

17/04 . . Plunger machines

17/06 . . Air injection machines

17/08 . Cold chamber machines, i.e. with unheated press chamber into which molten metal is ladled

17/10 . . with horizontal press motion

17/12 . . with vertical press motion

17/14 . Machines with evacuated die cavity

17/16 . specially adapted for casting slide fasteners or elements therefor

17/18 . Machines built up from units providing for different combinations

17/20 . Accessories; Details

17/22 . . Dies (manufacture, see the appropriate class, e.g. B23P 15/24); Die plates; Die supports; Cooling equipment for dies; Accessories for loosening and ejecting castings from dies

17/24 . . . Accessories for locating and holding cores or inserts

17/26 . . Mechanisms or devices for locking or opening dies

17/28 . . Melting pots

17/30 . . Accessories for supplying molten metal, e.g. in rations

17/32 . . Controlling equipment

18/00 Pressure casting; **Vacuum casting** (B22D 17/00 takes precedence; treating the metal in the mould by using pressure or vacuum B22D 27/00) **[3]**

18/02 . Pressure casting making use of mechanical pressing devices, e.g. cast-forging (B22D 18/04 takes precedence) **[3]**

18/04 . Low pressure casting, i.e. making use of pressures up to a few bars to fill the mould **[3]**

18/06 . Vacuum casting, i.e. making use of vacuum to fill the mould **[3]**

18/08 . Controlling, supervising, e.g. for safety reasons **[3]**

19/00 Casting in, on, or around, objects which form part of the product (B22D 23/04 takes precedence; alumino-thermic welding B23K 23/00; coating by casting molten material on the substrate C23C 6/00)

19/02 . for making reinforced articles (B22D 19/14 takes precedence) **[3]**

19/04 . for joining parts

19/06 . for manufacturing or repairing tools

19/08 . for building up linings or coverings, e.g. of anti-frictional metal

19/10 . Repairing defective or damaged objects by metal casting techniques (by other techniques B23P 6/04)

19/12 . for making objects, e.g. hinges, with parts which are movable relatively to one another

19/14 . the objects being filamentary or particulate in form (making alloys containing fibres or filaments by contacting the fibres or filaments with molten metal C22C 47/08) **[3]**

19/16 . for making compound objects cast of two or more different metals, e.g. for making rolls for rolling mills (casting compound ingots B22D 7/02) **[3]**

21/00 Casting non-ferrous metals or metallic compounds so far as their metallurgical properties are of importance for the casting procedure (apparatus for vacuum casting B22D 18/00); **Selection of compositions therefor**

21/02 . Casting exceedingly oxidisable non-ferrous metals, e.g. in inert atmosphere (use of inert atmosphere in casting metals in general B22D 23/00)

21/04 . . Casting aluminium or magnesium

21/06 . Casting non-ferrous metals with a high melting-point, e.g. metallic carbides (B22D 21/02 takes precedence)

23/00 Casting processes not provided for in groups B22D 1/00 to B22D 21/00 (making metallic powder by casting B22F 9/08; alumino-thermic welding B23K 23/00; remelting metals C22B 9/16)

23/02 . Top casting

23/04 . Casting by dipping (hot-dipping or immersion processes for applying coating material in the molten state without affecting the shape C23C 2/00)

23/06 . Melting-down metal, e.g. metal particles, in the mould

23/10 . . Electroslag casting **[5]**

25/00 Special casting characterised by the nature of the product (B22D 15/02, B22D 17/16, B22D 19/00 take precedence; casting stereotype plates B41D 3/00) **[2]**

25/02 . by its peculiarity of shape; of works of art

25/04 . . Casting metal electric battery plates or the like (manufacture thereof by multi-step processes H01M 4/82) **[2]**

25/06 . by its physical properties (B22D 27/00 takes precedence)

25/08 . . by uniform hardness (B22D 15/00 takes precedence)

27/00 Treating the metal in the mould while it is molten or ductile (B22D 7/12, B22D 11/10, B22D 18/00, B22D 43/00 take precedence) **[3]**

27/02 . Use of electric or magnetic effects

27/04 . Influencing the temperature of the metal, e.g. by heating or cooling the mould (cooling of open-ended moulds in continuous casting B22D 11/055) **[1,7]**

27/06 . . Heating the top discard of ingots (hot tops for ingot moulds B22D 7/10)

27/08 . Shaking, vibrating, or turning of moulds (B22D 11/051, B22D 11/053 take precedence) **[1,7]**

27/09 . by using pressure **[3]**

27/11 . . making use of mechanical pressing devices **[3]**

27/13 . . making use of gas pressure **[3]**

27/15 . by using vacuum **[3]**

27/18 . Measures for using chemical processes for influencing the surface composition of castings, e.g. for increasing resistance to acid attack

27/20 . Measures not previously mentioned for influencing the grain structure or texture; Selection of compositions therefor

Final measures after casting

29/00 Removing castings from moulds, not restricted to casting processes covered by a single main group; **Removing cores**; **Handling ingots [2]**

29/02 . Vibratory apparatus specially designed for shaking out flasks

29/04 . Handling or stripping castings or ingots (grippers in general, see the relevant subclasses, e.g. B66C)

29/06 . . Strippers actuated by fluid pressure

29/08 . . Strippers actuated mechanically **[2]**

30/00 Cooling castings, not restricted to casting processes covered by a single main group (accessories for cooling cast stock in continuous casting of metals B22D 11/124; controlling or regulating processes or operations for cooling cast stock or mould in continuous casting of metals B22D 11/22; chill casting B22D 15/00) **[5]**

31/00 Cutting-off surplus material after casting, e.g. gates (cleaning of castings by sand-blasting B24C)

Other equipment for casting [3]

33/00 Equipment for handling moulds

33/02 . Turning or transposing moulds

33/04 . Bringing together or separating moulds

33/06 . Burdening or relieving moulds

35/00 Equipment for conveying molten metal into beds or moulds (B22D 37/00 to B22D 41/00 take precedence; specially adapted to particular processes or machines, see the relevant groups)

35/02 . into beds

35/04 . into moulds, e.g. base plates, runners

35/06 . Heating or cooling equipment

37/00 Controlling or regulating the pouring of molten metal from a casting melt-holding vessel (B22D 39/00, B22D 41/00 take precedence; specially adapted to particular processes or machines, see the relevant groups of this subclass) **[3,5]**

39/00 Equipment for supplying molten metal in rations (specially adapted to particular processes or machines, see the relevant groups of this subclass)

39/02 . having means for controlling the amount of molten metal by volume **[3]**

39/04 . having means for controlling the amount of molten metal by weight **[3]**

39/06 . having means for controlling the amount of molten metal by controlling the pressure above the molten metal **[3]**

41/00 Casting melt-holding vessels, e.g. ladles, tundishes, cups or the like (B22D 39/00, B22D 43/00 take precedence) **[5]**

41/005 . with heating or cooling means **[5]**

41/01 . . Heating means **[5]**

41/015 . . . with external heating, i.e. the heat source not being a part of the ladle **[5]**

41/02 . Linings

41/04 . tiltable

41/05 . . Tea-pot spout ladles **[5]**

41/06 . Equipment for tilting

41/08 . for bottom pouring (B22D 41/14, B22D 41/50 take precedence)

41/12 . Travelling ladles or similar containers; Cars for ladles (casting cranes B66C)

41/13 . . Ladle turrets **[7]**

41/14 . Closures **[5]**

41/16 . . stopper-rod type, i.e. a stopper-rod being positioned downwardly through the vessel and the metal therein, for selective registry with the pouring opening **[5]**

41/18 . . . Stopper-rods therefor **[5]**

41/20 . . . Stopper-rod operating equipment **[5]**

41/22 . . sliding-gate type, i.e. having a fixed plate and a movable plate in sliding contact with each other for selective registry of their openings **[5]**

41/24 . . . characterised by a rectilinearly movable plate (B22D 41/38 to B22D 41/42 take precedence) **[5]**

41/26 . . . characterised by a rotatively movable plate (B22D 41/38 to B22D 41/42 take precedence) **[5]**

41/28 . . . Plates therefor (B22D 41/38 to B22D 41/42 take precedence) **[5]**

41/30 . . . . Manufacturing or repairing thereof **[5]**

41/32 . . . . . characterised by the materials used therefor **[5]**

41/34 . . . . Supporting, fixing or centering means therefor **[5]**

41/36 . . . . Treating the plates, e.g. lubricating, heating (ladles, cups or the like with heating means B22D 41/01) **[5]**

41/38 . . . Means for operating the sliding gate **[5]**

41/40 . . . Means for pressing the plates together **[5]**

41/42 . . . Features relating to gas injection **[5]**

41/44 . . Consumable closure means, i.e. closure means being used only once **[5]**

41/46 . . . Refractory plugging masses **[5]**

41/48 . . . Meltable closures **[5]**

41/50 . Pouring-nozzles **[5]**

41/52 . . Manufacturing or repairing thereof **[5]**

41/54 . . . characterised by the materials used therefor **[5]**

41/56 . . Means for supporting, manipulating or changing a pouring-nozzle **[5]**

41/58 . . with gas injecting means **[5]**

41/60 . . with heating or cooling means **[5]**

41/62 . . with stirring or vibrating means **[5]**

43/00 Mechanical cleaning, e.g. skimming of molten metals

45/00 Equipment for casting, not otherwise provided for

46/00 Controlling, supervising, not restricted to casting covered by a single main group, e.g. for safety reasons [3]

47/00 Casting plants

47/02 . for both moulding and casting

B22F **WORKING METALLIC POWDER**; **MANUFACTURE OF ARTICLES FROM METALLIC POWDER**; **MAKING METALLIC POWDER** (processes or devices for granulating materials in general B01J 2/00; making ceramics by compacting or sintering C04B, e.g. C04B 35/64; for the production of metals as such, see class C22; reduction or decomposition of metal compounds in general C22B; making alloys by powder metallurgy C22C; electrolytic production of metal powder C25C 5/00)

(1) This subclass covers the making of metallic powder only insofar as powder with specific physical characteristics is made. **[6]**
(2) In this subclass, the following terms or expressions are used with the meanings indicated:
– "metallic powder" covers powders containing a substantial proportion of non-metallic material;
– "powder" includes somewhat larger particles which are worked, obtained or behave in a manner similar to powder, e.g. fibres.

1/00 **Special treatment of metallic powder, e.g. to facilitate working, to improve properties**; **Metallic powders per se, e.g. mixtures of particles of different composition** (C04, C08 take precedence)
1/02 . comprising coating of the powder **[2]**

3/00 **Manufacture of workpieces or articles from metallic powder characterised by the manner of compacting or sintering**; **Apparatus specially adapted therefor**
3/02 . Compacting only
3/03 . . Press-moulding apparatus therefor **[6]**
3/035 . . . with one or more of the parts thereof being pivotally mounted **[6]**
3/04 . . by applying fluid pressure
3/06 . . by centrifugal forces
3/08 . . by explosive forces
3/087 . . using high energy impulses, e.g. magnetic field impulses **[6]**
3/093 . . using vibration **[6]**
3/10 . Sintering only
3/105 . . by using electric current, laser radiation or plasma (B22F 3/11 takes precedence) **[6]**
3/11 . . Making porous workpieces or articles **[6]**
3/115 . by spraying molten metal, i.e. spray sintering, spray casting **[6]**
3/12 . Both compacting and sintering (by forging B22F 3/17) **[6]**
3/14 . . simultaneously
3/15 . . . Hot isostatic pressing **[6]**
3/16 . . in successive or repeated steps
3/17 . by forging **[6]**
3/18 . by using pressure rollers **[6]**
3/20 . by extruding
3/22 . for producing castings from a slip
3/23 . involving a self-propagating high-temperature synthesis or reaction sintering step **[6]**
3/24 . After-treatment of workpieces or articles
3/26 . . Impregnating

5/00 **Manufacture of workpieces or articles from metallic powder characterised by the special shape of the product**
5/02 . of piston rings
5/04 . of turbine blades
5/06 . of threaded articles, e.g. nuts
5/08 . of toothed articles, e.g. gear wheels; of cam discs
5/10 . of articles with cavities or holes, not otherwise provided for in the preceding subgroups **[6]**
5/12 . of tubes or wires **[6]**

7/00 **Manufacture of composite layers, workpieces, or articles, comprising metallic powder, by sintering the powder, with or without compacting**
7/02 . of composite layers
7/04 . . with one or more layers not made from powder, e.g. made from solid metal
7/06 . of composite workpieces or articles from parts, e.g. to form tipped tools
7/08 . . with one or more parts not made from powder

8/00 **Manufacture of articles from scrap or waste metal particles [6]**

9/00 **Making metallic powder or suspensions thereof**
9/02 . using physical processes **[3]**
9/04 . . starting from solid material, e.g. by crushing, grinding or milling (crushing, grinding or milling, in general, see the relevant subclasses, e.g. B02C) **[3]**
9/06 . . starting from liquid material **[3]**
9/08 . . . by casting, e.g. through sieves or in water, by atomising or spraying (using electric discharge B22F 9/14) **[3]**
9/10 . . . . using centrifugal force **[3]**
9/12 . . starting from gaseous material **[3]**
9/14 . . using electric discharge **[3]**
9/16 . using chemical processes **[3]**
9/18 . . with reduction of metal compounds **[3]**
9/20 . . . starting from solid metal compounds **[3]**
9/22 . . . . using gaseous reductors **[3]**
9/24 . . . starting from liquid metal compounds, e.g. solutions **[3]**
9/26 . . . . using gaseous reductors **[3]**
9/28 . . . starting from gaseous metal compounds **[3]**
9/30 . . with decomposition of metal compounds, e.g. by pyrolysis **[3]**

B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR

(1) This class covers:
- operations not provided for in any other class;
- combinations of operations covered by different subclasses of classes B21 to B24, which combinations are covered by subclass B23P, with the exception of subsidiary operations performed in conjunction with main operations covered by a single subclass;
- features, specific to machine tools, which relate to a requirement or problem of a nature which is not peculiar to a particular kind of machine tool, e.g. feeding work, which are covered by subclass B23Q, although the realisation of these features may differ according to the kind of machine tool concerned. The said subclass covers such features, in general, even if the feature or a specific function, in any particular case, is to some extent peculiar to, or is claimed only for, machine tools designed for one particular operation; only in exceptional cases are such features classified in the subclass for the machine tool concerned. Certain features of this general nature are, however, referred to subclasses relating to particular metal-working operations, especially B23B, in which case the subclasses in question are not restricted, in respect of those features, to the kind of machine tool with which they are primarily concerned.

(2) In this class, the following terms or expressions are used with the meanings indicated:
- "metal-working" covers the working of other materials unless the context requires otherwise;
- "kind of operations" and similar expressions relate to such metal-working operations as boring, drilling, milling and grinding;
- "kind of machine" means a machine designed for a particular kind of metal-working operation (e.g. a lathe);
- "form of machine" means a machine of a particular kind adapted or arranged for a particular way of working or for particular work, e.g. face-plate lathe, tailstock lathe, turret lathe;
- "different machines" covers different forms of machines for performing the same type of metal-working operation, e.g. vertical and horizontal boring machines.

(3) If details, components, or accessories have no essential feature specific to machine tools, the more general class, e.g. F16, takes precedence.

B23B **TURNING**; **BORING** (using an electrode which takes the place of a tool B23H, e.g. making holes B23H 9/14; working by laser beam B23K 26/00; arrangements for copying or controlling B23Q)

Subclass index

Turning

1/00 Methods for turning or working essentially requiring the use of turning-machines; Use of auxiliary equipment in connection with such methods

3/00 General-purpose turning-machines or devices, e.g. centre lathes with feed rod and lead screw; Sets of turning-machines

3/02 . Small lathes, e.g. for toolmakers (specially designed for watchmakers G04D 3/00)

3/04 . Turning-machines in which the workpiece is rotated by means at a distance from the headstock

3/06 . Turning-machines or devices characterised only by the special arrangement of constructional units (B23Q 37/00 takes precedence; structural features of details, see the relevant groups; such features of general applicability B23Q)

3/08 . Turning-machines characterised by the use of faceplates

3/10 . . with the faceplate horizontal, i.e. vertical boring and turning machines

3/12 . . with the faceplate vertical, i.e. face lathes

3/14 . . Mountings or drives of faceplates

3/16 . Turret lathes for turning individually-chucked workpieces

3/18 . . with horizontal working-spindle

3/20 . . with vertical working-spindle

3/22 . Turning-machines or devices with rotary tool heads

3/24 . . the tools of which do not perform a radial movement; Rotary tool heads therefor

3/26 . . the tools of which perform a radial movement; Rotary tool heads thereof

3/28 . Turning-machines in which the feed is controlled by a copying device, i.e. copying lathes (features of copying devices B23Q 35/00)

3/30 . Turning-machines with two or more working-spindles, e.g. in fixed arrangement

3/32 . . for performing identical operations simultaneously on two or more workpieces

3/34 . Short turning-machines with one or multiple working-spindles attended from the end (B23B 3/12 takes precedence)

3/36 . Associations of only turning-machines directed to a particular metal-working result (if the metal-working result is not essential B23Q 39/00)

5/00 Turning-machines or devices specially adapted for particular work; **Accessories specially adapted therefor**

5/02 . for turning hubs or brake drums (B23B 5/04 takes precedence)

5/04 . for reconditioning hubs or brake drums or axle spindles without removing same from the vehicle

5/06 . for turning valves or valve bodies

5/08 . for turning axles, bars, rods, tubes, rolls, i.e. shaft-turning lathes, roll lathes; Centreless turning

5/10 . . for turning pilgrim rolls

5/12 . . for peeling bars or tubes by making use of cutting bits arranged around the workpiece (making use of cutting bits arranged around the workpiece otherwise than by turning B23D 79/12) **[2]**

5/14 . Cutting-off lathes (shearing B23D)

5/16 . for bevelling, chamfering, or deburring the ends of bars or tubes

5/18 . for turning crankshafts, eccentrics, or cams, e.g. crankpin lathes

5/20 . . without removing same from the engine

5/22 . . Holding the workpiece in the machine, e.g. chucking devices

5/24 . for turning pistons or other workpieces to a slightly non-circular cross-section

5/26 . for simultaneously turning internal and external surfaces of a body

5/28 . for turning wheels or wheel sets or cranks thereon, i.e. wheel lathes

5/30 . . Arrangements providing for tool control by templates

5/32 . . for reconditioning wheel sets without removing same from the vehicle; Underfloor wheel lathes for railway vehicles

5/34 . . Holding the workpiece in the machine, e.g. chucking devices therefor; Drivers therefor

5/36 . for turning specially-shaped surfaces by making use of relative movement of the tool and work produced by geometrical mechanisms, i.e. forming-lathes

5/38 . . for turning conical surfaces inside or outside, e.g. taper pins

5/40 . . for turning spherical surfaces inside or outside

5/42 . . for turning relieving surfaces, i.e. relieving-lathes

5/44 . . for turning polygonal or other non-circular surfaces controlled by gear or guide mechanisms, i.e. eccentric lathes

5/46 . . for turning helical or spiral surfaces (thread cutting B23G)

5/48 . . . for cutting grooves, e.g. oil grooves of helicoidal shape

7/00 Automatic or semi-automatic turning-machines with a single working-spindle, e.g. controlled by cams; **Equipment therefor**; **Features common to automatic and semi-automatic turning-machines with one or more working-spindles**

7/02 . Automatic or semi-automatic machines for turning of stock

7/04 . . Turret machines

7/06 . . with sliding headstock

7/08 . . with the working-spindle vertical

7/10 . . Accessories, e.g. guards

7/12 . Automatic or semi-automatic machines for turning of workpieces

7/14 . . with the working-spindle horizontal

7/16 . . with the working-spindle vertical

9/00 Automatic or semi-automatic turning-machines with a plurality of working-spindles, e.g. automatic multiple-spindle machines with spindles arranged in a drum carrier able to be moved into pre-determined positions; **Equipment therefor** (equipment applicable to single-spindle machines B23B 7/00)

9/02 . Automatic or semi-automatic machines for turning of stock

9/04 . . with the working-spindles horizontal

9/06 . . with the working-spindles vertical

9/08 . Automatic or semi-automatic machines for turning of workpieces

9/10 . . with the working-spindles horizontal

9/12 . . with the working-spindles vertical

11/00 Automatic or semi-automatic turning-machines incorporating equipment for performing other working procedures, e.g. slotting, milling, rolling

13/00 Arrangements for automatically conveying, chucking or guiding stock for turning machines

13/02 . for turning-machines with a single working-spindle

13/04 . for turning-machines with a plurality of working-spindles

13/06 . Arrangements for switching-off the drive of turning-machines after the stock has been completely machined

13/08 . Arrangements for reducing vibrations in feeding-passages or for damping noise (damping noise in general G10K)

13/10 . with magazines for stock

13/12 . Accessories, e.g. stops, grippers

15/00 Arrangements for conveying, loading, adjusting, reversing, chucking, or discharging workpieces specially designed for automatic or semi-automatic turning-machines

Components or accessories particularly for turning machines

17/00 Lathe beds (foundation frames, carriage guides as such B23Q 1/00)

19/00 Headstocks; **Equivalent parts of any machine tools**

19/02 . Working-spindles; Features relating thereto, e.g. supporting arrangements (B23B 13/00 takes precedence)

21/00 Lathe carriages; **Cross-slides**; **Tool posts** (tool holders B23B 29/00); **Similar parts of any machine tools**

23/00 Tailstocks; **Centres**

23/02 . Dead centres

23/04 . Live centres

25/00 **Accessories or auxiliary equipment for turning-machines** (for machine tools in general B23Q; cooling or lubricating B23Q 11/12)

25/02 . Arrangements for chip-breaking in turning-machines (on cutting tools B23B 27/22)

25/04 . Safety guards specially designed for turning-machines (in general F16P)

25/06 . Measuring, gauging, or adjusting equipment on turning-machines for setting-on, feeding, controlling, or monitoring the cutting tools or work (measuring devices or gauges G01B)

27/00 **Tools for turning or boring machines** (for drilling machines B23B 51/00); **Tools of a similar kind in general**; **Accessories therefor**

27/02 . Cutting tools with straight main part and cutting edge at an angle (B23B 27/04 to B23B 27/08 take precedence)

27/04 . Cutting-off tools (B23B 27/08 takes precedence)

27/06 . Profile cutting tools, i.e. forming-tools

27/08 . Cutting tools with blade- or disc-like main parts

27/10 . Cutting tools with special provision for cooling

27/12 . . with a continuously-rotated circular cutting edge; Holders therefor

27/14 . Cutting tools of which the bits or tips are of special material

27/16 . . with exchangeable cutting bits, e.g. able to be clamped

27/18 . . with cutting bits or tips rigidly mounted, e.g. by brazing

27/20 . . with diamond bits

27/22 . Cutting tools with chip-breaking equipment

27/24 . Knurling tools

29/00 **Holders for non-rotary cutting tools** (B23B 27/12 takes precedence); **Boring bars or boring heads**; **Accessories for tool holders**

29/02 . Boring bars

29/03 . Boring heads

29/034 . . with tools moving radially, e.g. for making chamfers or undercuttings **[4]**

29/04 . Tool holders for a single cutting tool

29/06 . . Tool holders equipped with longitudinally-arranged grooves for setting the cutting tool

29/08 . . Tool holders equipped with grooves arranged crosswise to the longitudinal direction for setting the cutting tool

29/10 . . . with adjustable counterbase for the cutting tool

29/12 . . Special arrangements on tool holders

29/14 . . . affording a yielding support of the cutting tool, e.g. by spring clamping

29/16 . . . for supporting the workpiece in a backrest

29/18 . . . for retracting the cutting tool

29/20 . . . for placing same by shanks in sleeves of a turret

29/22 . . . for tool adjustment by means of shims or spacers

29/24 . Tool holders for a plurality of cutting tools, e.g. turrets

29/26 . . Tool holders in fixed position

29/28 . . Turrets manually adjustable about a vertical pivot

29/30 . . Turrets manually adjustable about a horizontal pivot

29/32 . . Turrets adjustable by power drive, i.e. turret heads

29/34 . . Turrets equipped with triggers for releasing the cutting tools

31/00 **Chucks**; **Expansion mandrels**; **Adaptations thereof for remote control** (devices for securing work or tools to spindles in general B23Q 3/12; rotary devices holding by magnetic or electrical force acting directly on work B23Q 3/152)

31/02 . Chucks

31/06 . . Features relating to the removal of tools or work; Accessories therefor

31/07 . . . Ejector wedges **[5]**

31/08 . . holding tools or work yieldably

31/10 . . characterised by the retaining or gripping devices or their immediate operating means

Note

Group B23B 31/12 takes precedence over groups B23B 31/103 to B23B 31/117. **[5]**

31/103 . . . Retention by pivotal elements, e.g. catches, pawls **[5]**

31/107 . . . Retention by laterally-acting detents, e.g. pins, screws, wedges; Retention by loose elements, e.g. balls **[5]**

31/11 . . . Retention by threaded connection **[5]**

31/113 . . . Retention by bayonet connection **[5]**

31/117 . . . Retention by friction only, e.g. using springs, resilient sleeves, tapers **[5]**

31/12 . . . Chucks with simultaneously-acting jaws, whether or not also individually adjustable

31/14 . . . . involving the use of centrifugal force

31/16 . . . . moving radially

31/163 . . . . . actuated by one or more spiral grooves **[5]**

31/165 . . . . . actuated by screw-and-nut mechanisms **[5]**

31/167 . . . . . actuated by oblique racks **[5]**

31/169 . . . . . actuated by toothed gearing (B23B 31/167 takes precedence) **[5]**

31/171 . . . . . actuated by a cam surface in a radial plane **[5]**

31/173 . . . . . actuated by coaxial conical surfaces (B23B 31/177 takes precedence) **[5]**

31/175 . . . . . actuated by levers moved by a coaxial control rod **[5]**

31/177 . . . . . actuated by the oblique surfaces of a coaxial control rod (B23B 31/167 takes precedence) **[5]**

31/18 . . . . pivotally movable in planes containing the axis of the chuck

31/19 . . . . moving parallel to the axis of the chuck

31/20 . . . . Longitudinally-split sleeves, e.g. collet chucks

31/22 . . . . Jaws in the form of balls

31/24 . . characterised by features relating primarily to remote control of the gripping means

31/26 . . . using mechanical transmission through the working-spindle

31/28 . . . using electric or magnetic means in the chuck

31/30 . . . using fluid-pressure means in the chuck

31/32 . . with jaws carried by diaphragm

31/34 . . with means enabling the workpiece to be reversed or tilted

31/36 . . with means for adjusting the chuck with respect to the working-spindle

31/38 . . with overload clutches

31/39 . . Jaw changers **[5]**

31/40 . Expansion mandrels
31/42 . . characterised by features relating primarily to remote control of the gripping means

33/00 Drivers; **Driving centres**; **Nose clutches, e.g. lathe dogs**

Boring; **Drilling [3]**

35/00 Methods for boring or drilling, or for working essentially requiring the use of boring or drilling machines; **Use of auxiliary equipment in connection with such methods**

37/00 Boring by making use of vibrations of ultrasonic frequency (working materials by subjecting the grinding tools or the abrading medium to vibration, e.g. grinding with ultrasonic frequency, B24B 1/04)

39/00 General-purpose boring or drilling machines or devices; **Sets of boring or drilling machines**
39/02 . Boring machines; Combined horizontal boring and milling machines
39/04 . Co-ordinate boring or drilling machines; Machines for making holes without previous marking
39/06 . . Equipment for positioning work
39/08 . . Devices for programme control
39/10 . characterised by the drive, e.g. by fluid-pressure drive, pneumatic power drive
39/12 . Radial drilling machines
39/14 . with special provision to enable the machine or the drilling or boring head to be moved into any desired position, e.g. with respect to immovable work
39/16 . Drilling machines with a plurality of working-spindles; Drilling automatons
39/18 . . Setting work or tool carrier along a straight index line
39/20 . . Setting work or tool carrier along a circular index line; Turret head drilling machines
39/22 . . with working-spindles in opposite headstocks
39/24 . . designed for programme control
39/26 . in which the working position of tool or work is controlled by copying discrete points of a pattern (features of copying devices B23Q 35/02)
39/28 . Associations of only boring or drilling machines directed to a particular metal-working result (if not producing a particular metal-working result B23Q 39/00)

41/00 Boring or drilling machines or devices specially adapted for particular work; **Accessories specially adapted therefor**
41/02 . for boring deep holes; Trepanning, e.g. of gun or rifle barrels
41/04 . for boring polygonal or other non-circular holes
41/06 . for boring conical holes
41/08 . for boring, drilling, or tapping holes in tubes under fluid or gas pressure (sealing features or operations, combined with placing branch parts F16L 41/04)
41/10 . for boring holes in steam boilers
41/12 . for forming working surfaces of cylinders, of bearings, e.g. in heads of driving rods, or of other engine parts
41/14 . for very small holes
41/16 . for boring holes with high-quality surface

43/00 Boring or drilling devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool (if specially adapted for particular work B23B 41/00)
43/02 . to the tailstock of a lathe

45/00 Hand-held or like portable drilling machines, e.g. drill guns; **Equipment therefor** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**
45/02 . driven by electric power
45/04 . driven by fluid-pressure or pneumatic power
45/06 . driven by man-power
45/08 . . for drilling rails or profiled stock
45/10 . . by using a fiddle bow or a belt
45/12 . . by using a ratchet brace
45/14 . Means for holding or guiding the drilling device or for securing it to the work (B23B 41/08 takes precedence); Thrust stands
45/16 . with superimposed percussive action (portable percussive machines with superimposed rotation B25D 16/00) **[3]**

Components or accessories for boring or drilling machines

47/00 Constructional features of components specially designed for boring or drilling machines; **Accessories therefor** (working-spindles, bearing sleeves therefor B23B 19/02; for machine tools in general B23Q)
47/02 . Drives; Gearings (B23B 39/10 takes precedence)
47/04 . . for rotating the working-spindle
47/06 . . . driven essentially by electrical means
47/08 . . . driven essentially by fluid-pressure or pneumatic power
47/10 . . . . equipped with turbines or other rotating machines
47/12 . . . . equipped with oscillating pistons
47/14 . . . Change-speed gearings; Reversing gearings
47/16 . . . Belt or chain drives
47/18 . . for feeding or retracting tool or work
47/20 . . . actuated essentially by electric power
47/22 . . . actuated essentially by fluid-pressure or pneumatic power
47/24 . . . Stops or feed interruption owing to fracture or overload of the boring or drilling tool
47/26 . Liftable or lowerable drill heads or headstocks; Balancing arrangements therefor
47/28 . Drill jigs for workpieces (equipment for setting or guiding the drill B23B 49/00)
47/30 . Additional gear with one or more working-spindles attachable to the main working-spindle and mounting the additional gear
47/32 . Arrangements for preventing the running-out of drills or fracture of drills when getting through
47/34 . Arrangements for removing chips out of the holes made; Chip-breaking arrangements attached to the tool

49/00 Measuring or gauging equipment on boring machines for positioning or guiding the drill; **Devices for indicating failure of drills during boring**; **Centring devices for holes to be bored** (marking-out equipment B25H 7/00; measuring devices, gauges G01B)
49/02 . Boring templates or bushings

49/04 . Devices for boring or drilling centre holes in workpieces
49/06 . Devices for drilling holes in brake bands or brake linings

51/00 Tools for drilling machines
51/02 . Twist drills
51/04 . for trepanning
51/05 . . for cutting discs from sheet **[4]**
51/06 . Drills with lubricating or cooling equipment
51/08 . Drills combined with tool parts or tools for performing additional working
51/10 . Bits for countersinking
51/12 . Adapters for drills or chucks; Tapered sleeves
51/14 . . Adapters for broken drills

B23C MILLING (broaching B23D; broach-milling in making gears B23F; arrangements for copying or controlling B23Q)

Subclass index

1/00 Milling machines not designed for particular work or special operations
1/02 . with one horizontal working-spindle
1/025 . . with working-spindle in a fixed position **[2]**
1/027 . . with working-spindle movable in a vertical direction **[2]**
1/04 . with a plurality of horizontal working-spindles
1/06 . with one vertical working-spindle
1/08 . with a plurality of vertical working-spindles
1/10 . with both horizontal and vertical working-spindles
1/12 . with spindle adjustable to different angles, e.g. either horizontally or vertically
1/14 . with rotary work-carrying table (work-tables for machine tools in general B23Q 1/00)
1/16 . specially designed for control by copying devices
1/18 . . for milling while revolving the work
1/20 . Portable devices or machines (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00); Hand-driven devices or machines **[4]**

3/00 Milling particular work; **Special milling operations**; **Machines therefor** (milling gear teeth B23F; milling of threads B23G 1/32) **[2]**
3/02 . Milling surfaces of revolution (B23C 3/06, B23C 3/08 take precedence)
3/04 . . while revolving the work
3/05 . . Finishing valves or valve seats **[2]**
3/06 . Milling crankshafts
3/08 . Milling cams, camshafts, or the like
3/10 . Relieving by milling (lathes or turning devices for relieving B23B 5/42)
3/12 . Trimming or finishing edges, e.g. deburring welded corners
3/13 . Surface milling of plates, sheets or strips **[2]**
3/14 . Scrubbing or peeling ingots or similar workpieces
3/16 . Working surfaces curved in two directions
3/18 . . for shaping screw-propellers, turbine blades, or impellers
3/20 . . for shaping dies
3/22 . Forming overlapped joints, e.g. of the ends of piston-rings
3/24 . Making square or polygonal ends on workpieces, e.g. key studs on tools
3/26 . Making square or polygonal holes in workpieces, e.g. key holes in tools
3/28 . Grooving workpieces
3/30 . . Milling straight grooves, e.g. keyways
3/32 . . Milling helical grooves, e.g. in making twist-drills
3/34 . . Milling grooves of other forms, e.g. circumferential
3/35 . . Milling grooves in keys
3/36 . Milling milling-cutters (B23C 3/28 takes precedence)

5/00 Milling-cutters (for cutting gear teeth B23F 21/12)
5/02 . characterised by the shape of the cutter
5/04 . . Plain cutters, i.e. having essentially a cylindrical or tapered cutting surface of substantial length (B23C 5/10 takes precedence)
5/06 . . Face-milling cutters, i.e. having only or primarily a substantially flat cutting surface
5/08 . . Disc-type cutters
5/10 . . Shank-type cutters, i.e. with an integral shaft
5/12 . . Cutters specially designed for producing particular profiles (B23C 5/10 takes precedence)
5/14 . . . essentially comprising curves
5/16 . characterised by physical features other than shape
5/18 . . with permanently-fixed cutter-bits or teeth
5/20 . . with removable cutter-bits or teeth
5/22 . . . Securing arrangements for bits or teeth
5/24 . . . . adjustable
5/26 . Securing milling-cutters to the driving spindle
5/28 . Features relating to lubricating or cooling

7/00 Milling devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool
7/02 . to lathes
7/04 . to planing or slotting machines

9/00 Details or accessories so far as specially adapted to milling machines or cutters (drives, control devices, or accessories, in general B23Q)

B23D **PLANING**; **SLOTTING**; **SHEARING**; **BROACHING**; **SAWING**; **FILING**; **SCRAPING**; **LIKE OPERATIONS FOR WORKING METAL BY REMOVING MATERIAL, NOT OTHERWISE PROVIDED FOR** (making toothed gears or the like B23F; cutting metal by applying heat locally B23K; arrangements for copying or controlling B23Q)

Note

This subclass covers machines for shearing sheet metal or other stock material except metal foils workable in a manner analogous to paper, which is covered by class B26. **[2]**

Subclass index

Planing; **Slotting**

1/00 **Planing or slotting machines cutting by relative movement of the tool and workpiece in a horizontal straight line only**

1/02 . by movement of the work-support
1/04 . . with the tool supported only on one side of the bed
1/06 . . with the tool supported on both sides of the bed
1/08 . by movement of the tool
1/10 . . with means for adjusting the tool-guide vertically
1/12 . . . with the tool supported only on one side of the bed
1/14 . . . with the tool supported on both sides of the bed
1/16 . . without means for adjusting the tool-guide vertically
1/18 . cutting on both the forward and the return stroke
1/20 . with tool-supports or work-supports specially mounted or guided for working in different directions or at different angles; Special purpose machines
1/22 . . for planing ingots or the like (scrubbing or peeling ingots by milling B23C 3/14)
1/24 . . for planing inner surfaces, e.g. of moulds
1/26 . . for planing edges or ridges or cutting grooves (cutting helical grooves B23D 5/02)
1/28 . . in which the tool or workpiece is fed otherwise than in a straight line, e.g. for planing profiled stock
1/30 . . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices B23Q 35/00)

3/00 **Planing or slotting machines cutting by relative movement of the tool and workpiece in a vertical or inclined straight line**

3/02 . for cutting grooves (cutting helical grooves B23D 5/02)
3/04 . in which the tool or workpiece is fed otherwise than in a straight line
3/06 . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices B23Q 35/00)

5/00 **Planing or slotting machines cutting otherwise than by relative movement of the tool and workpiece in a straight line**

5/02 . involving rotary and straight-line movements only, e.g. for cutting helical grooves
5/04 . controlled by a copying device, e.g. by a pattern (features of copying devices B23Q 35/00)

7/00 **Planing or slotting machines characterised only by constructional features of particular parts** (constructional features of these parts per se B23Q)

7/02 . of frames, of work-table beds

7/04 . of pillars, of cross-beams

7/06 . of tool-carrying arrangements

7/08 . of work-tables

7/10 . of drives for reciprocating parts

7/12 . of arrangements for impact damping or regenerating energy

9/00 **Hand-operated planing devices**; **Portable planing apparatus** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

11/00 **Planing or slotting devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool**

13/00 **Tools or tool holders specially designed for planing or slotting machines** (features applicable also to turning-machines B23B 27/00, B23B 29/00; for cutting gear teeth B23F 21/04)

13/02 . Pivotally-mounted holders

13/04 . Holders for tool sets

13/06 . Devices for lifting or lowering the tool

Shearing; **Similar cutting**

15/00 **Shearing machines or shearing devices cutting by blades which move parallel to each other**

15/02 . having both upper and lower moving blades

15/04 . having only one moving blade

15/06 . Sheet shears

15/08 . . with a blade moved in one plane, e.g. perpendicular to the surface of the sheet

15/10 . . with a blade moved in a curved surface, e.g. for producing an edge with a curved cross-section

15/12 . characterised by drives or gearings therefor

15/14 . . actuated by fluid or gas pressure

17/00 **Shearing machines or shearing devices cutting by blades pivoted on a single axis** (on an axis parallel to the blade B23D 15/10; hand-held devices B23D 29/00)

17/02 . characterised by drives or gearings therefor

17/04 . . actuated by a rotary shaft

17/06 . . actuated by fluid or gas pressure

17/08 . . actuated by hand or foot operated lever mechanism

19/00 **Shearing machines or shearing devices cutting by rotary discs** (by friction saw discs B23D 45/00)

19/02 . having both a fixed shearing blade and a rotary shearing disc

19/04 . having rotary shearing discs arranged in co-operating pairs

19/06 . . with several spaced pairs of shearing discs working simultaneously, e.g. for trimming or making strips

19/08 . for special use, e.g. for cutting curves, for chamfering edges

21/00 **Machines or devices for shearing or cutting tubes** (as additional equipment for deep-drawing presses B21D 24/16; by sawing, see the relevant groups for sawing machines or sawing devices)

21/02 . otherwise than in a plane perpendicular to the axis of the tube, e.g. for making mitred cuts, for making bicycle frames

21/04 . Tube-severing machines with rotating tool-carrier

21/06 . Hand-operated tube cutters

21/08 . . with cutting wheels

21/10 . . with other cutting blades or tools

21/12 . . . with provision for hammering on the tool

21/14 . cutting inside the tube

23/00 **Machines or devices for shearing or cutting profiled stock** (hand-held devices B23D 29/00)

23/02 . otherwise than in a plane perpendicular to the axis of the stock

23/04 . by means of holding-dies, arranged side by side, subjecting the stock to torsional stress

25/00 **Machines or arrangements for shearing stock while the latter is travelling otherwise than in the direction of the cut** (control arrangements specially adapted for machines for shearing stock while the latter is travelling otherwise than in the direction of the cut B23D 36/00; controlling slack in travelling flexible stock B21C 47/10) **[2]**

25/02 . Flying shearing machines (B23D 25/12 takes precedence; flying shears for cutting in general B26D 1/56)

25/04 . . in which a cutting unit moves bodily with the work while cutting (B23D 25/06 takes precedence)

25/06 . . having a cutting device mounted on an oscillating lever

25/08 . . having two coacting shearing blades mounted independently

25/10 . . . on co-operating beams moving parallel to each other and attached to lever mechanisms

25/12 . Shearing machines with blades on coacting rotating drums

25/14 . without regard to the exact dimensions of the resulting material, e.g. for cutting-up scrap

27/00 **Machines or devices for cutting by a nibbling action**

27/02 . Hand-held devices (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

27/04 . . actuated by electric power

27/06 . . actuated by fluid or gas pressure

29/00 **Hand-held metal-shearing or metal-cutting devices** (with nibbling action B23D 27/02; hand-operated devices for metal-cutting otherwise than by shearing B26B)

29/02 . Hand-operated metal-shearing devices

31/00 **Shearing machines or shearing devices covered by none or more than one of the groups B23D 15/00 to B23D 29/00**; **Combinations of shearing machines**

31/02 . for performing different cutting operations on travelling stock, e.g. slitting and severing simultaneously

31/04 . for trimming stock combined with devices for shredding scrap

33/00 **Accessories for shearing machines or shearing devices** (feeding stock to machines or removing stock B21D 43/00)

33/02 . Arrangements for holding, guiding, or feeding work during the operation

33/04 . . for making circular cuts

33/06 . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices B23Q 35/00)

33/08 . Press-pads; Counter-bases; Hold-down devices

33/10 . Stops for positioning work

33/12 . Equipment for indicating where to cut

35/00 **Tools for shearing machines or shearing devices**; **Holders or chucks for shearing tools**

36/00 **Control arrangements specially adapted for machines for shearing or similar cutting, or for sawing, stock while the latter is travelling otherwise than in the direction of the cut [2]**

Broaching

37/00 **Broaching machines or broaching devices**

37/02 . Broaching machines with horizontally-arranged working tools

37/04 . . for broaching inner surfaces

37/06 . . for broaching outer surfaces

37/08 . Broaching machines with vertically-arranged working tools

37/10 . . for broaching inner surfaces

37/12 . . for broaching outer surfaces

37/14 . Broaching machines with rotatably-arranged working tools

37/16 . . for broaching helical grooves

37/18 . Broaching machines with working tools mounted on an endless chain or belt

37/20 . Broaching machines with arrangements for working in opposite directions

37/22 . for special purposes (B23D 37/14 takes precedence)

39/00 **Accessories for broaching machines or broaching devices**

41/00 **Broaching machines or broaching devices characterised only by constructional features of particular parts** (constructional features of these parts per se B23Q)

41/02 . of frames; of work supports

41/04 . of tool-carrying arrangements

41/06 . of devices for feeding, clamping, or ejecting workpieces

41/08 . of drives; of control devices

43/00 **Broaching tools** (for cutting gear teeth B23F 21/26)

43/02 . for cutting by rectilinear movement (B23D 43/08 takes precedence)

43/04 . . having inserted cutting edges

43/06 . for cutting by rotational movement

43/08 . mounted on an endless chain or belt

Sawing

45/00 **Sawing machines or sawing devices with circular saw blades or with friction saw discs** (shearing machines with rotary discs B23D 19/00 to B23D 25/00)

45/02 . with a circular saw blade or the stock mounted on a carriage

45/04 . with a circular saw blade or the stock carried by a pivoted lever

45/06 . with a circular saw blade arranged underneath a stationary work-table

45/08 . with a ring blade having inside saw teeth

45/10 . with a plurality of circular saw blades

45/12 . with a circular saw blade for cutting tubes

45/14 . for cutting otherwise than in a plane perpendicular to the axis of the stock, e.g. for making a mitred cut

45/16 . Hand-held sawing devices with circular saw blades

45/18 . Machines with circular saw blades for sawing stock while the latter is travelling otherwise than in the direction of the cut (control of such machines B23D 36/00) **[2]**

45/20 . . Flying sawing machines, the saw carrier of which is reciprocated in a guide and moves with the travelling stock during sawing

45/22 . . Flying sawing machines with lever-supported saw carrier which moves in a complete circular path

45/24 . . Flying sawing machines with lever-supported saw carrier which oscillates in an arc

45/26 . with high-speed cutting discs, performing the cut by frictional heat melting the material (grinders for cutting-off B24B 27/06)

47/00 **Sawing machines or sawing devices working with circular saw blades, characterised only by constructional features of particular parts** (constructional features of these parts per se B23Q; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

47/02 . of frames; of guiding arrangements for work-table or saw-carrier

47/04 . of devices for feeding, positioning, clamping, or rotating work

47/06 . . for stock of indefinite length

47/08 . of devices for bringing the circular saw blade to the workpiece or removing same therefrom

47/10 . . actuated by fluid or gas pressure

47/12 . of drives for circular saw blades

49/00 **Machines or devices for sawing with straight reciprocating saw blades, e.g. hacksaws**

49/02 . Hacksaw machines with straight saw blades secured to a rectilinearly-guided frame, e.g. with the frame fed stepwise in the plane of the guide

49/04 . Hacksaw machines with straight saw blades secured to a pivotally-arranged frame

49/06 . Hacksaw machines with straight saw blades for special use

49/08 . Pad-saw machines, i.e. machines in which the blade is attached to a carrier at one end only

49/10 . Hand-held or hand-operated sawing devices with straight saw blades

49/11 . . for special purposes, e.g. offset-blade hand saws **[5]**

49/12 . . Hacksaws (B23D 49/11, B23D 49/16 take precedence; bows adjustable in length or height B23D 51/12) **[5]**

49/14 . . Pad saws (B23D 49/11, B23D 49/16 take precedence) **[5]**

49/16 . . actuated by electric or magnetic power or prime movers (B23D 49/11 takes precedence) **[5]**

51/00 **Sawing machines or sawing devices working with straight blades, characterised only by constructional features of particular parts** (constructional features of these parts per se B23Q; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00); **Carrying or attaching means for tools, covered by this subclass, which are connected to a carrier at both ends [4]**

51/01 . characterised by the handle **[5]**
51/02 . of beds; of guiding arrangements for work-tables or saw carriers; of frames **[5]**
51/03 . . with extensible or collapsible frames **[5]**
51/04 . of devices for feeding, positioning, clamping, or rotating work
51/06 . . for stock of indefinite length
51/08 . of devices for mounting straight saw blades or other tools
51/10 . . for hand-held or hand-operated devices
51/12 . . for use with tools, dealt with in this subclass, which are connected to a carrier at both ends, e.g. bows adjustable in length or height
51/14 . . . Attachment of the tool
51/16 . of drives or feed mechanisms for straight tools, e.g. saw blades, or bows
51/18 . . actuated by fluid or gas pressure (B23D 51/20 takes precedence)
51/20 . . with controlled feed of the tool, or with special arrangements for relieving or lifting the tool on the return stroke

53/00 **Machines or devices for sawing with strap saw blades which are effectively endless in use, e.g. for contour cutting**

53/02 . with stationarily-mounted wheels carrying the strap (B23D 53/06 takes precedence)
53/04 . with the wheels carrying the strap mounted shiftably or swingingly, other than merely for adjustment
53/06 . with shiftable or swinging work-table
53/08 . for cutting profiled stock
53/10 . Sawing devices working with strap saw blades able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool
53/12 . Hand-held or hand-operated sawing devices working with strap saw blades

55/00 **Sawing machines or sawing devices working with strap saw blades, characterised only by constructional features of particular parts** (constructional features of these parts per se B23Q)

55/02 . of frames; of tables
55/04 . of devices for feeding or clamping work
55/06 . of drives for strap saw blades; of wheel mountings
55/08 . of devices for guiding or feeding strap saw blades
55/10 . of devices for tensioning strap saw blades (B23D 55/06 takes precedence; incorporated in the strap B23D 61/12)

57/00 **Sawing machines or sawing devices not covered by one of groups B23D 45/00 to B23D 55/00**

57/02 . with chain saws

59/00 **Accessories specially designed for sawing machines or sawing devices** (lubricating or cooling machine tools in general B23Q 11/12)

59/02 . Devices for lubricating or cooling circular saw blades
59/04 . Devices for lubricating or cooling straight or strap saw blades

61/00 **Tools for sawing machines or sawing devices** (tools for trepanning B23B 51/04); **Clamping devices for these tools**

61/02 . Circular saw blades
61/04 . . with inserted saw teeth
61/06 . . . in exchangeable arrangement
61/08 . . Ring saw blades with internal saw teeth
61/10 . . clamped between hubs; Clamping or aligning devices therefor
61/12 . Straight saw blades; Strap saw blades
61/14 . . with inserted saw teeth
61/16 . . . in exchangeable arrangement
61/18 . Sawing tools of special type, e.g. wire saw strands, saw blades or saw wire equipped with diamonds or other abrasive particles in selected individual positions

63/00 **Dressing the tools of sawing machines or sawing devices for use in cutting any kind of material, e.g. in the manufacture of sawing tools**

63/02 . Setting saw teeth by means of hand-operated devices
63/04 . Setting saw teeth of circular, straight, or strap saw blades by means of power-operated devices
63/06 . Upsetting the cutting edges of saw teeth, e.g. swaging
63/08 . Sharpening the cutting edges of saw teeth
63/10 . . by filing
63/12 . . by grinding
63/14 . . . Sharpening circular saw blades
63/16 . . of chain saws (of mortise chain cutters B24B 3/14)
63/18 . Straightening damaged saw blades; Reconditioning the side surface of saw blades, e.g. by grinding
63/20 . Combined processes for dressing saw teeth, e.g. both hardening and setting

65/00 **Making tools for sawing machines or sawing devices for use in cutting any kind of material**

65/02 . Making saw teeth by punching, cutting, or planing
65/04 . Making saw teeth by milling

Filing or rasping

67/00 **Filing or rasping machines or devices** (securing arrangements for files or rasps B23D 71/00)

67/02 . with reciprocating tools, mounted on a yoke or the like
67/04 . with reciprocating tools, attached to a carrier at one end only
67/06 . with rotating tools
67/08 . with tools mounted on an endless chain or belt
67/10 . for special use, e.g. for filing keys; Accessories therefor
67/12 . Hand-held or hand-operated filing or rasping devices (hand files or rasps B23D 71/04)

69/00 **Filing or rasping machines or devices, characterised only by constructional features of particular parts, e.g. guiding arrangements, drives** (constructional features of these parts per se B23Q; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00); **Accessories for filing or rasping** (attached to the tool B23D 71/10) **[4]**

69/02 . Guiding arrangements for hand tools

71/00 **Filing or rasping tools**; **Securing arrangements therefor** (tool holders for machine tools B23Q 3/00; handles for hand implements B25G)

71/02 . for filing or rasping machines or devices

71/04 . Hand files or hand rasps (carrying or attaching means for tools which are connected to a carrier at both ends B23D 51/12; guiding arrangements B23D 69/02)
71/06 . . using a single interchangeable blade
71/08 . . using a plurality of interchangeable cutting elements
71/10 . Accessories for filing or rasping tools, e.g. for preventing scoring of workpieces by the edges of the tool

73/00 Making files or rasps
73/02 . Preliminary treatment of blanks, e.g. grinding, polishing, specially adapted for the manufacture of files or rasps
73/04 . Methods or machines for the manufacture of files or rasps (non-mechanical methods, see the relevant classes)
73/06 . . Cutting the working surfaces by means of chisels
73/08 . . Milling, planing, slotting, knurling, or broaching the working surfaces
73/10 . . Grinding the working surfaces
73/12 . . Peculiar procedures for sharpening or otherwise treating the working surfaces (special treatment by sand-blast B24C 1/02; sharpening files by etching C23F 1/06)
73/14 . Tools or accessories specially adapted for making files or rasps, e.g. chisels, supporting-frames

Reaming bored holes

75/00 Reaming machines or reaming devices (tool holders for machine tools B23Q 3/00; handles for hand implements B25G)

77/00 Reaming tools
77/02 . Reamers with inserted cutting edges
77/04 . . with cutting edges adjustable to different diameters along the whole cutting length
77/06 . Reamers with means for compensating wear (B23D 77/04 takes precedence)
77/08 . . by spreading slotted parts of the tool body
77/10 . . by expanding a tube-like non-slotted part of the tool body
77/12 . Reamers with cutting edges arranged in tapered form
77/14 . Reamers for special use, e.g. for working cylinder ridges

79/00 Methods, machines or devices not covered elsewhere, for working metal by removal of material (by combined operations B23D 81/00; working of metal by the action of a high concentration of electric current B23H; cutting by electron-beam B23K 15/00, by laser beam B23K 26/00; other working of metal B23P; tool holders for machine tools B23Q 3/00; handles for hand implements B25G)
79/02 . Machines or devices for scraping (turning machines for bevelling, chamfering, or deburring the ends of bars or tubes B23B 5/16; scrubbing or peeling ingots by milling B23C 3/14)
79/04 . . with rotating cutting-tool, e.g. for smoothing linings of bearings
79/06 . . with reciprocating cutting-tool
79/08 . . Hand scraping-implements
79/10 . . Accessories for holding scraping tools or work to be scraped
79/12 . Machines or devices for peeling bars or tubes by making use of cutting bits arranged around the workpiece, otherwise than by turning (by turning B23B 5/12) **[2]**

81/00 Methods, machines, or devices for working metal, covered by more than one main group in this subclass (in combination with other metal-working operations B23P 13/00, B23P 23/00)

B23F MAKING GEARS OR TOOTHED RACKS (by stamping B21D; by rolling B21H; by forging or pressing B21K; by casting B22; arrangements for copying or controlling B23Q; machines or devices for grinding or polishing, in general B24B)

(1) This subclass covers:
- the use of methods or apparatus specially designed to produce accurately the shapes of gear teeth which are essential for proper intermeshing of toothed gearing elements to ensure the required relative motions;
- the use of similar methods or apparatus in the production of other articles of toothed or like form, e.g. dog clutches, splined shafts, milling cutters.

(2) This subclass does not cover the production of such other articles of toothed or like form using methods or apparatus other than those mentioned under Note (1) above.

(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "gear teeth" covers the teeth or lobes of other accurately-intermeshing members having relative movement of a similar kind, such as rotors of rotary pumps and blowers;
- "profile" may include the outline of both faces or only one face of a tooth, or the opposing faces of adjacent teeth;
- "straight" means that a tooth as a whole (ignoring any curvature of the tooth-face alone, e.g. crowning) is straight in the direction of its length, for example as seen in the direction of a radius of a spur wheel. It accordingly includes the teeth of helical gears and of the normal type of bevel gear;
- "broach-milling" means milling with a rotary cutter having a number of teeth of progressively increasing depth or width.

Subclass index

1/00 Making gear teeth by tools of which the profile matches the profile of the required surface (special adaptations for making curved teeth B23F 9/00)

1/02 . by grinding
1/04 . by planing or slotting
1/06 . by milling
1/08 . by broaching; by broach-milling

3/00 Making gear teeth involving copying operations controlled by templates having a profile which matches that of the required tooth face or part thereof or a copy thereof to a different scale (copying systems or devices per se B23Q 35/00)

5/00 Making straight gear teeth involving moving a tool relatively to a workpiece with a rolling-off or an enveloping motion with respect to the gear teeth to be made

5/02 . by grinding
5/04 . . the tool being a grinding worm
5/06 . . the tool being a grinding disc with a plane front surface
5/08 . . the tool being a grinding disc having the same profile as the tooth or teeth of a rack
5/10 . . the tool being a grinding disc having the same profile as the tooth or teeth of a crown or bevel wheel
5/12 . by planing or slotting
5/14 . . the tool having the same profile as a tooth or teeth of a rack
5/16 . . the tool having a shape similar to that of a spur wheel or part thereof
5/18 . . the tool having the same profile as a tooth of a crown wheel
5/20 . by milling
5/22 . . the tool being a hob for making spur gears
5/24 . . the tool being a hob for making bevel gears
5/26 . . the tool having the same profile as a tooth or teeth of a rack, for making spur gears
5/27 . . the tool having the same profile as a tooth or teeth of a crown or bevel wheel **[2]**
5/28 . by broaching; by broach-milling

7/00 Making herring-bone gear teeth

9/00 Making gears having teeth curved in their longitudinal direction

9/02 . by grinding
9/04 . by planing or slotting with reciprocating cutting tools
9/06 . . having a shape similar to a spur wheel of part thereof
9/07 . . having a shape similar to a crown wheel or a part thereof **[2]**
9/08 . by milling, e.g. with helicoidal hob
9/10 . . with a face-mill
9/12 . . . for non-continuous generating processes **[2]**
9/14 . . . for continuous generating processes **[2]**

11/00 Making worm wheels, e.g. by hobbing

13/00 Making worms by methods essentially requiring the use of machines of the gear-cutting type (making screw-thread B23G)

13/02 . Making worms of cylindrical shape
13/04 . . by grinding
13/06 . Making worms of globoidal shape
13/08 . . by grinding

15/00 Methods or machines for making gear wheels of special kinds, not covered by groups B23F 7/00 to B23F 13/00

15/02 . Making gear teeth on wheels of varying radius of operation, e.g. on elliptical wheels
15/04 . Making fine-pitch gear teeth on clock wheels or the like by special machining
15/06 . Making gear teeth on the front surface of wheels, e.g. for clutches or couplings with toothed faces
15/08 . Making intermeshing rotors, e.g. of pumps

17/00 Special methods or machines for making gear teeth, not covered by groups B23F 1/00 to B23F 15/00

19/00 Finishing gear teeth by other tools than those used for manufacturing gear teeth

19/02 . Lapping gear teeth
19/04 . . Lapping spur gears by making use of a correspondingly shaped counterpart
19/05 . Honing gear teeth **[2]**
19/06 . Shaving the faces of gear teeth
19/10 . Chamfering the end edges of gear teeth
19/12 . . by grinding

21/00 Tools specially adapted for use in machines for manufacturing gear teeth

21/02 . Grinding discs; Grinding worms (truing grinding tools B24B; grinding tools in general B24D)
21/03 . Honing tools **[2]**
21/04 . Planing or slotting tools
21/06 . . having a profile which matches a gear tooth profile
21/08 . . having the same profile as a tooth or teeth of a rack
21/10 . . Gear-shaper cutters having a shape similar to a spur wheel or part thereof
21/12 . Milling tools
21/14 . . Profile cutters of disc type
21/16 . . Hobs
21/18 . . . Taper hobs, e.g. for bevel gears
21/20 . . Fly cutters
21/22 . . Face-mills for longitudinally-curved gear teeth
21/23 . . . with cutter teeth arranged on a spiral curve for continuous generating processes **[2]**
21/24 . Broach-milling tools
21/26 . Broaching tools
21/28 . Shaving cutters

23/00 Accessories or equipment combined with or arranged in, or specially designed to form part of, gear-cutting machines (accessories or equipment not restricted to gear-cutting machines B23Q; tool-guiding mechanisms, see the relevant groups for making gear teeth)

23/02 . Loading or chucking arrangements for workpieces
23/04 . . Loading arrangements
23/06 . . Chucking arrangements

23/08 . Index mechanisms
23/10 . Arrangements for compensating irregularities in drives or indexing mechanisms
23/12 . Other devices, e.g. tool holders; Checking devices for controlling workpieces in machines for manufacturing gear teeth

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B23G **THREAD CUTTING**; **WORKING OF SCREWS, BOLT HEADS, OR NUTS, IN CONJUNCTION THEREWITH** (thread-forming by corrugating tubes B21D 15/04, by rolling B21H 3/02, by forging, pressing, or hammering B21K 1/56; making helical grooves by turning B23B 5/48, by milling B23C 3/32, by grinding B24B 19/02; arrangements for copying or controlling B23Q)

Note

In this subclass, the following expression is used with the meaning indicated:
– "thread cutting" includes the use of tools similar both in form and in manner of use to thread-cutting tools, but without removing any material.

Subclass index

1/00 **Thread cutting**; **Automatic machines specially designed therefor**
1/02 . on an external or internal cylindrical or conical surface, e.g. on recesses (B23G 1/16, B23G 1/22, B23G 1/32, B23G 1/36 take precedence)
1/04 . . Machines with one working-spindle
1/06 . . . specially adapted for making conical screws, e.g. wood-screws
1/08 . . Machines with a plurality of working-spindles
1/10 . . . specially adapted for making conical screws, e.g. wood-screws
1/12 . . Machines with a toothed cutter in the shape of a spur gear or the like which is rotated to generate the thread profile as the work rotates
1/14 . . . specially adapted for making conical screws, e.g. wood-screws
1/16 . in holes of workpieces by taps (B23G 1/26, B23G 1/32, B23G 1/36 take precedence)
1/18 . . Machines with one working-spindle
1/20 . . Machines with a plurality of working-spindles
1/22 . Machines specially designed for operating on pipes or tubes
1/24 . . portable
1/26 . Manually-operated thread-cutting devices (features of the threading tool B23G 5/00)
1/28 . . with means for adjusting the threading tool
1/30 . . without means for adjusting the threading tool, e.g. with die-stocks (tap wrenches B25B)
1/32 . by milling
1/34 . . with a cutting bit moving in a closed path arranged eccentrically with respect to the axis of the rotating workpiece
1/36 . by grinding
1/38 . . with grinding discs guided along the workpiece in accordance with the pitch of the required thread
1/40 . . with grinding discs guided radially to the workpiece
1/42 . Centreless grinding
1/44 . Equipment or accessories specially designed for machines or devices for thread cutting
1/46 . . for holding the threading tools
1/48 . . for guiding the threading tools
1/50 . . for cutting thread by successive operations
1/52 . . for operating on pipes or tubes

3/00 **Arrangements or accessories for enabling machine tools not specially designed only for thread cutting to be used for this purpose, e.g. arrangements for reversing the working-spindle**
3/02 . for withdrawing or resetting the threading tool
3/04 . . for repeatedly setting the threading tool in a predetermined working position
3/06 . for compensating inaccuracies in the pitch of the lead-screw
3/08 . for advancing or controlling the threading tool or the work by templates, cams, or the like
3/10 . . for cutting thread of variable pitch
3/12 . . for using several adjacently-arranged threading tools, e.g. using several chasers
3/14 . . for cutting thread of conical shape

5/00 **Thread-cutting tools**; **Die-heads**
5/02 . without means for adjustment
5/04 . . Dies
5/06 . . Taps (chucks therefor B23B 31/00)
5/08 . with means for adjustment
5/10 . . Die-heads
5/12 . . . self-releasing
5/14 . . Tapping-heads
5/16 . . . self-releasing
5/18 . Milling cutters
5/20 . combined with other tools, e.g. drills

7/00 **Forming thread by means of tools similar both in form and in manner of use to thread-cutting tools, but without removing any material** (features of machines or devices not specially adapted to the particular mode of forming the thread B23G 1/00)

7/02 . Tools for this purpose

9/00 **Working screws, bolt heads or nuts in conjunction with thread cutting, e.g. slotting screw heads or shanks, removing burrs from screw heads or shanks**; **Finishing, e.g. polishing, any screw thread** (making washers or nuts by processing metal sheets, tubes or profiles without essentially removing material B21D 53/20, B21D 53/24)

11/00 **Feeding or discharging mechanisms combined with, or arranged in, or specially adapted for use in connection with, thread-cutting machines** (for machine tools in general B23Q)

B23H **WORKING OF METAL BY THE ACTION OF A HIGH CONCENTRATION OF ELECTRIC CURRENT ON A WORKPIECE USING AN ELECTRODE WHICH TAKES THE PLACE OF A TOOL**; **SUCH WORKING COMBINED WITH OTHER FORMS OF WORKING OF METAL** (processes for the electrolytic or electrophoretic production of coatings, electroforming, or apparatus therefor C25D; processes for the electrolytic removal of material from objects C25F; manufacturing printed circuits using precipitation techniques to apply the conductive material to form the desired conductive pattern H05K 3/18) **[4]**

Note

This subclass covers the working of metal described as “electroerosion”. **[4]**

Subclass index

1/00 **Electrical discharge machining, i.e. removing metal with a series of rapidly recurring electrical discharges between an electrode and a workpiece in the presence of a fluid dielectric [4]**

1/02 . Electric circuits specially adapted therefor, e.g. power supply, control, preventing short circuits or other abnormal discharges **[4]**

1/04 . Electrodes specially adapted therefor or their manufacture (B23H 9/00 takes precedence) **[4]**

1/06 . . Electrode material **[4]**

1/08 . Working media **[4]**

1/10 . Supply or regeneration of working media **[4]**

3/00 **Electrochemical machining, i.e. removing metal by passing current between an electrode and a workpiece in the presence of an electrolyte [4]**

3/02 . Electric circuits specially adapted therefor, e.g. power supply, control, preventing short circuits **[4]**

3/04 . Electrodes specially adapted therefor or their manufacture (B23H 9/00 takes precedence) **[4]**

3/06 . . Electrode material **[4]**

3/08 . Working media **[4]**

3/10 . Supply or regeneration of working media **[4]**

5/00 **Combined machining [4]**

5/02 . Electrical discharge machining combined with electrochemical machining **[4]**

5/04 . Electrical discharge machining combined with mechanical working **[4]**

5/06 . Electrochemical machining combined with mechanical working, e.g. grinding or honing **[4]**

5/08 . . Electrolytic grinding **[4]**

5/10 . Electrodes specially adapted therefor or their manufacture (B23H 1/04, B23H 3/04 take precedence) **[4]**

5/12 . Working media **[4]**

5/14 . Supply or regeneration of working media **[4]**

7/00 **Processes or apparatus applicable to both electrical discharge machining and electrochemical machining [4]**

7/02 . Wire-cutting **[4]**

7/04 . . Apparatus for supplying current to working gap; Electric circuits specially adapted therefor **[4]**

7/06 . . Control of the travel curve of the relative movement between electrode and workpiece **[4]**

7/08 . . Wire electrodes **[4]**

7/10 . . . Supporting, winding or electrical connection of wire-electrode **[4]**

7/12 . Rotating-disc electrodes **[4]**

7/14 . Electric circuits specially adapted therefor, e.g. power supply **[4]**

7/16 . . for preventing short circuits or other abnormal discharges **[4]**

7/18 . . for maintaining or controlling the desired spacing between electrode and workpiece **[4]**

7/20 . . for programme-control, e.g. adaptive **[4]**

7/22 . Electrodes specially adapted therefor or their manufacture (B23H 7/08, B23H 7/12, B23H 9/00 take precedence) **[4]**

7/24 . . Electrode material **[4]**

7/26 . Apparatus for moving or positioning electrode relatively to workpiece; Mounting of electrode **[4]**

7/28 . . Moving electrode in a plane normal to the feed direction, e.g. orbiting **[4]**

7/30 . . Moving electrode in the feed direction (B23H 7/32 takes precedence) **[4]**
7/32 . . Maintaining desired spacing between electrode and workpiece **[4]**
7/34 . Working media **[4]**
7/36 . Supply or regeneration of working media **[4]**
7/38 . Influencing metal working by using specially adapted means not directly involved in the removal of metal, e.g. ultrasonic waves, magnetic fields or laser irradiation **[4]**

9/00 Machining specially adapted for treating particular metal objects or for obtaining special effects or results on metal objects (heat treatment by cathodic discharge C21D 1/38) **[4]**

9/02 . Trimming or deburring **[4]**
9/04 . Treating surfaces of rolls **[4]**
9/06 . Marking or engraving **[4]**
9/08 . Sharpening **[4]**
9/10 . Working turbine blades or nozzles **[4]**
9/12 . Forming parts of complementary shape, e.g. punch-and-die **[4]**
9/14 . Making holes **[4]**
9/16 . . using an electrolytic jet **[4]**
9/18 . Producing external conical surfaces or spikes (B23H 9/08 takes precedence) **[4]**

11/00 Auxiliary apparatus or details, not otherwise provided for [4]

B23K SOLDERING OR UNSOLDERING; **WELDING**; **CLADDING OR PLATING BY SOLDERING OR WELDING**; **CUTTING BY APPLYING HEAT LOCALLY, E.G. FLAME CUTTING**; **WORKING BY LASER BEAM** (making metal-coated products by extruding metal B21C 23/22; building up linings or coverings by casting B22D 19/08; casting by dipping B22D 23/04; manufacture of composite layers by sintering metal powder B22F 7/00; arrangements on machine tools for copying or controlling B23Q; covering metals or covering materials with metals, not otherwise provided for C23C; burners F23D)

(1) This subclass covers also electric circuits specially adapted for the purposes covered by the title of the subclass.
(2) In this subclass, the following term is used with the meaning indicated:
– "soldering" means uniting metals using solder and applying heat without melting either of the parts to be united. **[5]**
(3) In groups B23K 1/00 to B23K 31/00, it is desirable to add the indexing codes of groups B23K 101/00 or B23K 103/00. **[5]**

Subclass index

Soldering, e.g. brazing, or unsoldering

1/00 Soldering, e.g. brazing, or unsoldering (B23K 3/00 takes precedence; characterised only by the use of special materials or media B23K 35/00; dip or wave soldering in the manufacture of printed circuits H05K 3/34) **[5]**

1/002 . Soldering by means of induction heating **[5]**
1/005 . Soldering by means of radiant energy **[5]**
1/008 . Soldering within a furnace (B23K 1/012 takes precedence) **[5]**
1/012 . Soldering with the use of hot gas **[5]**
1/015 . . Vapour-condensation soldering **[5]**
1/018 . Unsoldering; Removal of melted solder or other residues **[5]**
1/06 . making use of vibrations, e.g. supersonic vibrations
1/08 . Soldering by means of dipping in molten solder
1/14 . specially adapted for soldering seams (making tubes involving operations other than soldering B21C) **[5]**
1/16 . . longitudinal seams, e.g. of shells **[5]**
1/18 . . circumferential seams, e.g. of shells **[5]**
1/19 . taking account of the properties of the materials to be soldered **[3]**
1/20 . Preliminary treatment of work or areas to be soldered, e.g. in respect of a galvanic coating (preparation of surfaces in particular ways, see the relevant classes for the treatments or the materials treated, e.g. C04B, C23C)

3/00 Tools, devices, or special appurtenances for soldering, e.g. brazing, or unsoldering, not specially adapted for particular methods (materials used for soldering B23K 35/00) **[5]**

3/02 . Soldering irons; Bits
3/03 . . electrically heated **[5]**
3/04 . Heating appliances (soldering lamps or blow-pipes F23D; electric heating in general H05B)
3/047 . . electric **[5]**

3/053 . . . using resistance wires **[5]**
3/06 . Solder feeding devices; Solder melting pans
3/08 . Auxiliary devices therefor (cleaning pipes or tubes or systems of pipes or tubes, e.g. before soldering, B08B 9/02) **[5]**

Flame welding or cutting

5/00 Gas flame welding
5/02 . Seam welding (making tubes involving operations other than welding B21C)
5/04 . . using additional profiled strips or like of welding metal along seam edges
5/06 . . Welding longitudinal seams
5/08 . . Welding circumferential seams
5/10 . Welding workpieces essentially comprising layers of different metals, e.g. plated workpieces
5/12 . taking account of the properties of the material to be welded
5/14 . . of non-ferrous metals (B23K 5/16 takes precedence)
5/16 . . of different metals
5/18 . for purposes other than joining parts, e.g. built-up welding
5/20 . making use of vibrations, e.g. supersonic vibrations
5/213 . Preliminary treatment **[3]**
5/22 . Auxiliary equipment, e.g. backings, guides
5/24 . . Arrangements for supporting torches (not restricted to flame welding B23K 37/02)

7/00 Cutting, scarfing, or desurfacing by applying flames
7/06 . Machines, apparatus, or equipment specially designed for scarfing or desurfacing
7/08 . by applying additional compounds or means favouring the cutting, scarfing, or desurfacing procedure
7/10 . Auxiliary devices, e.g. for guiding or supporting the torch (guiding means applicable to other metal-working machines B23Q)

Electric welding or cutting

9/00 Arc welding or cutting (electro-slag welding B23K 25/00; welding transformers H01F; welding generators H02K)
9/007 . Spot arc welding **[5]**
9/013 . Arc cutting, gouging, scarfing or desurfacing **[5]**
9/02 . Seam welding; Backing means; Inserts
9/022 . . Welding by making use of electrode vibrations **[5]**
9/025 . . for rectilinear seams **[5]**
9/028 . . for curved planar seams **[5]**
9/032 . . for three-dimensional seams **[5]**
9/035 . . with backing means disposed under the seam **[5]**
9/038 . . using moulding means (not restricted to arc welding B23K 37/06) **[5]**
9/04 . Welding for other purposes than joining, e.g. built-up welding
9/06 . Arrangements or circuits for starting the arc, e.g. by generating ignition voltage, or for stabilising the arc **[5]**
9/067 . . Starting the arc **[5]**
9/073 . . Stabilising the arc **[5]**
9/08 . Arrangements or circuits for magnetic control of the arc
9/09 . Arrangements or circuits for arc welding with pulsed current or voltage **[3]**
9/095 . Monitoring or automatic control of welding parameters **[5]**
9/10 . Other electric circuits therefor; Protective circuits; Remote controls
9/12 . Automatic feeding or moving of electrodes or work for spot or seam welding or cutting
9/127 . . Means for tracking lines during arc welding or cutting (copying in general B23Q 35/00) **[5]**
9/133 . . Means for feeding electrodes, e.g. drums, rolls, motors **[5]**
9/14 . making use of insulated electrodes
9/16 . making use of shielding gas
9/167 . . and of a non-consumable electrode **[5]**
9/173 . . and of consumable electrode **[5]**
9/18 . Submerged-arc welding
9/20 . Stud welding
9/22 . Percussion welding
9/23 . taking account of the properties of the materials to be welded **[3]**
9/235 . Preliminary treatment **[3]**
9/24 . Features related to electrodes (form or composition of electrodes B23K 35/00)
9/26 . . Accessories for electrodes, e.g. ignition tips
9/28 . . Supporting devices for electrodes (not restricted to arc welding or cutting B23K 37/02)
9/29 . . . Supporting devices adapted for making use of shielding means **[5]**
9/30 . . . Vibrating holders for electrodes (B23K 9/022 takes precedence) **[5]**
9/32 . Accessories (earthing connections H01R)

10/00 Welding or cutting by means of a plasma [5]
10/02 . Plasma welding **[5]**

11/00 Resistance welding; Severing by resistance heating
11/02 . Pressure butt welding
11/04 . Flash butt welding
11/06 . using roller electrodes
11/08 . Seam welding not restricted to one of the preceding subgroups
11/087 . . for rectilinear seams **[5]**
11/093 . . for curved planar seams **[5]**
11/10 . Spot welding; Stitch welding
11/11 . . Spot welding **[5]**
11/12 . . making use of vibrations
11/14 . Projection welding
11/16 . taking account of the properties of the material to be welded
11/18 . . of non-ferrous metals (B23K 11/20 takes precedence)
11/20 . . of different metals
11/22 . Severing by resistance heating
11/24 . Electric supply or control circuits therefor
11/25 . . Monitoring devices **[5]**
11/26 . . Storage discharge welding
11/28 . Portable welding equipment
11/30 . Features relating to electrodes (form or composition of electrodes B23K 35/00)
11/31 . . Electrode holders (not restricted to resistance welding or severing by resistance heating B23K 37/02) **[5]**
11/34 . Preliminary treatment **[3]**
11/36 . Auxiliary equipment (B23K 11/31 takes precedence) **[3,5]**

13/00 Welding by high-frequency current heating [5]
13/01 . by induction heating **[5]**
13/02 . . Seam welding
13/04 . by conduction heating **[5]**
13/06 . characterised by the shielding of the welding zone against influence of the surrounding atmosphere (selection of media B23K 35/38) **[5]**
13/08 . Electric supply or control circuits therefor **[5]**

Other welding or cutting; **Working by laser beam [3]**

15/00 Electron-beam welding or cutting (electron- or ion-beam tubes H01J 37/00)
15/02 . Control circuits therefor **[5]**
15/04 . for welding annular seams **[5]**
15/06 . within a vacuum chamber (B23K 15/04 takes precedence) **[5]**
15/08 . Removing material, e.g. by cutting, by hole drilling **[5]**
15/10 . Non-vacuum electron beam-welding or cutting **[5]**

17/00 Use of the energy of nuclear particles in welding or related techniques

20/00 Non-electric welding by applying impact or other pressure, with or without the application of heat, e.g. cladding or plating [3]
20/02 . by means of a press **[3]**
20/04 . by means of a rolling mill **[3]**
20/06 . by means of high energy impulses, e.g. magnetic energy **[3]**
20/08 . . Explosive welding **[3]**
20/10 . making use of vibrations, e.g. ultrasonic welding **[3]**
20/12 . the heat being generated by friction; Friction welding **[3]**
20/14 . Preventing or minimising gas access, or using protective gases or vacuum during welding (formed by material interposed between workpieces B23K 20/18) **[3]**
20/16 . with interposition of special material to facilitate connection of the parts, e.g. material for absorbing or producing gas **[3]**
20/18 . Zonal welding by interposing weld-preventing substances between zones not to be welded **[3]**
20/20 . Special methods allowing subsequent separation, e.g. of metals of high quality from scrap material **[3]**
20/22 . taking account of the properties of the materials to be welded **[3]**
20/227 . . with ferrous layer **[5]**
20/233 . . without ferrous layer **[5]**
20/24 . Preliminary treatment **[3]**
20/26 . Auxiliary equipment **[3]**

23/00 Alumino-thermic welding

25/00 Slag welding, i.e. using a heated layer or mass of powder, slag, or the like in contact with the material to be joined (B23K 23/00 takes precedence; submerged-arc welding B23K 9/18)

26/00 Working by laser beam, e.g. welding, cutting, boring (lasers H01S 3/00) **[2,3]**
26/02 . Positioning or observing the workpiece, e.g. with respect to the point of impact; Aligning, aiming or focusing the laser beam **[3]**
26/03 . . Observing the workpiece **[7]**
26/04 . . Automatically aligning, aiming or focusing the laser beam, e.g. using the back-scattered light **[3]**
26/06 . . Shaping the laser beam, e.g. by masks or multi-focusing (optical elements, systems, or apparatus, in general G02B) **[3]**
26/067 . . . Dividing the beam into multiple beams, e.g. multi-focusing **[7]**
26/073 . . . Shaping the laser spot **[7]**
26/08 . Devices involving relative movement between laser beam and workpiece **[3]**
26/10 . . using a fixed support **[3]**
26/12 . in a special atmosphere, e.g. in an enclosure **[3]**
26/14 . using a flow, e.g. a jet of gas, in conjunction with the laser beam (B23K 26/12 takes precedence) **[3]**
26/16 . Removing of by-products, e.g. particles or vapours produced during treatment of a workpiece (by a flow of gas B23K 26/14) **[3]**
26/18 . using absorbing layers on the material being worked, e.g. for marking or protecting purposes **[3]**
26/20 . Bonding, e.g. welding (soldering by means of radiant energy B23K 1/005; joining of preformed plastics parts by heating using laser beam B29C 65/16) **[7]**
26/22 . . Spot welding **[7]**
26/24 . . Seam welding **[7]**
26/26 . . . of rectilinear seams **[7]**
26/28 . . . of curved planar seams **[7]**
26/30 . . . of three-dimensional seams **[7]**
26/32 . . taking account of the properties of the material involved **[7]**
26/34 . Welding for purposes other than joining, e.g. build-up welding **[7]**
26/36 . Removing material **[7]**
26/38 . . by boring or cutting **[7]**
26/40 . . taking account of the properties of the material involved **[7]**
26/42 . Preliminary treatment; Auxiliary operations or equipment (B23K 26/16 takes precedence) **[7]**

28/00 Welding or cutting not covered by groups B23K 5/00 to B23K 26/00 (joining workpieces by electrolysis C25D 2/00; electrolytic removal of materials C25F) **[2]**
28/02 . Combined welding or cutting procedures or apparatus **[2]**

31/00 Processes relevant to this subclass, specially adapted for particular articles or purposes, but not covered by any single one of main groups B23K 1/00 to B23K 28/00 (making tubes or profiled bars involving operations other than soldering or welding B21C 37/04, B21C 37/08)
31/02 . relating to soldering or welding (dip or wave soldering in the manufacture of printed circuits H05K 3/34)
31/10 . relating to cutting or desurfacing
31/12 . relating to investigating the properties, e.g. the weldability, of materials **[5]**

33/00 Specially-profiled edge portions of workpieces for making soldering or welding connections; **Filling the seams formed thereby**

35/00 Rods, electrodes, materials, or media, for use in soldering, welding, or cutting
35/02 . characterised by mechanical features, e.g. shape
35/04 . . specially designed for use as electrodes (ignition tips for arc welding or cutting B23K 9/26)
35/06 . . . of non-circular cross-section; with special arrangement, e.g. internal
35/08 . . . . multi-cored; multiple

35/10 . . . . with more than one layer of coating or sheathing material
35/12 . . not specially designed for use as electrodes
35/14 . . . for soldering
35/16 . . . of non-circular cross-section; with special arrangement, e.g. internal (B23K 35/14 takes precedence)
35/18 . . . . multi-cored; multiple
35/20 . . . . with more than one layer of coating or sheathing material
35/22 . characterised by the composition or nature of the material
35/24 . . Selection of soldering or welding materials proper (B23K 35/34 takes precedence)
35/26 . . . with the principal constituent melting at less than 400°C
35/28 . . . with the principal constituent melting at less than 950°C
35/30 . . . with the principal constituent melting at less than 1550°C
35/32 . . . with the principal constituent melting at more than 1550°C
35/34 . . comprising compounds which yield metals when heated
35/36 . . Selection of non-metallic compositions, e.g. coatings, fluxes (B23K 35/34 takes precedence); Selection of soldering or welding materials, conjoint with selection of non-metallic compositions, both selections being of interest (selection of soldering or welding materials proper B23K 35/24) **[2]**
35/362 . . . Selection of compositions of fluxes (B23K 35/365, B23K 35/368 take precedence) **[2]**
35/363 . . . . for soldering or brazing **[4]**
35/365 . . . Selection of non-metallic compositions of coating materials either alone or conjoint with selection of soldering or welding materials **[2]**
35/368 . . . Selection of non-metallic compositions of core materials either alone or conjoint with selection of soldering or welding materials **[2]**
35/38 . . Selection of media, e.g. special atmospheres for surrounding the working area
35/40 . Making wire or rods for soldering or welding (processes involving a single technical art, see the relevant subclasses, e.g. B05D, B21C)

37/00 Auxiliary devices or processes, not specially adapted to a procedure covered by only one of the other main groups of this subclass (eye-shields for welders worn on the operator's body or carried in the hand A61F 9/00; applicable to metal-working machines other than soldering, welding, or flame-cutting machines B23Q; other protective shields F16P 1/06)

37/02 . Carriages for supporting the welding or cutting element
37/04 . for holding or positioning work
37/047 . . moving work to adjust its position between soldering, welding or cutting steps (B23K 37/053 takes precedence) **[5]**
37/053 . . aligning cylindrical work; Clamping devices therefor **[5]**
37/06 . for positioning the molten material, e.g. confining it to a desired area
37/08 . for flash removal **[5]**

Indexing scheme associated with groups B23K 1/00 to B23K 31/00, relating to articles made by soldering, welding or cutting or to materials to be soldered, welded or cut. [5]

101/00 Articles made by soldering, welding or cutting [5]
101/02 . Honeycomb structures **[5]**
101/04 . Tubular or hollow articles **[5]**
101/06 . . Tubes **[5]**
101/08 . . . finned or ribbed **[5]**
101/10 . . Pipe-lines **[5]**
101/12 . . Vessels **[5]**
101/14 . . Heat exchangers **[5]**
101/16 . Bands or sheets of indefinite length **[5]**
101/18 . Sheet panels **[5]**
101/20 . Tools **[5]**
101/22 . Nets, wire fabrics or the like **[5]**
101/24 . Frameworks **[5]**
101/26 . Railway- or like rails **[5]**
101/28 . Beams **[5]**
101/30 . Chains, hoops or rings **[5]**
101/32 . Wires **[5]**
101/34 . Coated articles **[5]**
101/36 . Electric or electronic devices **[5]**
101/38 . . Conductors **[5]**
101/40 . . Semiconductor devices **[5]**
101/42 . . Printed circuits **[5]**

103/00 Materials to be soldered, welded or cut [5]
103/02 . Iron or ferrous alloys **[5]**
103/04 . . Steel alloys **[5]**
103/06 . . Cast-iron alloys **[5]**
103/08 . Non-ferrous metals or alloys **[5]**
103/10 . . Aluminium or alloys thereof **[5]**
103/12 . . Copper or alloys thereof **[5]**
103/14 . . Titanium or alloys thereof **[5]**
103/16 . Composite materials **[5]**
103/18 . Dissimilar materials **[5]**
103/20 . . Ferrous alloys and aluminium or alloys thereof **[5]**
103/22 . . Ferrous alloys and copper or alloys thereof **[5]**
103/24 . . Ferrous alloys and titanium or alloys thereof **[5]**

B23P OTHER WORKING OF METAL; **COMBINED OPERATIONS**; **UNIVERSAL MACHINE TOOLS** (arrangements for copying or controlling B23Q)

(1) This subclass does not cover non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass.

(2) In this subclass, the following expressions are used with the meanings indicated:
- "combined operations" excludes the assembling of parts if it is an essential feature of the next metal-working operation, since it is not regarded as an operation per se;
- "working of metal" and equivalent expressions include non-mechanical treatment of metal so far as it is not provided for in any other class or subclass, for example, in C21D, C22C, C22F, C23. Thus, combinations of such non-mechanical treatment with other metal-working are classified in this subclass.

(3) Attention is drawn to the Notes following the title of class B23.

Subclass index

5/00 Setting gems or the like on metal parts, e.g. diamonds on tools

6/00 Restoring or reconditioning objects (straightening or restoring form of sheet metal, metal rods, metal tubes, metal profiles, or specific articles made therefrom B21D 1/00, B21D 3/00; repairing defective or damaged objects by casting techniques B22D 19/10; procedures or apparatus covered by a single other subclass, see the relevant subclass) **[3]**

6/02 . Pistons or cylinders **[3]**

6/04 . Repairing fractures or cracked metal parts or products, e.g. castings **[3]**

9/00 Treating or finishing surfaces mechanically, with or without calibrating, primarily to resist wear or impact, e.g. smoothing or roughening turbine blades or bearings (treatment covered by a single other subclass, see the relevant subclass, e.g. B24C, C21D 7/00, C22F 1/00); **Features of such surfaces not otherwise provided for, their treatment being unspecified**

9/02 . Treating or finishing by applying pressure, e.g. knurling (B23P 9/04 takes precedence)

9/04 . Treating or finishing by hammering or applying repeated pressure

11/00 Connecting or disconnecting metal parts or objects by metal-working techniques, not otherwise provided for (connecting sheet metal or metal tubes, rods or profiles B21D 39/00; riveting B21J; soldering, unsoldering, welding B23K; hand tools for connecting wire or strip B25B 25/00; connecting metal parts by adhesives F16B 11/00) **[1,7]**

11/02 . by first expanding and then shrinking or vice versa, e.g. by using pressure fluids; by making force fits

13/00 Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects B23P 15/00)

13/02 . in which only the machining operations are important

13/04 . involving slicing of profiled material

15/00 Making specific metal objects by operations not covered by a single other subclass or a group in this subclass

15/02 . turbine or like blades from one piece

15/04 . turbine or like blades from several pieces

15/06 . piston rings from one piece

15/08 . piston rings from several pieces

15/10 . pistons

15/12 . gratings

15/14 . gear parts, e.g. gear wheels

15/16 . plates with holes of very small diameter e.g. for spinning or burner nozzles

15/18 . brake shoes

15/20 . railroad requirements, e.g. buffers

15/22 . cartridges or like shells

15/24 . dies (B21C 3/18, B21C 25/10, B21D 37/20 take precedence)

15/26 . heat exchangers

15/28 . cutting tools (sawing tools B23D 63/00, B23D 65/00; files or rasps B23D 73/00)

15/30 . . lathes or like tools

15/32 . . twist-drills

15/34 . . milling cutters

15/36 . . . for thread cutting

15/38 . . planing or slotting tools (B23P 15/30 takes precedence)

15/40 . . shearing tools

15/42 . . broaching tools

15/44 . . scraping or shaving tools

15/46 . . reaming tools

15/48 . . threading tools (milling cutters for thread-cutting B23P 15/36)

15/50 . . . dies

15/52 . . . taps

17/00 Metal-working operations, not covered by a single other subclass or another group in this subclass

17/02 . Single metal-working processes; Machines or apparatus therefor

17/04 . characterised by the nature of the material involved or the kind of product independently of its shape

17/06 . . Making steel wool or the like

19/00 Machines for simply fitting together or separating metal parts or objects, or metal and non-metal parts, whether or not involving some deformation; **Tools or devices therefor so far as not provided for in other classes** (hand tools in general B25) **[3]**

19/02 . for connecting objects by press fit or for detaching same (B23P 19/10 takes precedence) **[1,7]**

19/027 . . using hydraulic or pneumatic means (B23P 19/033 takes precedence) **[7]**

19/033 . . using vibration **[7]**

19/04 . for assembling or disassembling parts (B23P 19/10 takes precedence) **[1,7]**

19/06 . . Screw or nut setting or loosening machines

19/08 . . Machines for placing washers, circlips, or the like on bolts or other members

19/10 . Aligning parts to be fitted together **[7]**

19/12 . . Alignment of parts for insertion into bores **[7]**

21/00 Machines for assembling a multiplicity of different parts to compose units, with or without preceding or subsequent working of such parts, e.g. with programme control

23/00 Machines or arrangements of machines for performing specified combinations of different metal-working operations not covered by a single other subclass (combined horizontal boring and milling machines B23B 39/02; if the particular kinds of operation are not essential B23Q 37/00 to B23Q 41/00; features relating to operations covered by a single subclass, see the relevant subclass for the operation)

23/02 . Machine tools for performing different machining operations (lathes, e.g. capstan lathes, B23B)

23/04 . for both machining and other metal-working operations

23/06 . Metal-working plant comprising a number of associated machines or apparatus

25/00 Auxiliary treatment of workpieces, before or during machining operations, to facilitate the action of the tool or the attainment of a desired final condition of the work, e.g. relief of internal stress

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B23Q DETAILS, COMPONENTS, OR ACCESSORIES FOR MACHINE TOOLS, E.G. ARRANGEMENTS FOR COPYING OR CONTROLLING (tools of the kind used in lathes or boring machines B23B 27/00); MACHINE TOOLS IN GENERAL, CHARACTERISED BY THE CONSTRUCTION OF PARTICULAR DETAILS OR COMPONENTS; COMBINATIONS OR ASSOCIATIONS OF METAL-WORKING MACHINES, NOT DIRECTED TO A PARTICULAR RESULT

(1) In this subclass, groups designating parts of machine tools cover machine tools characterised by constructional features of such parts.

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "controlling" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation; **[3]**
- "regulation" means maintaining a variable automatically at a desired value or within a desired range of values. The desired value or range may be fixed, or manually varied, or may vary with time according to a predetermined "programme" or according to variation of another variable. Regulation is a form of control; **[3]**
- "automatic control" is often used in the art as a synonym for regulation. **[3]**

(3) Attention is drawn to the Notes following the title of class B23.

Subclass index

1/00 Members which are comprised in the general build-up of a form of machine, particularly relatively large fixed members (B23Q 37/00 takes precedence)

1/01 . Frames, beds, pillars or like members; Arrangement of ways **[6]**

1/03 . Stationary work or tool supports (B23Q 1/70 takes precedence; auxiliary tables B23Q 1/74; tailstocks B23B 23/00) **[6]**

1/25 . Movable or adjustable work or tool supports **[6]**

1/26 . . characterised by constructional features relating to the co-operation of relatively movable members; Means for preventing relative movement of such members **[6]**

1/28 . . . Means for securing sliding members in any desired position **[6]**

1/30 . . . controlled in conjunction with the feed mechanism **[6]**

1/32 . . . Relative movement obtained by co-operating spherical surfaces, e.g. ball-and-socket joints **[6]**

1/34 . . . Relative movement obtained by use of deformable elements, e.g. piezo-electric, magnetostrictive, elastic or thermally-dilatable elements (sensitive elements capable of producing movement or displacement for purposes not limited to measurement G12B 1/00) **[6]**

1/36 . . . . Springs **[6]**
1/38 . . . using fluid bearings or fluid cushion supports **[6]**
1/40 . . . using ball, roller or wheel arrangements **[6]**
1/42 . . . using T-, V-, dovetail-section or like guides (B23Q 1/40 takes precedence) **[6]**
1/44 . . using particular mechanisms (B23Q 1/26 takes precedence) **[6]**

(1) In this group, the following expressions are used with the meaning indicated: **[6]**
- "sliding pair" means a pair consisting of two elements operating in such a way that only straight line movement between both elements is possible; **[6]**
- "rotating pair" means a pair consisting of two elements operating in such a way that only rotary movement between both elements is possible; **[6]**
- "screw pair" means a pair consisting of two elements operating in such a way as to produce simultaneous rotation and axial translation between both elements. **[6]**

(2) In this group, where more than one pair of elements is provided on the same axis for the same kind of movement, the pairs are regarded as a single pair for the purposes of classification. **[6]**

1/46 . . . with screw pairs **[6]**
1/48 . . . with sliding pairs and rotating pairs (B23Q 1/46 takes precedence) **[6]**
1/50 . . . with rotating pairs only **[6]**
1/52 . . . . a single rotating pair **[6]**
1/54 . . . . two rotating pairs only **[6]**
1/56 . . . with sliding pairs only **[6]**
1/58 . . . . a single sliding pair **[6]**
1/60 . . . . two sliding pairs only **[6]**
1/62 . . . . . with perpendicular axes, e.g. cross-slides **[6]**
1/64 . . characterised by the purpose of the movement (indexing equipment B23Q 16/02) **[6]**
1/66 . . . Work-tables interchangeably movable into operating positions **[6]**
1/68 . . . for withdrawing tool or work during reverse movement **[6]**
1/70 . Stationary or movable members for carrying working-spindles for attachment of tools or work (headstocks or the like, working-spindle supports B23B 19/00; working-spindles B23B 19/02) **[6]**
1/72 . Auxiliary arrangements; Interconnections between auxiliary tables and movable machine elements **[6]**
1/74 . . Auxiliary tables **[6]**
1/76 . . Steadies; Rests **[6]**

3/00 Devices holding, supporting, or positioning, work or tools, of a kind normally removable from the machine (work-tables or other parts, e.g. faceplates, normally not incorporating means for securing work B23Q 1/00; automatic position control B23Q 15/00; rotary tool heads for turning-machines B23B 3/24, B23B 3/26; non-driven tool holders B23B 29/00; general features of turrets B23B 29/24; tools or bench devices for fastening, connecting, disengaging or holding B25B)

3/02 . for mounting on a work-table, tool-slide, or analogous part (B23Q 3/15 takes precedence)
3/04 . . adjustable in inclination
3/06 . . Work-clamping means
3/08 . . . other than mechanically-actuated
3/10 . . Auxiliary devices, e.g. bolsters, extension members
3/12 . for securing to a spindle in general (B23Q 3/152 takes precedence; chucks B23B 31/02)
3/14 . . Mandrels in general (expansion mandrels B23B 31/40)
3/15 . Devices for holding work using magnetic or electric force acting directly on the work
3/152 . . Rotary devices
3/154 . . Stationary devices
3/155 . Arrangements for automatic insertion or removal of tools
3/157 . . of rotary tools
3/16 . controlled in conjunction with the operation of the tool
3/18 . for positioning only

5/00 Driving or feeding mechanisms; **Control arrangements therefor** (automatic control B23Q 15/00; copying B23Q 33/00, B23Q 35/00; specially adapted for boring or drilling machines B23B 39/10, B23B 47/02)

5/02 . Driving main working members
5/027 . . reciprocating members **[2]**
5/033 . . . driven essentially by fluid pressure **[2]**
5/04 . . rotary shafts, e.g. working-spindles
5/06 . . . driven essentially by fluid pressure or pneumatic power
5/08 . . . . electrically controlled
5/10 . . . driven essentially by electrical means
5/12 . . . Mechanical drives with means for varying the speed ratio
5/14 . . . . step-by-step
5/16 . . . . infinitely-variable
5/18 . . . . Devices for preselecting speed of working-spindle
5/20 . . . Adjusting or stopping working-spindles in a predetermined position
5/22 . Feeding members carrying tools or work
5/26 . . Fluid-pressure drives **[3]**
5/28 . . Electric drives **[3]**
5/32 . . Feeding working-spindles (feeding working-spindle supports B23Q 5/34) **[3]**
5/34 . . Feeding other members supporting tools or work, e.g. saddles, tool-slides, through mechanical transmission **[3]**
5/36 . . . in which a servomotor forms an essential element **[3]**
5/38 . . . feeding continuously **[3]**
5/40 . . . . by feed shaft, e.g. lead screw **[3]**
5/42 . . . . . Mechanism associated with headstock **[3]**
5/44 . . . . . Mechanism associated with the moving member **[3]**
5/46 . . . . with variable speed ratio **[3]**
5/48 . . . . . by use of toothed gears **[3]**
5/50 . . . feeding step by step **[3]**
5/52 . . Limiting feed movement
5/54 . Arrangements or details not restricted to group B23Q 5/02 or group B23Q 5/22 respectively
5/56 . . Preventing backlash
5/58 . . Safety devices

7/00 **Arrangements for handling work specially combined with or arranged in, or specially adapted for use in connection with, machine tools, e.g. for conveying, loading, positioning, discharging, sorting** (incorporated in working-spindles B23B 13/00, B23B 19/02; for automatic or semi-automatic turning machines B23B 15/00) **[2]**

7/02 . by means of drums or rotating tables or discs

7/03 . by means of endless chain conveyers (B23Q 7/16 takes precedence) **[2]**

7/04 . by means of grippers

7/05 . by means of roller-ways (B23Q 7/16 takes precedence) **[2]**

7/06 . by means of pushers

7/08 . by means of slides or chutes

7/10 . by means of magazines

7/12 . Sorting arrangements

7/14 . co-ordinated in production lines

7/16 . Loading work on to conveyers; Arranging work on conveyers, e.g. varying spacing between individual workpieces **[2]**

7/18 . . Orienting work on conveyers **[2]**

9/00 **Arrangements for supporting or guiding portable metal-working machines or apparatus** (for tapping pipes B23B 41/08; specially designed for drilling B23B 45/14)

9/02 . for securing machines or apparatus to workpieces, or other parts, of particular shape, e.g. to beams of particular cross-section

Accessories

11/00 **Accessories fitted to machine tools for keeping tools or parts of the machine in good working condition or for cooling work**; **Safety devices specially combined with or arranged in, or specially adapted for use in connection with, machine tools** (in respect of boring or drilling machines B23B 47/24, B23B 47/32 take precedence; safety devices in general F16P)

11/02 . Devices for removing scrap from the cutting teeth of circular cutters

11/04 . Arrangements preventing overload of tools, e.g. restricting load

11/06 . Safety devices for circular cutters

11/08 . Protective coverings for parts of machine tools; Splash guards

11/10 . Arrangements for cooling or lubricating tools or work (incorporated in tools, see the relevant subclass for the tool) **[1,8]**

11/12 . Arrangements for cooling or lubricating parts of the machine (B23Q 11/14 takes precedence) **[1,8]**

11/14 . Methods or arrangements for maintaining a constant temperature in parts of machine tools **[1,8]**

13/00 **Equipment for use with tools or cutters when not in operation, e.g. protectors for storage**

Measuring; **Indicating**; **Controlling** **[3]**

15/00 **Automatic control or regulation of feed movement, cutting velocity or position of tool or work [3]**

15/007 . while the tool acts upon the workpiece **[3]**

15/013 . . Control or regulation of feed movement (B23Q 15/12 takes precedence) **[3]**

15/02 . . . according to the instantaneous size and the required size of the workpiece acted upon (B23Q 15/06 takes precedence) **[3]**

15/04 . . . according to the final size of the previously machined workpiece (B23Q 15/06 takes precedence) **[3]**

15/06 . . . according to measuring results produced by two or more gauging methods using different measuring principles, e.g. by both optical and mechanical gauging **[3]**

15/08 . . Control or regulation of cutting velocity (B23Q 15/12 takes precedence) **[3]**

15/10 . . . to maintain constant cutting velocity between tool and workpiece **[3]**

15/12 . . Adaptive control, i.e. adjusting itself to have a performance which is optimum according to a preassigned criterion **[3]**

15/14 . . Control or regulation of the orientation of the tool with respect to the work **[3]**

15/16 . . Compensation for wear of the tool **[3]**

15/18 . . Compensation of tool-deflection due to temperature or force **[3]**

15/20 . before or after the tool acts upon the workpiece **[3]**

15/22 . . Control or regulation of position of tool or workpiece **[3]**

15/24 . . . of linear position **[3]**

15/26 . . . of angular position **[3]**

15/28 . . with compensation for tool wear **[3]**

16/00 **Equipment for precise positioning of tool or work into particular locations not otherwise provided for** (automatic control or regulation of position of tool or work B23Q 15/22; arrangements for indicating or measuring existing or desired position of tool or work B23Q 17/22) **[4]**

16/02 . Indexing equipment (specially adapted for gear-cutting machines B23F 23/08) **[4]**

16/04 . . having intermediate members, e.g. pawls, for locking the relatively movable parts in the indexed position **[4]**

16/06 . . . Rotary indexing **[4]**

16/08 . . having means for clamping the relatively movable parts together in the indexed position **[4]**

16/10 . . . Rotary indexing **[4]**

16/12 . . using optics **[4]**

17/00 **Arrangements for indicating or measuring on machine tools** (for automatic control or regulation of feed movement, cutting velocity or position of tool or work B23Q 15/00) **[3,4]**

17/09 . for indicating or measuring cutting pressure or cutting-tool condition, e.g. cutting ability, load on tool (arrangements preventing overload of tools B23Q 11/04; devices for indicating failure of drills during boring B23B 49/00) **[4]**

17/10 . for indicating or measuring cutting speed or number of revolutions

17/12 . for indicating or measuring vibration

17/20 . for indicating or measuring workpiece characteristics, e.g. contour, dimension, hardness **[4]**

17/22 . for indicating or measuring existing or desired position of tool or work **[4]**

17/24 . using optics **[4]**

23/00 **Arrangements for compensating for irregularities or wear, e.g. of ways, of setting mechanisms** (automatic control B23Q 15/00) **[3]**

27/00 **Geometrical mechanisms for the production of work of particular shapes, not fully provided for in another subclass**

Copying

Note

In groups B23Q 33/00 or B23Q 35/00, the following term is used with the meaning indicated:
– "copying" covers the derivation of a required shape from a pattern, of the same or a different shape or scale, by a mechanism or equivalent means controlled by a member following the pattern. The pattern may be a model or drawing, or an element such as a cam incorporated in the operating mechanism of a machine. This term does not cover the derivation of a required shape from simple geometrical shapes, e.g. generating a cycloid by a rolling circle, which in general is provided for in group B23Q 27/00.

33/00 Methods for copying

35/00 Control systems or devices for copying directly from a pattern or a master model; **Devices for use in copying manually**

35/02 . Copying discrete points from the pattern, e.g. for determining the position of holes to be drilled
35/04 . using a feeler or the like travelling along the outline of the pattern, model or drawing; Feelers, patterns, or models therefor
35/06 . . specially adapted for controlling successive operations, e.g. separate cuts, on a workpiece
35/08 . . Means for transforming movement of the feeler or the like into feed movement of tool or work
35/10 . . . mechanically only
35/12 . . . involving electrical means (programme recording for copying purposes in a separate apparatus G05, G11)
35/121 . . . . using mechanical sensing
35/122 . . . . . the feeler opening or closing electrical contacts
35/123 . . . . . the feeler varying the impedance in a circuit
35/124 . . . . . varying resistance
35/125 . . . . . varying capacitance
35/126 . . . . . varying inductance
35/127 . . . . using non-mechanical sensing
35/128 . . . . . Sensing by using optical means
35/129 . . . . . Sensing by means of electric discharges
35/13 . . . . . Sensing by using magnetic means
35/14 . . . . controlling one or more electromotors
35/16 . . . . controlling fluid motors
35/18 . . . involving fluid means (B23Q 35/16 takes precedence)
35/20 . . . with special means for varying the ratio of reproduction
35/22 . . . specially adapted for compensating for wear of the tool
35/24 . . Feelers; Feeler units
35/26 . . . designed for physical contact with a pattern or a model
35/28 . . . . for control of a mechanical copying system
35/30 . . . . for control of an electrical or electro-hydraulic copying system
35/32 . . . . . in which the feeler makes and breaks an electrical contact or contacts, e.g. with brush-type tracers
35/34 . . . . . in which the feeler varies an electrical characteristic in a circuit, e.g. capacity, frequency
35/36 . . . . for control of a hydraulic or pneumatic copying system
35/38 . . . designed for sensing the pattern, model, or drawing without physical contact (sensing by means of a fluid jet B23Q 35/36)
35/40 . . . . involving optical or photoelectrical systems
35/42 . . Patterns; Master models
35/44 . . . provided with means for adjusting the contact face, e.g. comprising flexible bands held by set-screws
35/46 . . . Supporting devices therefor
35/48 . using a feeler or the like travelling to-and-fro between opposite parts of the outline of the pattern, model, or drawing

Metal-working machines comprising units or sub-assemblies; **Associations of metal-working machines or units**

37/00 Metal-working machines, or constructional combinations thereof, built-up from units designed so that at least some of the units can form parts of different machines or combinations; **Units therefor in so far as the feature of interchangeability is important** (features relating to particular metal-working operations, see the relevant subclasses, e.g. B23P 23/00)

39/00 Metal-working machines incorporating a plurality of sub-assemblies, each capable of performing a metal-working operation (B23Q 33/00, B23P 23/00 take precedence; if the operations are similar and the kind of operation is essential, see the relevant subclass for the operation)

39/02 . the sub-assemblies being capable of being brought to act at a single operating station
39/04 . the sub-assemblies being arranged to operate simultaneously at different stations, e.g. with an annular work-table moved in steps (associations of machines connected only by work-transferring means B23Q 41/00)

41/00 Combinations or associations of metal-working machines not directed to a particular result according to classes B21, B23, or B24 (B23Q 37/00, B23Q 39/00 take precedence; features relating to operations performed, if the different metal-working operations are of the same kind, see the subclass for the kind of operation, e.g. punching B21D, welding B23K, grinding B24B; features relating to technically specified combinations of different metal-working operations B23P 23/00)

41/02 . Features relating to transfer of work between machines (arrangements for handling work for machine tools co-ordinated in production lines B23Q 7/14)
41/04 . Features relating to relative arrangements of machines
41/06 . Features relating to organisation of working of machines
41/08 . Features relating to maintenance of efficient operation

B24 GRINDING; POLISHING

Note

In this class, the following term is used with the meaning indicated:
– "grinding" is used in its most general sense to mean machining and covers, in particular, "corrective" operations.

B24B **MACHINES, DEVICES, OR PROCESSES FOR GRINDING OR POLISHING** (grinding of gear teeth B23F, of screw threads B23G 1/36; by electro-erosion B23H; abrasive or related blasting B24C; tools for grinding, buffing or sharpening B24D; polishing compositions C09G 1/00; abrasives C09K 3/14; electrolytic etching or polishing C25F 3/00; grinding arrangements for use on assembled railway tracks E01B 31/17); **DRESSING OR CONDITIONING OF ABRADING SURFACES**; **FEEDING OF GRINDING, POLISHING, OR LAPPING AGENTS [2]**

(1) In this subclass, the following term is used with the meaning indicated:
– "polishing" means the smoothing of a surface, i.e. a surface improvement but no improvement of the dimensional accuracy as would occur in a "grinding" operation. **[4]**

(2) Attention is drawn to Notes (1) and (2) following the title of subclass B23F. **[4]**

Subclass index

Note

In groups B24B 1/00 to B24B 27/00, in connection with glass the terms "grinding" and "polishing" are treated as being equivalent. **[4]**

1/00 **Processes of grinding or polishing**; **Use of auxiliary equipment in connection with such processes** (processes characterised by the use of special machines or devices, see the relevant places for those machines or devices) **[4]**

1/04 . subjecting the grinding or polishing tools, the abrading or polishing medium or work to vibration, e.g. grinding with ultrasonic frequency (polishing or abrading surfaces on work by means of tumbling apparatus B24B 31/00, involving oscillating or vibrating containers B24B 31/06; superfinishing surfaces on work, e.g. by means of abrading blocks reciprocating with high frequency, B24B 35/00) **[4]**

3/00 **Sharpening cutting edges, e.g. of tools**; **Accessories therefor, e.g. for holding the tools** (non-abrasive sharpening devices for scythes, sickles, or the like A01D 3/00; sharpening devices designed as components of machines with cutters, see the relevant places for the machines, e.g. A01D 75/08, B26D 7/12; sharpening of saw teeth B23D 63/12; sharpening of files or rasps B23D 73/00; grinding of die-stocks or chasers B23G 1/36)

3/02 . of milling cutters

3/04 . . of plain milling cutters

3/06 . . of face or end milling cutters or cutter heads, e.g. of shank type

3/08 . . of profile milling cutters, e.g. of disc type

3/10 . . of routers or engraving needles

3/12 . . of hobs

3/14 . . of mortise chain cutters

3/16 . of broaches

3/18 . of taps or reamers

3/20 . . Tapering or chamfering taps or reamers

3/22 . . Relief cutting of taps or reamers

3/24 . of drills (by fluting the shank B24B 19/04)

3/26 . . of the point of twist drills

3/28 . . . by swivelling the drill around an axis angularly to the drill axis

3/30 . . . . and rotating the drill about its own axis

3/32 . . . for thinning the point
3/33 . . of drills for stone
3/34 . of turning or planing tools or tool bits, e.g. gear cutters (B24B 3/36 takes precedence)
3/36 . of cutting blades (B24B 3/58 takes precedence)
3/38 . . for planing wood, e.g. cutter blades
3/40 . . Processes or apparatus specially adapted for sharpening curved edges
3/42 . . helically bent, e.g. for lawn mowers
3/44 . . of scythes or sickles **[2]**
3/46 . . of disc blades
3/48 . . of razor blades or razors (by an abrasive block without mechanisms B24D)
3/50 . . . operated manually
3/52 . . of shear blades or scissors
3/54 . . of hand or table knives
3/55 . of knife bars for harvesting machines
3/56 . of slicing bands (B24B 3/58 takes precedence)
3/58 . of tools having scalloped cutting edges
3/60 . of tools not covered by the preceding subgroups

Grinding surfaces of particular forms

5/00 **Machines or devices designed for grinding surfaces of revolution on work, including those which also grind adjacent plane surfaces**; **Accessories therefor** (B24B 11/00 to B24B 21/00 take precedence; honing machines or devices using abrading blocks performing axial and rotary movements superimposed on one another B24B 33/00) **[2]**
5/01 . for combined grinding of surfaces of revolution and of adjacent plane surfaces on work **[4]**
5/02 . involving centres or chucks for holding work
5/04 . . for grinding cylindrical surfaces externally (grinding combined cylindrical and conical surfaces B24B 5/14)
5/06 . . for grinding cylindrical surfaces internally (B24B 5/40 takes precedence)
5/08 . . . involving a vertical tool spindle
5/10 . . . involving a horizontal tool spindle
5/12 . . for grinding cylindrical surfaces both externally and internally with several grinding wheels
5/14 . . for grinding conical surfaces, e.g. of centres
5/16 . . for grinding peculiarly profiled surfaces, e.g. bulged
5/18 . involving centreless means for supporting, guiding, floating or rotating work (centreless turning B23B 5/08; centreless grinding of threads B23G 1/42) **[2]**
5/20 . . involving grooved abrading blocks
5/22 . . for grinding cylindrical surfaces, e.g. on bolts
5/24 . . for grinding conical surfaces
5/26 . . for grinding peculiarly profiled surfaces, e.g. bulged
5/28 . . for grinding outer surfaces concentrically to bores, involving additional centring means
5/30 . . Regulating-wheels; Equipment therefor
5/307 . . Means for supporting work **[3]**
5/313 . involving work-supporting means carrying several workpieces to be operated on in succession **[3]**
5/32 . . the work-supporting means being indexable **[3]**
5/35 . Accessories **[3]**
5/36 . Single-purpose machines or devices
5/37 . . for grinding rolls, e.g. barrel-shaped rolls **[4]**
5/38 . . for externally grinding travelling elongated stock, e.g. wire
5/40 . . for grinding tubes internally
5/42 . . for grinding crankshafts or crankpins
5/44 . . for grinding rims of vehicle wheels, e.g. for bicycles
5/46 . . for grinding railway car wheels
5/48 . . for grinding walls of very fine holes, e.g. in drawing-dies
5/50 . characterised by a special design with respect to properties of the material of non-metallic articles to be ground, e.g. strings (cutting profiles into the treads of tyres B29D 30/68)

7/00 **Machines or devices designed for grinding plane surfaces on work, including polishing plane glass surfaces**; **Accessories therefor** (B24B 21/00 takes precedence; honing of plane surfaces on work B24B 33/055) **[4]**
7/02 . involving a reciprocatingly-moved work-table (involving a reciprocatingly-moved grinding wheel in combination with a stationary work-table B24B 7/07) **[4]**
7/04 . involving a rotary work-table
7/06 . involving conveyer belts, a sequence of travelling work-tables or the like
7/07 . involving a stationary work-table **[4]**
7/08 . . having an abrasive wheel built in
7/10 . Single-purpose machines or devices (grinding tools or machines specially adapted for use on assembled railway track E01B 31/17)
7/12 . . for grinding travelling elongated stock, e.g. strip-shaped work **[4]**
7/13 . . . grinding while stock moves from coil to coil **[4]**
7/14 . . for grinding slideways (portable grinding machines designed for fastening on workpieces B24B 23/08) **[4]**
7/16 . . for grinding end faces, e.g. of gauges, rollers, nuts, piston rings (for combined grinding of surfaces of revolution and of adjacent plane surfaces on work B24B 5/01; for grinding edges or bevels on work B24B 9/00) **[4]**
7/17 . . . for simultaneously grinding opposite and parallel end faces, e.g. double disc grinders **[4]**
7/18 . . for grinding floorings, walls, ceilings or the like (machines or devices for cleaning floorings A47L 11/00, A47L 13/00)
7/19 . . for grinding plane decorative patterns **[4]**
7/20 . characterised by a special design with respect to properties of the material of non-metallic articles to be ground
7/22 . . for grinding inorganic material, e.g. stone, ceramics, porcelain
7/24 . . . for grinding or polishing glass
7/26 . . . . for simultaneously grinding or polishing opposite faces of continuously travelling sheets or bands of glass
7/28 . . for grinding wood
7/30 . . for grinding plastics **[4]**

9/00 **Machines or devices designed for grinding edges or bevels on work or for removing burrs**; **Accessories therefor** (B24B 21/00 takes precedence; for sharpening cutting edges on tools B24B 3/00; removing burrs by loose abrasive material B24B 31/00)
9/02 . characterised by a special design with respect to properties of materials specific to articles to be ground
9/04 . . of metal, e.g. skate blades

9/06 . . of non-metallic inorganic material, e.g. stone, ceramics, porcelain
9/08 . . . of glass
9/10 . . . . of plate glass
9/12 . . . . of hollow glassware, e.g. drinking glasses, preserve jars, television picture tube viewing panels
9/14 . . . . of optical work, e.g. lenses, prisms
9/16 . . . of diamonds, of jewels or the like; Diamond grinders' dops; Dop holders or tongs (for grinding sharp pointed diamonds or sapphires B24B 19/16) **[4]**
9/18 . . of wood
9/20 . . of plastics **[4]**

11/00 Machines or devices designed for grinding spherical surfaces or parts of spherical surfaces on work; **Accessories therefor** (specially designed for optical surfaces B24B 13/00, for seat surfaces B24B 15/00)
11/02 . for grinding balls
11/04 . . involving grinding wheels
11/06 . . . acting by the front faces, e.g. of plane, grooved, or bevelled shape
11/08 . . . acting by the circumference
11/10 . . . of cup type

13/00 Machines or devices designed for grinding or polishing optical surfaces on lenses or surfaces of similar shape on other work; **Accessories therefor** (edging optical work, e.g. lenses, prisms, B24B 9/14) **[2]**
13/005 . Blocking means, chucks or the like; Alignment devices **[4]**
13/01 . Specific tools, e.g. bowl-like; Production, dressing or fastening of these tools **[4]**
13/015 . of televison picture tube viewing panels, headlight reflectors or the like **[4]**
13/02 . by means of tools with abrading surfaces corresponding in shape with the lenses to be made
13/04 . grinding of lenses involving grinding wheels controlled by gearing (B24B 13/06 takes precedence) **[4]**
13/06 . grinding of lenses, the tool or work being controlled by information carrying means, e.g. patterns, punched tapes, magnetic tapes **[4]**

15/00 Machines or devices designed for grinding seat surfaces; **Accessories therefor** (for spherical surfaces in general B24B 11/00)
15/02 . in valve housings
15/03 . . using portable or mobile machines **[4]**
15/04 . on valve members
15/06 . on openings of bottles; on bottle stoppers or the like **[4]**
15/08 . for grinding co-operating seat surfaces by moving one over the other

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17/00 Special adaptations of machines or devices for grinding controlled by patterns, drawings, magnetic tapes or the like (machines or devices so-controlled for grinding the edges of lenses B24B 9/14; for grinding or polishing optical lens surfaces B24B 13/06; for grinding non-circular cross-sections B24B 19/08; for grinding trochoidal surfaces B24B 19/09; for grinding cams B24B 19/12; for grinding turbine blades or the like B24B 19/14; such control means per se B23Q 33/00, B23Q 35/00, G05); **Accessories therefor [4]**
17/02 . involving mechanical transmission means only
17/04 . involving optical auxiliary means, e.g. optical projection form grinding machines
17/06 . . combined with electrical transmission means, e.g. controlled by photoelectric cells
17/08 . involving fluid transmission means only
17/10 . involving electrical transmission means only, e.g. controlled by magnetic tape

19/00 Single purpose machines or devices for particular grinding operations not covered by any other main group (tapering, chamfering or relief cutting of taps or reamers B24B 3/20, B24B 3/22; grinding screw threads B23G 1/36)
19/02 . for grinding grooves, e.g. on shafts, in casings, in tubes, homokinetic joint elements **[4]**
19/03 . . for grinding grooves in glass workpieces, e.g. decorative grooves **[4]**
19/04 . . for fluting drill shanks
19/06 . . for grinding races, e.g. roller races
19/08 . for grinding non-circular cross-sections, e.g. shafts of elliptical or polygonal cross-section
19/09 . . for grinding trochoidal surfaces, e.g. in rotor housings of Wankel engines **[4]**
19/10 . . for grinding pistons
19/11 . . for grinding the circumferential surface of rings, e.g. piston rings (grinding end faces B24B 7/16, B24B 7/17) **[4]**
19/12 . . for grinding cams or camshafts
19/14 . for grinding turbine blades, propeller blades or the like (using grinding belts B24B 21/16) **[4]**
19/16 . for grinding sharp-pointed workpieces, e.g. needles, pens, fish hooks, tweezers, record player styli (grinding bevels on diamonds or sapphires B24B 9/16; polishing of needles B24B 29/08) **[4]**
19/18 . . for grinding carding equipment, e.g. card-clothings (devices for sharpening card-clothings built in, or attachable to, carding machines D01G)
19/20 . for grinding dies (for grinding walls of very fine holes B24B 5/48)
19/22 . characterised by a special design with respect to properties of the material of non-metallic articles to be ground
19/24 . . of wood, e.g. furniture
19/26 . for grinding workpieces with arcuate surfaces, e.g. parts of car bodies, bumpers, magnetic recording heads (grinding of spherical surfaces in general B24B 11/00, of optical surfaces on lenses or surfaces of similar shape on other work B24B 13/00) **[4]**
19/28 . . for grinding shoes or linings of drum brakes (of brake drum hubs B24B 5/06; of brake discs B24B 7/17) **[4]**

21/00 Machines or devices using grinding or polishing belts (for sharpening cutting edges of tools B24B 3/00; portable belt-grinding machines B24B 23/06); **Accessories therefor [4]**
21/02 . for grinding rotationally symmetrical surfaces
21/04 . for grinding plane surfaces
21/06 . . involving members with limited contact area pressing the belt against the work, e.g. shoes sweeping across the whole area to be ground (B24B 21/12 takes precedence)
21/08 . . . Pressure shoes; Backing belts
21/10 . . involving a rigid member, e.g. pressure bar, table, pressing or supporting the belt over substantially its whole span
21/12 . . involving a contact wheel or roller pressing the belt against the work

21/14 . . . Contact wheels; Contact rollers; Belt supporting rolls **[4]**
21/16 . for grinding other surfaces of particular shape (single purpose machines for grinding cams or camshafts B24B 19/12) **[4]**
21/18 . Accessories
21/20 . . for controlling or adjusting the tracking or the tension of the grinding belt **[4]**
21/22 . . for producing a reciprocation of the grinding belt normal to its direction of movement **[4]**

23/00 Portable grinding machines, e.g. hand-guided; **Accessories therefor** (B24B 7/18 takes precedence; for grinding seat surfaces B24B 15/00; having a flexible shaft B24B 27/027; grinders for cutting-off B24B 27/08; dust extraction equipment B24B 55/10; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**
23/02 . with rotating grinding tools; Accessories therefor
23/03 . . the tool being driven in a combined movement **[4]**
23/04 . with oscillating grinding tools; Accessories therefor **[4]**
23/06 . with abrasive belts, e.g. with endless travelling belts; Accessories therefor **[4]**
23/08 . Portable grinding machines designed for fastening on workpieces or other parts of particular section, e.g. for grinding commutators

25/00 Grinding machines of universal type

27/00 Other grinding machines or devices
27/02 . Bench grinders **[4]**
27/027 . having a flexible shaft **[4]**
27/033 . for grinding a surface for cleaning purposes, e.g. for descaling or for grinding off flaws in the surface **[4]**
27/04 . . Grinding machines or devices in which the grinding tool is supported on a swinging arm
27/06 . Grinders for cutting-off
27/08 . . being portable **[4]**

Polishing surfaces; **Finishing surfaces**

29/00 Machines or devices for polishing surfaces on work by means of tools made of soft or flexible material with or without the application of solid or liquid polishing agents (machines or devices for grinding or polishing glass B24B 7/24, B24B 9/08, B24B 13/00; for grinding or polishing using belts B24B 21/00; polishing tools in general B24D 13/00) **[4]**
29/02 . designed for particular workpieces **[4]**
29/04 . . for rotationally symmetrical workpieces, e.g. ball-, cylinder- or cone-shaped workpieces **[4]**
29/06 . . for elongated workpieces having uniform cross-section in one main direction **[4]**
29/08 . . . the cross-section being circular, e.g. tubes, wires, needles **[4]**
29/10 . . for table cutlery **[4]**

31/00 Machines or devices designed for polishing or abrading surfaces on work by means of tumbling apparatus or other apparatus in which the work or the abrasive material is loose; **Accessories therefor** (machines or devices for grinding or polishing glass B24B 7/24, B24B 9/08, B24B 13/00; abrasive blasting machines B24C 3/26)
31/02 . involving rotary barrels
31/023 . . with tiltable axis **[4]**
31/027 . . with additional oscillating movement **[4]**
31/03 . . the workpieces being continuously-travelling **[4]**
31/033 . . having several rotating or tumbling drums with parallel axes **[4]**
31/037 . . having several rotating or tumbling drums with non-parallel axes **[4]**
31/05 . involving a container formed as a conveyer belt **[4]**
31/06 . involving oscillating or vibrating containers
31/067 . . involving a bowl formed as a straight trough **[4]**
31/073 . . involving a bowl being ring- or spiral-shaped **[4]**
31/10 . involving other means for tumbling of work **[4]**
31/104 . . involving a rotating bowl, in which a ring zone of abrasive powder is formed by centrifugal force **[4]**
31/108 . . involving a sectioned bowl, one part of which, e.g. its wall, is stationary and the other part of which is moved, e.g. rotated **[4]**
31/112 . . using magnetically consolidated grinding powder, moved relatively to the workpiece under the influence of pressure **[4]**
31/116 . . using plastically deformable grinding compound, moved relatively to the workpiece under the influence of pressure **[4]**
31/12 . Accessories; Protective equipment or safety devices; Installations for exhaustion of dust or for sound absorption specially designed for machines covered by group B24B 31/00 (in general B24B 55/00) **[4]**
31/14 . . Abrading-bodies specially designed for tumbling apparatus, e.g. abrading-balls
31/16 . . Means for separating the workpiece from the abrasive medium at the end of operation **[4]**

33/00 Honing machines or devices; **Accessories therefor**
33/02 . designed for working internal surfaces of revolution, e.g. of cylindrical or conical shapes
33/04 . designed for working external surfaces of revolution
33/05 . designed for working grooves, e.g. in gun barrels
33/055 . designed for working plane surfaces **[4]**
33/06 . with controlling or gauging equipment (gauging in general G01B; controlling in general G05)
33/08 . Honing tools
33/10 . Accessories

35/00 Machines or devices designed for superfinishing surfaces on work, i.e. by means of abrading blocks reciprocating with high frequency (B24B 3/00 takes precedence)

37/00 Lapping machines or devices, i.e. requiring pulverulent abrading substances inserted between a lap of relatively soft but rigid material and the surface to be lapped; **Accessories therefor** (B24B 3/00 takes precedence)
37/02 . designed for working surfaces of revolution
37/04 . designed for working plane surfaces

39/00 Burnishing machines or devices, i.e. requiring pressure members for compacting the surface zone (modifying the physical properties or structure of metal by burnishing C21D 7/08, C22F 1/00); **Accessories therefor** (B24B 3/00 takes precedence)
39/02 . designed for working internal surfaces of revolution
39/04 . designed for working external surfaces of revolution
39/06 . designed for working plane surfaces **[4]**

Component parts of general applicability for grinding machines or devices

41/00 **Component parts of grinding machines or devices, such as frames, beds, carriages or headstocks**
41/02 . Frames; Beds; Carriages
41/04 . Headstocks; Working-spindles; Features relating thereto
41/047 . . Grinding heads for working on plane surfaces **[4]**
41/053 . . . for grinding or polishing glass **[4]**
41/06 . Work supports, e.g. adjustable steadies

45/00 **Means for securing grinding wheels on rotary arbors** (suppression of vibrations in systems F16F 15/00; testing static or dynamic balancing of machines G01M 1/00)

47/00 **Drives or gearings for grinding machines or devices**; **Equipment therefor**
47/02 . for performing a reciprocating movement of carriages or work-tables
47/04 . . by mechanical gearing only
47/06 . . by liquid or gas pressure only
47/08 . . by mechanical gearing combined with fluid systems
47/10 . for rotating or reciprocating working-spindles carrying grinding wheels or workpieces
47/12 . . by mechanical gearing or electric power (B24B 47/16 takes precedence)
47/14 . . by liquid or gas pressure (B24B 47/16 takes precedence)
47/16 . . performing a reciprocating movement, e.g. during which the sense of rotation of the working-spindle is reversed
47/18 . . for rotating the spindle at a speed adaptable to wear of the grinding wheel
47/20 . relating to feed movement
47/22 . Equipment for exact control of the position of the grinding tool or work at the start of the grinding operation
47/25 . for compensating grinding wheel abrasion resulting from dressing **[4]**
47/26 . Accessories, e.g. stops
47/28 . Equipment for preventing backlash

Measuring; **Indicating**; **Controlling**

49/00 **Measuring or gauging equipment for controlling the feed movement of the grinding tool or work**; **Arrangements of indicating or measuring equipment, e.g. for indicating the start of the grinding operation** (B24B 33/06 takes precedence; if applicable to other machine tools, B23Q 15/00 to B23Q 17/00 take precedence; gauging instruments in general G01B)
49/02 . according to the instantaneous size and required size of the workpiece acted upon, the measuring or gauging being continuous or intermittent (B24B 49/12 takes precedence) **[4]**
49/03 . . according to the final size of the previously ground workpiece **[4]**
49/04 . . involving measurement of the workpiece at the place of grinding during grinding operation **[4]**
49/05 . . . including the measurement of a first workpiece already machined and of another workpiece being machined and to be matched with the first one **[4]**
49/06 . . requiring comparison of the workpiece with standard gauging plugs, rings or the like
49/08 . involving liquid or pneumatic means
49/10 . involving electrical means (B24B 49/02, B24B 49/08 take precedence)
49/12 . involving optical means
49/14 . taking regard of the temperature during grinding
49/16 . taking regard of the load
49/18 . taking regard of the presence of dressing tools

51/00 **Arrangements for automatic control of a series of individual steps in grinding a workpiece**

53/00 **Devices or means for dressing or conditioning abrasive surfaces** (compensation for grinding wheel abrasion resulting from dressing B24B 47/25) **[4]**
53/007 . Cleaning of grinding wheels **[4]**
53/013 . Application of loose grinding agent as auxiliary tool during truing operation **[4]**
53/02 . of plane surfaces on abrasive tools
53/04 . of cylindrical or conical surfaces on abrasive tools or wheels **[4]**
53/047 . . equipped with one or more diamonds **[4]**
53/053 . . using a rotary dressing tool **[4]**
53/06 . of profiled abrasive wheels
53/065 . . having other than straight profiles, e.g. crowned (B24B 53/07 takes precedence) **[4]**
53/07 . . by means of forming tools having a shape complementary to that to be produced, e.g. blocks, profile rolls **[4]**
53/075 . . for workpieces having a grooved profile, e.g. gears, splined shafts, threads, worms (B24B 53/07 takes precedence) **[4]**
53/08 . . controlled by information means, e.g. patterns, templets, punched tapes or the like
53/085 . . . for workpieces having a grooved profile, e.g. gears, splined shafts, threads, worms (B24B 53/09 takes precedence) **[4]**
53/09 . . . having transfer elements formed as pantograph mechanism **[4]**
53/095 . Cooling or lubricating during dressing operation (cooling the grinding surfaces B24B 55/02) **[4]**
53/10 . of travelling flexible backings coated with abrasives; Cleaning of abrasive belts **[4]**
53/12 . Dressing tools; Holders therefor **[4]**
53/14 . . Dressing tools equipped with rotary rollers or cutters; Holders therefor **[4]**

55/00 **Safety devices for grinding or polishing machines**; **Accessories fitted to grinding or polishing machines for keeping tools or parts of the machine in good working condition** (of general applicability for machine tools B23Q 11/00; in general F16P)
55/02 . Equipment for cooling the grinding surfaces, including devices for feeding coolant (cooling or lubricating during dressing operation B24B 53/095; incorporated in grinding wheels B24D) **[4]**
55/03 . . designed as a complete equipment for feeding or clarifying coolant **[4]**
55/04 . Protective covers for the grinding wheel
55/05 . . specially designed for portable grinding machines **[4]**
55/06 . Dust extraction equipment on grinding or polishing machines (B24B 31/12 takes precedence)
55/08 . . specially designed for belt grinding machines **[4]**

55/10 . . specially designed for portable grinding machines, e.g. hand-guided **[4]**

55/12 . Devices for exhausting mist of oil or coolant; Devices for collecting or recovering materials resulting from grinding or polishing, e.g. of precious metals, precious stones, diamonds or the like **[4]**

57/00 **Devices for feeding, applying, grading or recovering grinding, polishing or lapping agents** (for abrasive blasting B24C 1/00, B24C 7/00) **[4]**

57/02 . for feeding of fluid, sprayed, pulverised, or liquefied grinding, polishing or lapping agents **[4]**

57/04 . for feeding of solid grinding, polishing or lapping agents **[4]**

B24C ABRASIVE OR RELATED BLASTING WITH PARTICULATE MATERIAL

(1) This subclass covers:
- the use of a blast of any particles or pellets dispersed in air, gas, or liquid for the treatment of surfaces or cutting of materials, the particles usually being of abrasive material;
- the equivalent use of a jet of particles or pellets projected or energised by means other than a stream of air.

(2) In this subclass, the following terms are used with the meanings indicated:
- "abrasive" covers any material used in the manner mentioned in Note (1) above;
- "blast" covers any equivalent jet of material mentioned in Note (1) above.

1/00 **Methods for use of abrasive blasting for producing particular effects**; **Use of auxiliary equipment in connection with such methods**

1/02 . for sharpening or cleaning cutting tools, e.g. files

1/04 . for treating only selected parts of a surface, e.g. for carving stone or glass

1/06 . for producing matt surfaces, e.g. on plastic materials, on glass

1/08 . for polishing surfaces, e.g. by making use of liquid-borne abrasives

1/10 . for compacting surfaces, e.g. shot-peening (for deforming sheet metal, tubes or profiles B21D 31/06; as a metallurgical treatment C21D 7/00, C22F 1/00)

3/00 **Abrasive blasting machines or devices**; **Plants**

3/02 . characterised by the arrangement of the component assemblies with respect to each other (B24C 3/08, B24C 3/18 take precedence)

3/04 . . stationary

3/06 . . movable; portable

3/08 . essentially adapted for abrasive blasting of travelling stock or travelling workpieces

3/10 . . for treating external surfaces

3/12 . . . Apparatus using nozzles

3/14 . . . Apparatus using impellers

3/16 . . for treating internal surfaces

3/18 . essentially provided with means for moving workpieces into different working positions (B24C 3/08 takes precedence)

3/20 . . the work being supported by turntables

3/22 . . . Apparatus using nozzles

3/24 . . . Apparatus using impellers

3/26 . . the work being supported by barrel cages, i.e. tumblers; Gimbal mountings therefor

3/28 . . . Apparatus using nozzles

3/30 . . . Apparatus using impellers

3/32 . designed for abrasive blasting of particular work, e.g. the internal surfaces of cylinder blocks (B24C 3/08, B24C 3/18 take precedence)

3/34 . . for cleaning sparking plugs

Accessories or equipment for abrasive blasting machines or devices

5/00 **Devices or accessories for generating abrasive blasts**

5/02 . Blast guns, e.g. for generating high velocity abrasive fluid jets for cutting materials **[5]**

5/04 . . Nozzles therefor (nozzles in general B05B)

5/06 . Impeller wheels; Rotor blades therefor

5/08 . Devices for generating abrasive blasts non-mechanically, e.g. of metallic abrasives by means of a magnetic field

7/00 **Equipment for feeding abrasive material**; **Controlling the flowability, constitution, or other physical characteristics of abrasive blasts**

9/00 **Appurtenances of abrasive blasting machines or devices, e.g. working chambers, arrangements for handling used abrasive material**

11/00 **Selection of abrasive materials for abrasive blasts** (polishing compositions C09G)

B24D TOOLS FOR GRINDING, BUFFING, OR SHARPENING (tools for grinding or polishing optical surfaces on lenses or surfaces of similar shape B24B 13/01; grinding heads B24B 41/00; manufacture of abrasive or friction articles or shaped materials containing macromolecular substances C08J 5/14; polishing compositions C09G 1/00; abrasives C09K 3/14)

(1) This subclass covers grinding tools for working on any material.

(2) Tools for grinding, buffing or sharpening, specially designed for a particular purpose, which purpose is provided for in a single other place, are classified in that place, e.g. B23F 21/02. **[4]**

Subclass index

3/00 **Physical features of abrasive bodies, or sheets, e.g. abrasive surfaces of special nature**; **Abrasive bodies or sheets characterised by their constituents** (composition of friction linings F16D 69/02)

3/02 . the constituent being used as bonding agent
3/04 . . and being essentially inorganic
3/06 . . . metallic
3/08 . . . . for close-grained structure, e.g. using metal with low melting point
3/10 . . . . for porous or cellular structure, e.g. for use with diamonds as abrasives
3/12 . . . water-setting, e.g. concrete
3/14 . . . ceramic, i.e. vitrified bondings
3/16 . . . . for close grained structure, i.e. of high density
3/18 . . . . for porous or cellular structure
3/20 . . and being essentially organic
3/22 . . . Rubbers
3/24 . . . . for close-grained structure
3/26 . . . . for porous or cellular structure
3/28 . . . Resins
3/30 . . . . for close-grained structure
3/32 . . . . for porous or cellular structure
3/34 . characterised by additives enhancing special physical properties, e.g. wear resistance, electric conductivity, self-cleaning properties

Bonded abrasive wheels

5/00 **Bonded abrasive wheels, or wheels with inserted abrasive blocks, designed for acting only by their periphery**; **Bushings or mountings therefor**

5/02 . Wheels in one piece
5/04 . . with reinforcing means
5/06 . with inserted abrasive blocks, e.g. segmental (zonally graded B24D 5/14)
5/08 . . with reinforcing means
5/10 . with cooling provisions, e.g. with radial slots
5/12 . Cut-off wheels
5/14 . Zonally-graded wheels; Composite wheels comprising different abrasives
5/16 . Bushings; Mountings

7/00 **Bonded abrasive wheels, or wheels with inserted abrasive blocks, designed for acting otherwise than only by their periphery, e.g. by the front face**; **Bushings or mountings therefor**

7/02 . Wheels in one piece
7/04 . . with reinforcing means
7/06 . with inserted abrasive blocks, e.g. segmental (zonally-graded B24D 7/14)
7/08 . . with reinforcing means
7/10 . with cooling provisions
7/12 . with apertures for inspecting the surface to be abraded
7/14 . Zonally-graded wheels; Composite wheels comprising different abrasives
7/16 . Bushings; Mountings
7/18 . Wheels of special form (if specially designed for a particular purpose provided for in a single other class, that class takes precedence)

9/00 **Wheels or drums supporting in exchangeable arrangement a layer of flexible abrasive material, e.g. sandpaper** (wheels or drums as machine elements F16)

9/02 . Expansible drums for carrying flexible material in tubular form, e.g. expanded by centrifugal force
9/04 . Rigid drums for carrying flexible material
9/06 . . able to be stripped-off from a built-in delivery spool
9/08 . Circular back-plates for carrying flexible material
9/10 . . with suction means for securing the material

11/00 **Constructional features of flexible abrasive materials**; **Special features in the manufacture of such materials**

11/02 . Backings, e.g. foils, webs, mesh fabrics
11/04 . Zonally-graded surfaces
11/06 . Connecting the ends of materials, e.g. for making abrasive belts
11/08 . Equipment for after-treatment of the coated backings, e.g. for flexing the coating

13/00 **Wheels having flexibly-acting working parts, e.g. buffing wheels**; **Mountings therefor**

13/02 . acting by their periphery
13/04 . . comprising a plurality of flaps or strips arranged around the axis
13/06 . . the flaps or strips being individually attached
13/08 . . comprising annular or circular sheets packed side by side
13/10 . . comprising assemblies of brushes
13/12 . . comprising assemblies of felted or spongy material, e.g. felt, steel wool, foamed latex
13/14 . acting by the front face
13/16 . . comprising pleated flaps or strips
13/18 . with cooling provisions
13/20 . Mountings for the wheels

15/00 **Hand tools or other devices for non-rotary grinding, polishing, or stropping**

15/02 . rigid; with rigidly-supported operative surface
15/04 . resilient; with resiliently-mounted operative surface
15/06 . specially designed for sharpening cutting edges
15/08 . . of knives; of razors
15/10 . . of safety-razor blades (devices with mechanically-operated parts B24B 3/50)

18/00 Manufacture of grinding tools, e.g. wheels, not otherwise provided for [4]

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

B25 HAND TOOLS; PORTABLE POWER-DRIVEN TOOLS; HANDLES FOR HAND IMPLEMENTS; WORKSHOP EQUIPMENT; MANIPULATORS

Note

In this class, the following term is used with the meaning indicated:
– "portable" includes suspension for easy manual handling, e.g. in connection with spring-suspended portable apparatus for use along assembly lines.

B25B TOOLS OR BENCH DEVICES NOT OTHERWISE PROVIDED FOR, FOR FASTENING, CONNECTING, DISENGAGING, OR HOLDING

Note

This subclass covers hand tools for fastening, connecting, disengaging, or holding, which are not covered by another subclass such as B25C (hand-held nailing or stapling tools) or by an application place such as B21F (working of wire) or B65B (packaging).

Subclass index

1/00 **Vices** (specially adapted for tying flies for angling A01K 97/28; specially adapted for machine tools B23Q 3/00) **[5]**

1/02 . with sliding jaws
1/04 . with pivoted jaws
1/06 . Arrangements for positively actuating jaws
1/08 . . using cams
1/10 . . using screws
1/12 . . . with provision for disengagement
1/14 . . using toggle links
1/16 . . by pedal, with or without provision for additional manual actuation
1/18 . . motor driven, e.g. with fluid drive, with or without provision for manual actuation
1/20 . Vices for clamping work of special profile, e.g. pipes
1/22 . Arrangements for turning or tilting vices
1/24 . Details, e.g. jaws of special shape, slideways

3/00 **Hand vices, i.e. vices intended to be held by hand**; **Pin vices**

5/00 **Clamps** (for holding or positioning work for welding, soldering, or cutting by applying heat locally B23K 37/04; work-clamping means for mounting on a work-table, tool-slide, or analogous parts B23Q 3/06)

5/02 . with sliding jaws
5/04 . with pivoted jaws
5/06 . Arrangements for positively actuating jaws
5/08 . . using cams
5/10 . . using screws
5/12 . . using toggle links
5/14 . Clamps for work of special profile
5/16 . Details, e.g. jaws, jaw attachments

7/00 **Pliers**; **Other hand-held gripping tools with jaws on pivoted limbs**; **Details applicable generally to pivoted-limb hand tools** (implements for fastening, connecting, or tensioning wire or strip B25B 25/00; adapted for other fitting or separating purposes B25B 27/00; for marking animals A01K 11/00; dentists' forceps A61C 3/00; bending wire eyes B21F 1/06; hand-held metal-shearing or metal-cutting devices B23D 29/00; hand cutting tools B26B; for punching or perforating B26F 1/36; devices for securing ends of binding material in bundling machines B65B 13/24; specially designed for watch-making or comparable work G04D 1/00)

7/02 . Jaws
7/04 . . adjustable
7/06 . Joints
7/08 . . with fixed fulcrum
7/10 . . with adjustable fulcrum
7/12 . involving special transmission means between the handles and the jaws, e.g. toggle levers, gears
7/14 . Locking means
7/16 . . combined with means for tightening the operating arms or jaws
7/18 . Adjusting means for the operating arms
7/20 . Pliers for sealing
7/22 . Pliers provided with auxiliary tool elements, e.g. cutting edges, nail extractors (for removing insulation or armouring from electric cables H02G 1/12)

9/00 **Hand-held gripping tools other than those covered by group B25B 7/00** (wrenches B25B 13/00; specially adapted for watchmakers' or like use G04D)

9/02 . without sliding or pivotal connections, e.g. tweezers, one-piece tongs
9/04 . with sliding jaws

11/00 **Work holders or positioners not covered by groups B25B 1/00 to B25B 9/00, e.g. magnetic work holders, vacuum work holders** (for holding or positioning work for welding, soldering, or cutting by applying heat locally B23K 37/04; specially adapted to machine tools B23Q 3/00)

11/02 . Assembly jigs

13/00 **Spanners**; **Wrenches** (hand-driven gear-operated B25B 17/00; impact wrenches B25B 19/00; portable power-driven B25B 21/00; machines for fitting together or separating metal parts B23P 19/00)

13/02 . with rigid jaws (B25B 13/46, B25B 13/48 take precedence)

13/04 . . of ring jaw type

13/06 . . of socket type

13/08 . . of open jaw type

13/10 . with adjustable jaws (B25B 13/46, B25B 13/48 take precedence)

13/12 . . the jaws being slidable

13/14 . . . by rack and pinion, worm or gear

13/16 . . . by screw or nut

13/18 . . . by cam, wedge, or lever

13/20 . . . Arrangements for locking the jaws

13/22 . . . . by ratchet action or toothed bars

13/24 . . . . by cam, wedge, or friction means

13/26 . . . . by toggle links

13/28 . . the jaws being pivotally movable

13/30 . . . by screw or nut

13/32 . . . by cam, wedge, or lever

13/34 . . . Arrangements for locking the jaws

13/36 . . . . by ratchet action

13/38 . . . . by cam, wedge, or friction means

13/40 . . . . by toggle links

13/42 . . . . with self-locking action

13/44 . of the chuck type

13/46 . of the ratchet type, for providing a free return stroke of the handle

13/48 . for special purposes

13/50 . . for operating on work of special profile, e.g. pipes

13/52 . . . Chain or strap wrenches

13/54 . . . Internal grip wrenches

13/56 . Spanner sets

13/58 . Jaw attachments

15/00 **Screwdrivers** (hand-driven gear-operated B25B 17/00; impact screwdrivers B25B 19/00; portable power-driven B25B 21/00)

15/02 . operated by rotating the handle

15/04 . . with ratchet action

15/06 . operated by axial movement of the handle

17/00 **Hand-driven gear-operated wrenches or screwdrivers** (ratchet operated B25B 13/46, B25B 15/04)

17/02 . providing for torque amplification

19/00 **Impact wrenches or screwdrivers** (portable power-driven B25B 21/02)

21/00 **Portable power-driven screw or nut setting or loosening tools** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00); **Attachments for drilling apparatus serving the same purpose** (machines B23P 19/06) **[4]**

21/02 . with means for imparting impact to screwdriver blade or nut socket

23/00 **Details of, or accessories for, spanners, wrenches, screwdrivers** (bolt tensioners B25B 29/02)

23/02 . Arrangements for handling screws or nuts

23/04 . . for feeding screws or nuts

23/06 . . . using built-in magazine

23/08 . . for holding or positioning screw or nut prior to or during its rotation

23/10 . . . using mechanical gripping means

23/12 . . . using magnetic means

23/14 . Arrangement of torque limiters or torque indicators in wrenches or screwdrivers (couplings for transmitting rotation or clutches F16D; devices for measuring torque per se G01L)

23/142 . . specially adapted for hand operated wrenches or screwdrivers **[2]**

23/143 . . . wherein the work-contacting component pivots or rotates relative to the handle when a selected torque is exceeded **[4]**

23/144 . . . . having an electrical device activated by the pivotal or rotational movement which emits a signal when the selected torque is exceeded **[4]**

23/145 . . specially adapted for fluid operated wrenches or screwdrivers **[2]**

23/147 . . specially adapted for electrically operated wrenches or screwdrivers **[2]**

23/15 . . having a mechanism to mark the work when the selected torque is applied to the work **[4]**

23/151 . . the motor drive having condition-responsive means to regulate the power output of a motor driving the work-contacting component (control in general G05; controlling electric motors H02P) **[4]**

23/153 . . having a force-transmitting element which is permanently deformed upon application of an excessive amount of torque **[4]**

23/155 . . wherein the work-contacting means is released from torque-transmitting engagement with the work, when a selected torque is exceeded (B25B 23/153 takes precedence) **[4]**

23/157 . . having torque controlled clutch-type arrangements (B25B 23/143 takes precedence) **[4]**

23/159 . . the work-contacting component comprising or being connected to a resilient structural member, which remains rigid and fully force transmitting until a selected torque is exceeded or which signals excessive torque (B25B 23/153 takes precedence) **[4]**

23/16 . Handles (in general B25G)

23/18 . Devices for illuminating the head of the screw or the nut

25/00 **Implements for fastening, connecting, or tensioning of wire or strip** (bundling articles B65B 13/00)

27/00 **Hand tools or bench devices, specially adapted for fitting together or separating parts or objects whether or not involving some deformation, not otherwise provided for** (machines for simply fitting together or separating metal parts or objects B23P 19/00)

27/02 . for connecting objects by press fit or detaching same

27/04 . . inserting or withdrawing keys

27/06 . . inserting or withdrawing sleeves or bearing races

27/067 . . . employing wedging or impacting means **[3]**

27/073 . . . employing screw and nut means **[3]**

27/08 . . inserting or withdrawing cotter pins

27/10 . . inserting fittings into hoses

27/12 . . mounting or demounting piston rings

27/14 . for assembling objects other than by press fit or detaching same
27/16 . . abutted flanges
27/18 . . withdrawing broken threaded parts or twist drills
27/20 . . inserting or withdrawing split pins or circlips
27/22 . . positioning sprocket chains, endless tracks, antiskid chains (tools or implements for repairing chains using metal-working operations B21L 21/00)
27/24 . . mounting or demounting valves (for tyre valves B60C 25/18)
27/26 . . . compressing the springs
27/28 . . positioning or withdrawing resilient bushings or the like **[3]**
27/30 . . positioning or withdrawing springs, e.g. coil or leaf springs (B25B 27/26 takes precedence; watchmakers' or watch-repairers' tools G04D) **[3]**

28/00 **Portable power-driven joining or separation tools** (B25B 21/00 takes precedence) **[3]**

29/00 **Accessories** (specially for spanners, wrenches, screwdrivers B25B 23/00; tool boxes, tool positioning stands B25H)
29/02 . Bolt tensioners

31/00 **Hand tools for applying fasteners** (nailing or stapling tools B25C) **[3]**

33/00 **Hand tools not covered by any other group in this subclass [3]**

B25C HAND-HELD NAILING OR STAPLING TOOLS; MANUALLY-OPERATED PORTABLE STAPLING TOOLS (manufacturing footwear A43D)

(1) In this subclass, the following term is used with the meaning indicated:
– "nail" includes pin, bolt, stud, plug or the like.
(2) Tools for driving both nails or staples are classified with the nailing tools. **[3]**

Subclass index

1/00 **Hand-held nailing tools** (hammers B25D; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00; nailing machines B27F 7/02); **Nail feeding devices therefor [4]**
1/02 . operated by manual power **[3]**
1/04 . operated by fluid pressure **[3]**
1/06 . operated by electric power
1/08 . operated by combustion pressure
1/10 . . generated by detonation of a cartridge
1/12 . . . acting directly on the nail
1/14 . . . acting on an intermediate plunger or anvil (pistols for slaughtering or stunning animals A22B 3/02)
1/16 . . . Cartridges specially adapted for impact tools; Cartridge-and-nail units (bolts or the like for shooting into concrete constructions, metal walls, or the like by means of detonation-operated nailing tools F16B 19/14)
1/18 . . . Details or accessories, e.g. splinter guards, spall minimisers

3/00 **Portable devices for holding and guiding nails**; **Nail dispensers**

5/00 **Manually operated portable stapling tools**; **Hand-held power-operated stapling tools** (surgical staplers A61B 17/068, A61B 17/115; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00; stapling machines B27F 7/17); **Staple feeding devices therefor** (surgical staples A61B 17/064; staples F16B 15/00) **[3,4,5]**
5/02 . with provision for bending the ends of the staples on to the work
5/04 . . with means for forming the staples in the tool
5/06 . without provision for bending the ends of the staples on to the work
5/08 . . with means for forming the staples in the tool
5/10 . Driving means
5/11 . . operated by manual power **[3]**
5/13 . . operated by fluid pressure **[3]**
5/15 . . operated by electric power **[3]**
5/16 . Staple-feeding devices

7/00 **Accessories for nailing or stapling tools, e.g. supports** (for tools operated by detonation of a cartridge B25C 1/18)

9/00 **Nail punches**

11/00 **Nail, spike, or staple extractors** (incorporated in hammers B25D 1/00)
11/02 . Pincers (joints therefor B25B 7/06)

13/00 **Nail straightening devices**

B25D **PERCUSSIVE TOOLS** (percussive machines for forging B21J; hand-held drilling machines, in general B23B 45/00, for wood B27C 3/08; percussion drilling of earth or rock E21B) **[2]**

Subclass index

1/00 **Hand hammers**; **Hammer heads of special shape or materials**

1/02 . Inserts or attachments forming the striking part of hammer heads (B25D 1/08 to B25D 1/14 take precedence) **[5]**

1/04 . with provision for withdrawing or holding nails or spikes

1/06 . . Magnetic holders **[5]**

1/08 . having deformable heads (B25D 1/12 takes precedence) **[5]**

1/10 . having work protector surrounding faces (B25D 1/12 takes precedence) **[5]**

1/12 . having shock-absorbing means **[5]**

1/14 . having plural striking faces **[5]**

1/16 . having the impacting head in the form of a sleeve slidable on a shaft, e.g. hammers for driving a valve or draw-off tube into a barrel **[5]**

3/00 **Hand chisels** (mortise chisels B27G 17/08)

5/00 **Centre punches**

5/02 . Automatic centre punches

7/00 **Picks** (combined with other tools B25F)

9/00 **Portable percussive tools with fluid-pressure drive, e.g. having several percussive tool bits operated simultaneously** (centrifugal or rotary impact type B25D 15/00; portable non-percussive drilling tools driven by fluid pressure or pneumatic power B23B 45/04)

9/02 . of the tool-carrier piston type, i.e. in which the tool is connected to an impulse member

9/04 . of the hammer piston type, i.e. in which the tool bit or anvil is hit by an impulse member

9/06 . Means for driving the impulse member

9/08 . . comprising a built-in air compressor

9/10 . . comprising a built-in internal-combustion engine

9/11 . . operated by combustion pressure generated by detonation of a cartridge

9/12 . . comprising a built-in liquid motor

9/14 . Control devices for the reciprocating piston

9/16 . . Valve arrangements therefor

9/18 . . . involving a piston-type slide valve

9/20 . . . involving a tubular-type slide valve

9/22 . . . involving a rotary-type slide valve

9/24 . . . involving a rocking-plate type valve

9/26 . . Control devices for adjusting the stroke of the piston or the force or frequency of impact thereof

11/00 **Portable percussive tools with electromotor drive** (centrifugal or rotary impact type B25D 15/00)

11/02 . in which the tool is connected to an impulse member

11/04 . in which the tool bit or anvil is hit by an impulse member

11/06 . Means for driving the impulse member

11/08 . . comprising a worm mechanism

11/10 . . comprising a cam mechanism

11/12 . . comprising a crank mechanism

13/00 **Portable percussive tools with electromagnetic drive** (B25D 15/00 takes precedence)

15/00 **Portable percussive tools using centrifugal or rotary impact elements**

15/02 . in which the tool bit or anvil is hit by a rotary impulse member

16/00 **Portable percussive machines with superimposed rotation** (portable drilling machines with superimposed percussive action B23B 45/16) **[3]**

17/00 **Details of, or accessories for, portable power-driven percussive tools** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

17/02 . Percussive tool bits (drill bits for earth drilling E21B 10/00)

17/04 . Handles; Handle mountings

17/06 . Hammer pistons; Anvils

17/08 . Means for retaining and guiding the tool bit, e.g. chucks

17/10 . Safety devices (in general F16P)

17/11 . Arrangements of noise damping means (noise damping in general G10K 11/16) **[3]**

17/12 . . of exhaust silencers **[3]**

17/14 . Removing or laying dust (flushing boreholes while drilling earth or rock E21B 21/00)

17/16 . . by liquid

17/18 . . by exhausting dust-loaded air

17/20 . Devices for cleaning or cooling tool or work

17/22 . . using pressure fluid

17/24 . Damping the reaction force

17/26 . Lubricating (in general F16N)

17/28 . Supports; Devices for holding power-driven percussive tools in working position

17/30 . . Pillars and struts

17/32 . . Trolleys

B25F COMBINATION OR MULTI-PURPOSE TOOLS NOT OTHERWISE PROVIDED FOR; DETAILS OR COMPONENTS OF PORTABLE POWER-DRIVEN TOOLS NOT PARTICULARLY RELATED TO THE OPERATIONS PERFORMED AND NOT OTHERWISE PROVIDED FOR [4]

Note

This subclass does not cover tools having a clear primary function as well as one or more secondary functions. Those tools are covered by the relevant subclass for tools having such primary function and are, thus, not classified in group B25F 1/00 or B25F 3/00 of this subclass.

1/00 Combination or multi-purpose hand tools (associations of tools for different working operations with one portable power-drive means B25F 3/00)

1/02 . with interchangeable or adjustable tool elements

1/04 . . wherein the elements are brought into working position by a pivoting or sliding movement

3/00 Associations of tools for different working operations with one portable power-drive means; Adapters therefor

5/00 Details or components of portable power-driven tools not particularly related to the operations performed and not otherwise provided for [4]

5/02 . Construction of casings, bodies or handles **[4]**

B25G HANDLES FOR HAND IMPLEMENTS (attaching the blades or the like to handles of hand tools for soil working A01B 1/22; handles of hand implements for harvesting A01D 1/14; handles integral with brushware A46B)

(1) This subclass covers:
- handles for hand implements, in general;
- handles for hand implements for particular purposes, subject to Note (2) below.

(2) This subclass does not cover handles provided for elsewhere, e.g. it does not cover those provided for in A45B 9/02, A45C 13/22, A45C 13/26, A47B 95/02, A47J 45/00, B23D 51/01, B25J 13/02, B26B, B60N 3/02, B62B 5/06, B62B 9/20, B62K 21/26, B62M 3/14, B65D 25/28, E05B, G05G.

1/00 Handle constructions

1/01 . Shock-absorbing means (B25G 1/02 takes precedence) **[5]**

1/02 . flexible (hammers heads having shock-absorbing means B25D 1/12) **[5]**

1/04 . telescopic; extensible; sectional

1/06 . reversible or adjustable for position

1/08 . with provision for storing tool elements

1/10 . characterised by material or shape (B25G 1/01, B25G 1/02 take precedence) **[5]**

1/12 . . electrically insulating material **[2]**

3/00 Attaching handles to the implements

3/02 . Socket, tang, or like fixings (B25G 3/34 takes precedence)

3/04 . . with detachable or separate socket pieces (B25G 3/12 takes precedence)

3/06 . . with multiple socket, e.g. T-socket (B25G 3/12 takes precedence)

3/08 . . with dovetail or other groove (B25G 3/12 takes precedence)

3/10 . . with elastic, taper, or other self-grip socket or tang (B25G 3/12 takes precedence)

3/12 . . Locking or securing devices

3/14 . . . comprising barbs or teeth

3/16 . . . comprising bayonet joints

3/18 . . . comprising catches or pawls

3/20 . . . comprising clamping or contracting means acting concentrically on the handle or socket

3/22 . . . . Chucks

3/24 . . . comprising clamping or contracting means acting transversely on the handle or socket

3/26 . . . comprising nails, screws, bolts, or pins traversing or entering the socket

3/28 . . . comprising wedges, keys, or like expanding means

3/30 . . . comprising screwed sockets or tangs

3/32 . . . in association with, or including, tang, bolt, or other member passing axially through whole length of handle

3/34 . by pressing the handle on the implements; using cement or molten metal, e.g. casting, moulding; by welding or the like

3/36 . Lap joints; Riveted, screwed, or like joints (socket, tang, or like fixings B25G 3/02)

3/38 . Hinged, pivoted, swivelling, or folding joints

B25H **WORKSHOP EQUIPMENT, E.G. FOR MARKING-OUT WORK**; **STORAGE MEANS FOR WORKSHOPS** (storing or packaging B65)

1/00 **Work benches**; **Portable stands or supports for positioning portable tools or work to be operated on thereby**
1/02 . of table type
1/04 . . portable
1/06 . of trestle type
1/08 . with provision for attachment of work holders
1/10 . with provision for adjusting holders for tool or work
1/12 . with storage compartments
1/14 . with provision for adjusting the bench top
1/16 . . in height
1/18 . . in inclination
1/20 . with provision for shielding the work area

3/00 **Storage means or arrangements for workshops facilitating access to, or handling of, work, tools or instruments** (containers or packages with special means for dispensing contents B65D 83/00)
3/02 . Boxes
3/04 . Racks
3/06 . Trays

5/00 **Tool, instrument or work supports or storage means used in association with vehicles** (means for holding wheels or parts thereof B60B 30/00); **Workers' supports, e.g. mechanics' creepers**

7/00 **Marking-out or setting-out work** (measuring, gauging G01; optical apparatus G02B; by photographic means G03C)
7/02 . Plates having a flat surface
7/04 . Devices, e.g. scribers, for marking (centre punches B25D 5/00)

B25J **MANIPULATORS**; **CHAMBERS PROVIDED WITH MANIPULATION DEVICES** (robotic devices for individually picking fruits, vegetables, hops or the like A01D 46/30; needle manipulators for surgery A61B 17/062; manipulators associated with rolling mills B21B 39/20; manipulators associated with forging machines B21J 13/10; means for holding wheels or parts thereof B60B 30/00; cranes B66C; arrangements for handling fuel or other materials which are used within nuclear reactors G21C 19/00; structural combination of manipulators with cells or rooms shielded against radiation G21F 7/06) **[5]**

Note

In this subclass, the following term is used with the meaning indicated:
– "manipulator" covers handling tools, devices, or machines having a gripping or work head capable of bodily movement in space and of change of orientation, such bodily movement and change of orientation being controlled by means remote from the head, e.g. programme-controlled industrial robots.

Subclass index

1/00 **Manipulators positioned in space by hand** (of master-slave type B25J 3/00; micromanipulators B25J 7/00)
1/02 . articulated or flexible
1/04 . rigid, e.g. shelf-reachers
1/06 . of the lazy-tongs type
1/08 . movably mounted in a wall
1/10 . . Sleeve and pivot mountings therefor
1/12 . having means for attachment to a support stand

3/00 **Manipulators of master-slave type, i.e. both controlling unit and controlled unit perform corresponding spatial movements**
3/02 . involving a parallelogram coupling of the master and slave units (pantographic instruments B43L 13/00)
3/04 . involving servo mechanisms (servo-actuated heads B25J 15/02)

5/00 **Manipulators mounted on wheels or on carriages** (B25J 1/00 takes precedence; programme-controlled manipulators B25J 9/00)
5/02 . travelling along a guideway
5/04 . . wherein the guideway is also moved, e.g. travelling crane bridge type
5/06 . Manipulators combined with a control cab for the operator

7/00 **Micromanipulators**

9/00 **Programme-controlled manipulators**
9/02 . characterised by movement of the arms, e.g. cartesian co-ordinate type (B25J 9/06 takes precedence) **[4]**
9/04 . . by rotating at least one arm, excluding the head movement itself, e.g. cylindrical co-ordinate type or polar co-ordinate type **[4]**
9/06 . characterised by multi-articulated arms **[4]**
9/08 . characterised by modular constructions **[4]**

9/10 . characterised by positioning means for manipulator elements **[4]**
9/12 . . electric **[4]**
9/14 . . fluid **[4]**
9/16 . Programme controls (total factory control, i.e. centrally controlling a plurality of machines, G05B 19/418) **[4]**
9/18 . . electric **[4]**
9/20 . . fluidic **[4]**
9/22 . . Recording or playback systems (in general G05B 19/42) **[4]**

11/00 Manipulators not otherwise provided for

13/00 Controls for manipulators (programme controls B25J 9/16) **[4]**
13/02 . Hand grip control means
13/04 . Foot-operated control means
13/06 . Control stands, e.g. consoles, switchboards
13/08 . by means of sensing devices, e.g. viewing or touching devices **[4]**

15/00 Gripping heads
15/02 . servo-actuated
15/04 . with provision for the remote detachment or exchange of the head or parts thereof
15/06 . with vacuum or magnetic holding means
15/08 . having finger members (B25J 15/02, B25J 15/04 take precedence) **[4]**
15/10 . . with three or more finger members **[4]**
15/12 . . with flexible finger members **[4]**

17/00 Joints
17/02 . Wrist joints

18/00 Arms [4]
18/02 . extensible **[4]**
18/04 . . rotatable **[4]**
18/06 . flexible **[4]**

19/00 Accessories fitted to manipulators, e.g. for monitoring, for viewing; **Safety devices combined with or specially adapted for use in connection with manipulators** (safety devices in general F16P; protection against radiation in general G21F)
19/02 . Sensing devices **[4]**
19/04 . . Viewing devices **[4]**
19/06 . Safety devices **[4]**

21/00 Chambers provided with manipulation devices (constructional features of the mounting of the manipulator in the wall B25J 1/08)
21/02 . Glove-boxes, i.e. chambers in which manipulations are performed by the human hands in gloves built into the chamber walls; Gloves therefor

B26 HAND CUTTING TOOLS; CUTTING; SEVERING

B26B **HAND-HELD CUTTING TOOLS NOT OTHERWISE PROVIDED FOR** (for harvesting A01D; for horticulture, for forestry A01G; for butchering or meat treatment A22; for manufacturing or repairing footwear A43D; nail clippers or cutters A45D 29/02; kitchen equipment A47J; for surgical purposes A61B 17/00; for metal B23D; cutting by abrasive fluid jets B24C 5/02; plier-like tools with cutting edges B25B 7/22; pincers B25C 11/02; handles for hand implements, in general B25G; guillotine-type cutters B26D; for erasing B43L 19/00; for textile materials D06H)

Subclass index

Hand knives

1/00 **Hand knives with adjustable blade**; **Pocket knives** (B26B 11/00 takes precedence)
- 1/02 . with pivoted blade
- 1/04 . . lockable in adjusted position
- 1/06 . . with loosely-inserted spring
- 1/08 . with sliding blade
- 1/10 . Handles **[3]**

3/00 **Hand knives with fixed blades**
- 3/02 . Table-knives (B26B 9/02 takes precedence)
- 3/03 . specially adapted for cutting-off slices one by one
- 3/04 . for performing several incisions simultaneously; Multiple-blade knives
- 3/06 . Scout or similar sheath knives (sheaths therefor B26B 29/02)
- 3/08 . specially adapted for cutting cardboard, or wall, floor, or like covering materials

5/00 **Hand knives with one or more detachable blades** (surgical scalpels or knives with detachable blades A61B 17/3213)

7/00 **Hand knives with reciprocating motor-driven blades**

9/00 **Blades for hand knives**
- 9/02 . characterised by the shape of the cutting edge, e.g. wavy

11/00 **Hand knives combined with other implements, e.g. with corkscrew, with scissors, with writing implement** (combined table-ware A47G 21/06)

Hand shears; **Scissors**

13/00 **Hand shears**; **Scissors**
- 13/02 . with moulded-in blades
- 13/04 . with detachable blades
- 13/06 . characterised by the shape of the blades
- 13/08 . . with cutting edges wavy or toothed in the plane of the blade
- 13/10 . . for producing wavy, zig-zag, or like cuts
- 13/12 . characterised by the shape of the handles
- 13/14 . . without gripping bows in the handle
- 13/16 . . . spring loaded, e.g. with provision for locking the blades or the handles
- 13/18 . . . without joint, i.e. having blades interconnected by a resilient member
- 13/20 . . with gripping bows in the handle
- 13/22 . combined with auxiliary implements, e.g. with cigar cutter, with manicure instrument (cigar cutters per se A24F 13/24)
- 13/24 . . to aid hair cutting
- 13/26 . with intermediate links between the grips and the blades, e.g. for remote actuation
- 13/28 . Joints (B25B 7/06 takes precedence)

15/00 **Hand-held shears with motor-driven blades**

17/00 **Hand cutting tools with two jaws which come into abutting contact** (nail clippers or cutters A45D 29/02; joints therefor B25B 7/06)
- 17/02 . with jaws operated indirectly by the handles, e.g. through cams or toggle levers

19/00 **Clippers or shavers operating with a plurality of cutting edges, e.g. hair clippers, dry shavers**
- 19/02 . of the reciprocating-cutter type
- 19/04 . . Cutting heads therefor; Cutters therefor; Securing equipment thereof
- 19/06 . . . involving co-operating cutting elements both of which have shearing teeth
- 19/08 . . . . of nipper type
- 19/10 . . . involving two or more different types of reciprocating cutting elements, e.g. a pair of toothed shearing elements combined with a pair of perforated cutting elements or a combined toothed and perforated cutting assembly
- 19/12 . of the oscillating-cutter type; Cutting heads therefor; Cutters therefor (B26B 19/04 takes precedence)
- 19/14 . of the rotary-cutter type; Cutting heads therefor; Cutters therefor (B26B 19/04 takes precedence)
- 19/16 . . involving a knife cylinder or a knife cone or separate cutting elements moved like a rotating cylinder or a rotating cone
- 19/18 . . . in combination with a fixed razor-blade without shearing perforations
- 19/20 . with provision for shearing hair of preselected or variable length
- 19/22 . with provision for thinning-out hair
- 19/24 . specially adapted for shearing animals, e.g. sheep

19/26 . of the type performing different methods of operation simultaneously, e.g. reciprocating and oscillating; of the type having two or more heads of differing mode of operation

19/28 . Drive layout for hair clippers or dry shavers, e.g. providing for electromotive drive (electric motors per se H02)

19/30 . . providing for muscle drive, e.g. by rolling over the skin

19/32 . . providing for mechanical drive, e.g. installation of a spring motor

19/34 . . providing for fluid drive

19/36 . . providing for remote drive by means of a flexible shaft; Transmission means therefor

19/38 . Details of, or accessories for, hair clippers, or dry shavers, e.g. housings, casings, grips, guards (cutters, cutting heads B26B 19/04, B26B 19/12, B26B 19/14; cleaning or disinfecting devices A45D 27/46; drying devices A45D 27/48; casings for electric apparatus in general H05K)

19/40 . . Lubricating

19/42 . . providing for straightening the hair to be cut, e.g. by means of bristles; providing for tensioning the skin, e.g. by means of rollers, ledges (skin-stretchers for shaving per se A45D 27/38)

19/44 . . Suction means for collecting severed hairs or for the skin to be shaved

19/46 . . providing for illuminating the area to be shaved or clipped

19/48 . . Accessory implements for carrying out a function other than cutting hair, e.g. attachable appliances for manicuring (massage means per se A61H 7/00 to A61H 23/00)

21/00 Razors of the open or knife type; **Safety razors or other shaving implements of the planing type**; **Hair-trimming devices involving a razor-blade**; **Equipment therefor**

21/02 . involving unchangeable blades

21/04 . . Razors of the knife type

21/06 . . Safety razors with fixed blade, e.g. with moulded-in blade

21/08 . involving changeable blades

21/10 . . Safety razors with one or more blades arranged longitudinally to the handle

21/12 . . . combined with combs or other means for hair trimming

21/14 . . Safety razors with one or more blades arranged transversely to the handle

21/16 . . . involving blades with only one cutting edge (B26B 21/22 to B26B 21/38 take precedence)

21/18 . . . involving blades with two cutting edges (B26B 21/22 to B26B 21/38 take precedence)

21/20 . . . involving blades with more than two cutting edges; involving disc blades (B26B 21/22 to B26B 21/38 take precedence)

21/22 . . . involving several blades to be used simultaneously

21/24 . . . of the magazine type; of the injector type (containers for storing razor-blades A45D 27/24)

21/26 . . . of the continuous ribbon type

21/28 . . . of the drawing cut type, i.e. with the cutting edge of the blade arranged obliquely to the handle

21/30 . . . of the type carrying pivotally-mounted caps

21/32 . . . . in razors involving double-edged blades

21/34 . . . of the type carrying rollers

21/36 . . . . with provision for reciprocating the blade (reciprocating the cutting elements of clippers or dry shavers B26B 19/00)

21/38 . . . with provision for reciprocating the blade by means other than rollers (reciprocating the cutting elements of clippers or dry shavers B26B 19/00)

21/40 . Details or accessories

21/42 . . for cutting hair of preselected or variable length (combs, stencils or guides specially adapted for hair trimming devices A45D 24/36)

21/44 . . Means integral with, or attached to, the razor for storing shaving-cream, styptic, or the like

21/46 . . for illuminating the skin (B26B 19/46 takes precedence)

21/48 . . Heating means

21/50 . . Means integral with, or attached to, the razor for stropping the blade

21/52 . . Handles, e.g. tiltable, flexible

21/54 . Razor-blades

21/56 . . characterised by the shape **[3]**

21/58 . . characterised by the material **[3]**

21/60 . . . by the coating material **[3]**

23/00 Axes; **Hatchets**

25/00 Hand cutting tools involving disc blades, e.g. motor-driven (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

27/00 Hand cutting tools not provided for in groups B26B 1/00 to B26B 25/00, e.g. finger rings for cutting string, devices for cutting by means of wires

29/00 Guards or sheaths for hand cutting tools; **Arrangements for guiding hand cutting tools** (guards for hair clippers or dry shavers B26B 19/38) **[5]**

29/02 . Guards or sheaths for knives

29/04 . Guards or sheaths for scissors, e.g. combined with manicuring appliances (manicuring implements per se A45D 29/00)

29/06 . Arrangements for guiding hand cutting tools (guiding equipment or arrangements for specific cutting tools, see the particular places, e.g. for hair trimming devices A45D 24/36, for saw blades B27B 11/02, B27B 13/10) **[5]**

B26D **CUTTING**; **DETAILS COMMON TO MACHINES FOR SEVERING, E.G. BY CUTTING, PERFORATING, PUNCHING, STAMPING-OUT** (soil-working A01B; for growing crops or plants A01D, A01G; for fodder or straw A01F; for bulk butter A01J; for dough A21C; slaughtering A22B; for tobacco, cigars or cigarettes A24; marking-out, perforating or making buttonholes A41H 25/00; manufacturing footwear A43D; brushmaking A46D; surgery A61B; disintegrating, mincing or shredding in general B02C; cutting wire, making pins or nails B21F, B21G; of the kind used for metal B23; cutting by abrasive fluid jets B24C 5/02; hand-held cutting tools B26B; perforating, cutting-out, stamping-out or punching, or severing by means other than cutting B26F; for wood B27; for stone B28D; working of plastics or substances in a plastic state B29; making boxes, cartons, envelopes or bags, of paper or similarly worked materials, e.g. metal foil, B31B; article or web delivery apparatus incorporating cutting or line-perforating devices B65H 35/00; for leather or upholstery B68, C14B; for glass C03B; making matches C06F; for peat C10F; for sugar C13B 45/00; for textile materials D06H; civil engineering, building, mining, see section E; devices for withdrawing samples by cutting G01N 1/04; for light guides G02B 6/25; cutting processed photographic material G03D 15/04) **[2,5]**

(1) This subclass covers :
- cutting non-metallic sheet material or metal foil in general;
- cutting other forms of non-metallic material not otherwise provided for;
- features specific to machines for cutting, perforating, punching, cutting-out, stamping-out, or severing by means other than cutting, which relate to a requirement or problem of a nature which is not peculiar to a machine for these purposes, that is, details of or arrangements for operating or controlling such machines, although the realisation of such features may differ according to the kind of machine concerned. This subclass covers such features in general even if the feature, in any particular case, is to some extent peculiar to, or is claimed only for, a machine designed for perforating, punching, cutting-out, stamping-out, or for severing other than by cutting.

(2) If the details or arrangements have no essential features specific to cutting, perforating, punching, cutting-out, stamping-out or severing machines, the more general classes, e.g. F16, take precedence.

Subclass index

1/00 **Cutting through work characterised by the nature or movement of the cutting member**; **Apparatus or machines therefor**; **Cutting members therefor [3]**

1/01 . involving a cutting member which does not travel with the work **[3]**
1/02 . . having a stationary cutting member (B26D 1/547 takes precedence) **[3]**
1/03 . . . with a plurality of cutting members **[3]**
1/04 . . having a linearly-movable cutting member (B26D 1/46, B26D 1/547 take precedence) **[3]**
1/06 . . . wherein the cutting member reciprocates (cup or like cutting members B26D 1/44) **[3]**
1/08 . . . . of the guillotine type **[3]**
1/09 . . . . . with a plurality of cutting members **[3]**
1/10 . . . . in, or substantially in, a direction parallel to the cutting edge **[3]**
1/11 . . . . . with a plurality of cutting members **[3]**
1/12 . . having a cutting member moving about an axis (B26D 1/547 takes precedence; cup or like cutting members B26D 1/44) **[3]**
1/14 . . . with a circular cutting member, e.g. disc cutter **[3]**
1/143 . . . . rotating about a stationary axis (B26D 1/20 to B26D 1/24 take precedence) **[3]**
1/147 . . . . . with horizontal cutting member **[3]**
1/15 . . . . . with vertical cutting member **[3]**
1/153 . . . . . with inclined cutting member **[3]**
1/157 . . . . rotating about a movable axis (B26D 1/20 to B26D 1/24 take precedence) **[3]**
1/16 . . . . . mounted on a movable arm or the like **[3]**
1/18 . . . . . mounted on a movable carriage **[3]**
1/20 . . . . coacting with a fixed member **[3]**
1/22 . . . . coacting with a movable member, e.g. a roller (B26D 1/24 takes precedence) **[3]**
1/24 . . . . coacting with another disc cutter **[3]**
1/25 . . . with a non-circular cutting member **[3]**
1/26 . . . . moving about an axis substantially perpendicular to the line of cut **[3]**
1/28 . . . . . and rotating continuously in one direction during cutting **[3]**
1/29 . . . . . with cutting member mounted in the plane of a rotating disc, e.g. for slicing beans **[3]**
1/30 . . . . . with limited pivotal movement to effect cut **[3]**
1/34 . . . . moving about an axis parallel to the line of cut **[3]**
1/36 . . . . . and rotating continuously in one direction during cutting, e.g. mounted on a rotary cylinder (for flying cutting B26D 1/62) **[3]**
1/38 . . . . . and coacting with a fixed blade or other fixed member **[3]**
1/40 . . . . . and coacting with a rotary member **[3]**
1/42 . . . . . and slidably mounted in a rotary member **[3]**
1/43 . . . . moving about another axis, e.g. mounted on the surface of a cone or curved body **[3]**
1/44 . . having a cup or like cutting member **[3]**

1/45 . . having a cutting member the movement of which is not covered by any preceding group **[3]**
1/46 . . having an endless band-knife or the like **[3]**
1/48 . . . with tensioning means **[3]**
1/50 . . . with a plurality of band-knives or the like **[3]**
1/52 . . . . having adjustable spacing between knives **[3]**
1/54 . . . Guides for band-knives or the like **[3]**
1/547 . . having a wire-like cutting member (endless wire B26D 1/46; severing using a heated wire B26F 3/12) **[3]**
1/553 . . . with a plurality of wire-like cutting members **[3]**
1/56 . involving a cutting member which travels with the work, i.e. flying cutter (flying shears for metal B23D 25/00; flying saws for metal B23D 45/18) **[3]**
1/58 . . and is mounted on a movable arm or the like **[3]**
1/60 . . and is mounted on a movable carriage **[3]**
1/62 . . and is rotating about an axis parallel to the line of cut, e.g. mounted on a rotary cylinder **[3]**

3/00 Cutting work characterised by the nature of the cut made; **Apparatus therefor [3]**

3/02 . Bevelling
3/06 . Grooving involving removal of material from the surface of the work
3/08 . Making a superficial cut in the surface of the work without removal of material, e.g. scoring, incising
3/10 . Making cuts of other than simple rectilinear form (cutting-out B26F)
3/11 . . to obtain pieces of spiral or helical form **[3]**
3/12 . Slitting marginal portions of the work, i.e. forming cuts, without removal of material, at an angle, e.g. a right angle, to the edge of the work
3/14 . Forming notches in marginal portion of work by cutting (by punching B26F 1/12)
3/16 . Cutting rods or tubes transversely
3/18 . to obtain cubes or the like (ice harvesting F25C 5/02) **[3]**
3/20 . . using reciprocating knives
3/22 . . using rotating knives
3/24 . to obtain segments other than slices, e.g. cutting pies
3/26 . . specially adapted for cutting fruit or vegetables, e.g. for onions
3/28 . Splitting layers from work; Mutually separating layers by cutting (B26D 3/30 take precedence; recovery of plastics or other constituents of waste material containing plastics B29B 17/00) **[3]**
3/30 . Halving devices, e.g. for halving buns **[3]**

Note

In groups B26D 5/00 and B26D 7/00, the following term is used with the meaning indicated:
– "cutting" includes cutting-out, stamping-out, punching, perforating or severing by means other than cutting.

5/00 Arrangements for operating and controlling machines or devices for cutting, cutting-out, stamping-out, punching, perforating, or severing by means other than cutting

5/02 . Means for moving the cutting member into its operative position for cutting
5/04 . . by fluid pressure
5/06 . . by electrical means
5/08 . Means for actuating the cutting member to effect the cut
5/10 . . Hand or foot actuated means
5/12 . . Fluid-pressure means
5/14 . . Crank and pin means
5/16 . . Cam means
5/18 . . Toggle-link means (B26D 5/10 to B26D 5/16 take precedence)
5/20 . with interrelated action between the cutting member and work feed
5/22 . . having the cutting member and work feed mechanically connected
5/24 . . . including a metering device
5/26 . . wherein control means on the work feed means renders the cutting member operative
5/28 . . . the control means being responsive to presence or absence of work
5/30 . . having the cutting member controlled by scanning a record carrier
5/32 . . . with the record carrier formed by the work itself
5/34 . . . scanning being effected by a photosensitive device
5/36 . . . scanning being effected by magnetic means
5/38 . with means operable by the moving work to initiate the cutting action
5/40 . . including a metering device
5/42 . with interrelated action between work feed and clamp (work clamping arrangements B26D 7/02)

7/00 Details of apparatus for cutting, cutting-out, stamping-out, punching, perforating, or severing by means other than cutting (cutters B26D 1/00; arrangements for guiding hand cutting tools B26B 29/06; punching tools or dies, cutting-out knives or dies B26F) **[5]**

7/01 . Means for holding or positioning work **[3]**
7/02 . . with clamping means **[3]**
7/04 . . . providing adjustable clamping pressure **[3]**
7/06 . Arrangements for feeding or delivering work of other than sheet, web, or filamentary form (feeding or discharging sheets, webs, or filaments B65H)
7/08 . Means for treating work or cutting member to facilitate cutting (tensioning band cutters B26D 1/48)
7/10 . . by heating (severing by heating B26F)
7/12 . . by sharpening the cutting member
7/14 . . by tensioning the work
7/18 . Means for removing cut-out material or waste
7/20 . Cutting beds
7/22 . Safety devices specially adapted for cutting machines (safety devices in general F16P)
7/24 . . arranged to disable the operating means for the cutting member
7/26 . Means for mounting or adjusting the cutting member; Means for adjusting the stroke of the cutting member
7/27 . Means for performing other operations combined with cutting (B26D 9/00 takes precedence) **[3]**
7/28 . . for counting the number of cuts or measuring cut lengths (B26D 5/24, B26D 5/40 take precedence) **[3]**
7/30 . . for weighing cut product **[3]**

7/32 . . for conveying or stacking cut product (means for removing cut-out material or waste B26D 7/18) **[3]**

7/34 . . for applying a coating, such as butter, to cut product **[3]**

9/00 Cutting apparatus combined with punching or perforating apparatus or with dissimilar cutting apparatus

11/00 Combinations of several similar cutting apparatus

B26F PERFORATING; **PUNCHING**; **CUTTING-OUT**; **STAMPING-OUT**; **SEVERING BY MEANS OTHER THAN CUTTING** (marking-out, perforating or making buttonholes A41H 25/00; manufacturing footwear A43D; surgery A61B; punching metal B21D; drilling metal B23B; cutting of metal by applying heat locally, e.g. flame cutting, B23K; cutting by abrasive fluid jets B24C 5/02; details common to machines for severing B26D; drilling wood B27C; drilling stone B28D; working of plastics or substances in a plastic state B29; making boxes, cartons, envelopes or bags, of paper or similarly worked materials, e.g. metal foil, B31B; of glass C03B; of leather C14B; of textile materials D06H; for light guides G02B 6/25; of tickets G07B) **[2,5]**

(1) This subclass covers:
- perforating, punching, cutting-out, stamping-out;
- severing, by means other than cutting, non-metallic sheet material or metal foil in general;
- severing, by means other than cutting, other forms of non-metallic materials not otherwise provided for.

(2) Attention is drawn to Notes (1) and (2) following the title of subclass B26D.

1/00 Perforating; **Punching**; **Cutting-out**; **Stamping-out**; **Apparatus therefor** (perforating by laser beam B23K 26/00; subjecting the grinding tools or the abrading medium to vibration, e.g. grinding with ultrasonic frequency, B24B 1/04; perforating by sand-blasting B24C; punching cards or tapes for statistical and record purposes G06K 1/00)

1/02 . Perforating by punching, e.g. with relatively-reciprocating punch and bed

1/04 . . with selectively-operable punches

1/06 . . with punching tools moving with the work

1/08 . . . wherein the tools are carried by, and in operation move relative to, a rotative drum or similar support

1/10 . . . Roller type punches

1/12 . . to notch margins of work

1/14 . . Punching tools; Punching dies

1/16 . Perforating by tool or tools of the drill type

1/18 . Perforating by slitting, i.e. forming cuts closed at their ends without removal of material

1/20 . . with tools carried by a rotating drum or similar support (B26F 1/22 takes precedence)

1/22 . . to form non-rectilinear cuts, e.g. for tabs

1/24 . Perforating by needles or pins

1/26 . Perforating by non-mechanical means, e.g. by fluid jet

1/28 . . by electrical discharges

1/31 . . by radiation **[3]**

1/32 . Hand-held perforating or punching apparatus, e.g. awls

1/34 . . power actuated (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

1/36 . . Punching or perforating pliers

1/38 . Cutting-out; Stamping-out

1/40 . . using a press, e.g. of the ram type (presses in general B30B)

1/42 . . . having a pressure roller

1/44 . . Cutters therefor; Dies therefor

1/46 . . . Loose press knives

3/00 Severing by means other than cutting; **Apparatus therefor** (severing by grinding B24B 27/06)

3/02 . Tearing

3/04 . Severing by squeezing (B26F 3/08 takes precedence)

3/06 . Severing by using heat (severing by laser beam B23K 26/00)

3/08 . . with heated members

3/10 . . . with heated rollers or discs

3/12 . . . with heated wires

3/16 . . by radiation **[3]**

B27 WORKING OR PRESERVING WOOD OR SIMILAR MATERIAL; NAILING OR STAPLING MACHINES IN GENERAL

B27B **SAWS**; **COMPONENTS OR ACCESSORIES THEREFOR** (saws specially adapted for pruning or debranching A01G 3/08; sawing apparatus specially adapted for felling trees A01G 23/091; features not restricted to a particular type of wood saw B23D, e.g. attaching saw blades B23D 51/00; machine tool frames, beds, pillars or like members, in general B23Q 1/01) **[5]**

Subclass index

1/00 **Methods for subdividing trunks or logs essentially involving sawing** (features of machines used, see the relevant groups for the machines)

3/00 **Gang saw mills**; **Other sawing machines with reciprocating saw blades, specially designed for length sawing of trunks**

3/02 . with vertically-reciprocating saw frame
3/04 . . with multiple-blade saw frame
3/06 . . with side blade saw frame
3/08 . . . combined with a multiple-blade saw frame
3/10 . . Saw frames or guides therefor
3/12 . . Mechanisms for producing the reciprocating movement of the saw frame; Arrangements for damping vibration; Arrangements for counter-balancing (B27B 3/26 takes precedence)
3/14 . . Arrangements for raising or lowering the feed rollers
3/16 . . Driving mechanisms for the feed rollers
3/18 . . Controlling equipment, e.g. for controlling the drive
3/20 . . Equipment for guiding the sawn part of timber during machining, e.g. preventing faults due to torsional stress
3/22 . with horizontally-reciprocating saw frame
3/24 . . Arrangements for raising and lowering the saw frame
3/26 . . Mechanisms for producing the reciprocating movement of the saw frame; Arrangements for damping vibrations; Arrangements for counter-balancing
3/28 . Components
3/30 . . Blade attachments, e.g. saw buckles; Stretching devices
3/32 . . . the stretching devices being equipped with screw-threaded or wedging means
3/34 . . . the stretching devices being actuated by fluid pressure
3/36 . . Devices for adjusting the mutual distance of the saw blades
3/38 . . . Spacing bars; Spacing plates
3/40 . . Devices for adjusting the overhang of the saw

Circular saws

5/00 **Sawing machines working with circular saw blades** (for length sawing of trunks B27B 7/00); **Components or equipment therefor**

5/02 . characterised by a special purpose only
5/04 . . for edge trimming
5/06 . . for dividing plates in parts of determined size, e.g. panels
5/065 . . . with feedable saw blades, e.g. arranged on a carriage **[6]**
5/07 . . . . the plate being positioned in a substantially vertical plane (B27B 5/075 takes precedence) **[6]**
5/075 . . . . characterised by having a plurality of saw blades, e.g. turning about perpendicular axes **[6]**
5/08 . . for sawing with the saw blade abutting parallel against a surface of the workpiece
5/10 . Wheeled circular saws; Circular saws designed to be attached to tractors or other vehicles and driven by same
5/12 . Cylinder saws
5/14 . Rim-driven circular saws
5/16 . Saw benches (B27B 15/06 takes precedence)
5/18 . . with feedable circular saw blade, e.g. arranged on a carriage
5/20 . . . the saw blade being adjustable according to depth or angle of cut; Radial saws, i.e. sawing machines with a pivoted radial arm for guiding the movable carriage
5/22 . . with non-feedable circular saw blade
5/24 . . . the saw blade being adjustable according to depth or angle of cut
5/26 . . . the table being adjustable according to depth or angle of cut
5/29 . Details; Component parts; Accessories **[2]**
5/30 . . for mounting or securing saw blades or saw spindles
5/32 . . . Devices for securing circular saw blades to the saw spindle
5/34 . . . Devices for securing a plurality of circular saw blades on a single saw spindle; Equipment for adjusting the mutual distance

5/36 . . . Mounting for swivelling or tilting the circular saw blade

5/38 . . Devices for braking the circular saw blade or the saw spindle; Devices for damping vibrations of the circular saw blade, e.g. silencing

7/00 Sawing machines working with circular saw blades, specially designed for length sawing of trunks

7/02 . by making use of circular saws mounted substantially at right angles, e.g. vertically and horizontally

7/04 . by making use of a plurality of circular saws mounted on a single spindle; Arrangements for adjusting the mutual distances

9/00 Portable power-driven circular saws for manual operation (details or components, e.g. handles, casings, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

9/02 . Arrangements for adjusting the cutting depth or the amount of tilting

9/04 . Guiding equipment, e.g. for cutting panels

11/00 Cross-cut reciprocating saws with power drive; **Appurtenances therefor**

11/02 . Arrangements for guiding the saw blade

11/04 . . Supports able to be attached to the work

11/06 . Arrangements for chucking the saw blade, with or without releasable transmission mechanisms for uncoupling the drive

11/08 . Frames, pillars, or beds

11/10 . Devices for clamping the work or holding same in position

11/12 . Saw assemblies designed to be mounted on or driven by tractors

Band or strap sawing machines

13/00 Band or strap sawing machines (for length cutting of trunks B27B 15/00); **Components or equipment therefor**

13/02 . Frames, Pillars

13/04 . Work-tables; Arrangements for tilting the band saw blade

13/06 . Saw pulleys; Bearings therefor

13/08 . Arrangements for stretching the band saw blade

13/10 . Guiding equipment for the band saw blade, e.g. guide rollers, back guides, side guides

13/12 . Lubricating devices specially designed for band saw blades

13/14 . Braking devices specially designed for band sawing machines, e.g. acting after damage of the band saw blade

13/16 . Accessories, e.g. for cooling the saw blade

15/00 Band or strap sawing machines specially designed for length cutting of trunks

15/02 . with horizontally-guided saw blade, i.e. horizontal log band saw

15/04 . with vertically-guided saw blade

15/06 . in combined arrangement with circular saws for performing simultaneously several sawing procedures

15/08 . with a plurality of band saw blades

17/00 Chain saws; **Equipment therefor**

17/02 . Chain saws equipped with guide bar (B27B 17/06 takes precedence)

17/04 . . Roller bearing guides

17/06 . Chain saws mounted on a bow

17/08 . Drives or gearings; Devices for swivelling or tilting the chain saw

17/10 . . Transmission clutches specially designed for chain saws

17/12 . Lubricating devices specially designed for chain saws

17/14 . Arrangements for stretching the chain saw

19/00 Other reciprocating saws with power drive; **Fret-saws** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

19/02 . Saws with a power-driven blade chucked at both ends or at one end only, e.g. jig saws, scroll saws (B27B 19/10 takes precedence)

19/04 . . characterised by power drive, e.g. by electromagnetic drive

19/06 . . Stationary machines

19/09 . . portable **[2]**

19/10 . Fret-saws, i.e. with bilaterally-chucked saw blade in a manually-guided bow

19/12 . . with power drive

19/14 . . with hand drive

21/00 Hand saws without power drive (B27B 19/14 takes precedence); **Equipment for hand sawing, e.g. saw horses**

21/02 . Buck or hack saws

21/04 . Cross-cut saws; Pad saws

21/06 . Arrangements for stretching the saw blade

21/08 . Arrangements of gauging or adjusting equipment on hand saws, e.g. for limiting the cutting depth

23/00 Other cutting of wood by non-rotary toothed tools; **Tools therefor** (cutting with hot wire B27M 1/06)

Components or accessories for saws

25/00 Feeding devices for timber in saw mills or sawing machines; **Feeding devices for trees** (B27B 31/00 takes precedence) **[5]**

25/02 . with feed and pressure rollers

25/04 . with feed chains or belts

25/06 . Resilient feeding or pressing accessories, e.g. pads, springs

25/08 . Feeding devices able to be attached to any sawing machine

25/10 . Manually-operated feeding or pressing accessories, e.g. pushers

27/00 Guide fences or stops for timber in saw mills or sawing machines; **Measuring equipment thereon** (safety guards or devices specially designed for wood saws B27G 19/00; constructional features of measuring devices G01B)

27/02 . arranged laterally and parallel with respect to the plane of the saw blade

27/04 . arranged perpendicularly to the plane of the saw blade

27/06 . arranged angularly with respect to the plane of the saw blade, e.g. for mitring

27/08 . arranged adjustably, not limited to only one of the groups B27B 27/02 to B27B 27/06

27/10 . Devices for moving or adjusting the guide fences or stops

29/00 **Gripping, clamping, or holding devices for the trunk or log in saw mills or sawing machines** (safety guards or devices specially designed for wood saws B27G 19/00; for other timber, see the relevant groups for the machines); **Travelling trunk or log carriages**

29/02 . Clamping angles; Gripping equipment thereon

29/04 . Trunk or log carriages with gripping means which do not pass the saw blade(s), especially for gang saws; Arrangement of gripping accessories thereon

29/06 . . Auxiliary trunk or log carriages for carrying initially the log to the feed rollers or for carrying the sawn part of the log

29/08 . Trunk or log carriages with gripping means designed to pass the saw blade(s), especially for band saws; Arrangement of gripping accessories thereon; Turning devices thereon

29/10 . . Assemblies for laterally adjusting or controlling the clamping or turning devices with respect to the thickness of the board to be sawn

31/00 **Arrangements for conveying, loading, turning, adjusting, or discharging the log or timber, specially designed for saw mills or sawing machines** (B27B 29/00 takes precedence)

31/02 . Loading equipment for travelling carriages

31/04 . Turning equipment

31/06 . Adjusting equipment, e.g. using optical projection

31/08 . Discharging equipment

33/00 **Sawing tools for saw mills, sawing machines, or sawing devices**

33/02 . Structural design of saw blades or saw teeth

33/04 . . Gang saw blades

33/06 . . Band saw blades

33/08 . . Circular saw blades

33/10 . . Hand saw blades

33/12 . . Saw blades having inserted or exchangeably arranged bits or toothed segments

33/14 . Saw chains

33/16 . Saw wires; Twisted saw strips

33/18 . Saw cylinders having a toothed front rim

33/20 . Edge trimming saw blades or tools combined with means to disintegrate waste **[2]**

B27C **PLANING, DRILLING, MILLING, TURNING, OR UNIVERSAL MACHINES** (machine tools in general B23; working wood using abrasive, e.g. sanding, devices B24; tools for these purposes B27G)

1/00 **Machines for producing flat surfaces, e.g. by rotary cutters**; **Equipment therefor**

1/02 . Smoothing, i.e. working one side only

1/04 . Thicknessing machines

1/06 . Machines for smoothing and subsequent thicknessing

1/08 . Machines for working several sides of work simultaneously

1/10 . Hand planes equipped with power-driven cutter blocks (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

1/12 . Arrangements for feeding work

1/14 . Other details or accessories

3/00 **Drilling machines or drilling devices**; **Equipment therefor** (B23B takes precedence)

3/02 . Stationary drilling machines with a single working spindle

3/04 . Stationary drilling machines with a plurality of working-spindles

3/06 . Drilling machines or devices for making dowel holes

3/08 . Operator-supported drilling machines or devices

5/00 **Machines designed for producing special profiles or shaped work, e.g. by rotary cutters**; **Equipment therefor** (turning B27C 7/00; features of copying devices B23Q 35/00; slotting, mortising, making tongues or grooves B27F)

5/02 . Machines with table

5/04 . . Guide fences for work

5/06 . . Arrangements for clamping or feed work

5/08 . Rounding machines

5/10 . Portable hand-operated wood-milling machines; Routers (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) **[4]**

7/00 **Wood-turning machines**; **Equipment therefor** (B23B, B23G, B23Q take precedence; features of copying devices B23Q 35/00)

7/02 . Lathes for hand turning

7/04 . Devices for centring or chucking work

7/06 . Arrangements for guiding or supporting the tool, e.g. tool rests

9/00 **Multi-purpose machines**; **Universal machines**; **Equipment therefor**

9/02 . with a single working-spindle

9/04 . with a plurality of working-spindles

B27D **WORKING VENEER OR PLYWOOD** (applying liquids or other fluent materials to surfaces in general B05; grinding, sanding, or polishing of wood B24; applying adhesives or glue to surfaces of wood B27G 11/00; manufacture of veneer B27L 5/00)

Note

The layered products classified in this subclass are also classified in B32B. **[3]**

1/00 **Joining wood veneer with any material**; **Forming articles thereby** (manufacture by dry processes of articles made from particles or fibres consisting of wood or other lignocellulosic or like organic material B27N); **Preparatory processing of surfaces to be joined, e.g. scoring**

1/02 . Hot tables for warming veneers

1/04 . to produce plywood or articles made therefrom; Plywood sheets

1/06 . . Manufacture of central layers; Form of central layers

1/08 . . Manufacture of shaped articles; Presses specially designed therefor

1/10 . Butting blanks of veneer; Jointing same along edges; Preparatory processing of edges, e.g. cutting

3/00 **Veneer presses**; **Press plates**; **Plywood presses** (presses in general B30B)

3/02 . with a plurality of press plates, i.e. multi-platen hot presses

3/04 . with endless arrangement of moving press plates, belts, or the like

5/00 **Other working of veneer or plywood specially adapted to veneer or plywood** (working of strips in the same way as cane B27J)

B27F **DOVETAILED WORK**; **TENONS**; **SLOTTING MACHINES**; **NAILING OR STAPLING MACHINES** (hand-held nailing or stapling tools B25C; manufacture of cases, trunks or boxes from wood B27M 3/34; connections for building structures in general, e.g. dowels for use in building constructions E04B 1/38; jointing elements in general, e.g. dowels in general, F16B)

(1) This subclass covers also the assembling of the elements to be jointed, e.g. using adhesives.
(2) This subclass does not cover the application of adhesives or glue to surfaces of wood to be jointed, which is covered by group B27G 11/00.

1/00 **Dovetailed work**; **Tenons**; **Making tongues or grooves** (slotting B27F 5/00); **Groove-and-tongue jointed work**; **Finger-joints** (machines or devices for working mitred joints B27G 5/00; cutting tools for cutting grooves or tenons B27G 13/14) **[2]**

1/02 . Making tongues or grooves, of indefinite length

1/04 . . along only one edge of a board

1/06 . . simultaneously along opposite edges of a board

1/08 . Making dovetails, tongues, or tenons, of definite limited length

1/10 . . Cutting fenons of round or rounded-off profile

1/12 . . Corner-locking machines, i.e. machines for cutting crenellated joints

1/14 . . . Arrangements of gauging means specially designed for corner-locking machines (measuring instruments G01)

1/16 . Making finger joints, i.e. joints having tapers in the opposite direction to those of dovetail joints (B27F 1/08 takes precedence) **[2]**

4/00 **Machines for inserting dowels, with or without drilling equipment** (manufacture of wooden dowels B27M 3/28)

5/00 **Slotted or mortised work** (hand mortising chisels B27G 17/08)

5/02 . Slotting or mortising machines

5/04 . . equipped with both chain cutters and chisel cutters

5/06 . . equipped with chain cutters

5/08 . . . Chain cutters

5/10 . . equipped with chisel cutters

5/12 . . for making holes designed for taking up fittings, e.g. in frames of doors, windows, furniture

7/00 **Nailing or stapling** (surgical staplers A61B 17/068; hand-held nailing tools B25C 1/00; manually operated portable stapling tools, hand-held power-operated stapling tools B25C 5/00); **Nailed or stapled work**

7/02 . Nailing machines

7/04 . . Equipment for bending nails driven through

7/05 . . Driving means **[3]**

7/07 . . . operated by manual power **[3]**

7/09 . . . operated by fluid pressure **[3]**

7/11 . . . operated by electric power **[3]**

7/13 . . Nail feeding devices **[3]**

7/15 . Machines for driving in nail-plates **[3]**

7/17 . Stapling machines **[3,5]**

7/19 . . with provision for bending the ends of the staples on to the work **[3]**

7/21 . . . with means for forming the staples in the machine **[3]**

7/23 . . . . with rotary drive **[3]**

7/26 . . without provision for bending the ends of the staples on to the work **[3]**

7/28 . . . with means for forming the staples in the machine **[3]**

7/30 . . Driving means **[3]**

7/32 . . . operated by manual power **[3]**

7/34 . . . operated by fluid pressure **[3]**
7/36 . . . operated by electric power **[3]**
7/38 . . Staple feeding devices **[3]**

B27G **ACCESSORY MACHINES OR APPARATUS**; **TOOLS** (sawing tools B27B 33/00; tools for slotting or mortising machines B27F 5/00; tools for the manufacture of wood shavings, chips, powder, or the like B27L 11/00); **SAFETY DEVICES, E.G. FOR SAWS** (clamping devices for mitre joints, presses for producing frames, press frames, or cages equipped with clamping devices B25B; woodworkers' benches B25H)

Subclass index

Accessory machines or apparatus

1/00 **Machines or devices for removing knots or other irregularities or for filling-up holes**

3/00 **Arrangements for removing bark-zones, chips, waste, or dust, specially designed for use in connection with wood-working machine or in wood-working plants**

5/00 **Machines or devices for working mitre joints with even abutting ends** (with tenon or like connections B27F)
5/02 . for sawing mitre joints; Mitre boxes (guide fences for timber in sawing machines B27B 27/00)
5/04 . for planing, cutting, shearing, or milling mitre joints

11/00 **Applying adhesives or glue to surfaces of wood to be joined** (applying liquids, e.g. liquid adhesives, to surfaces in general B05C, B05D; adhesive processes C09J 5/00; associated with particular wood-working, see the relevant subclasses) **[2]**
11/02 . Glue vessels; Apparatus for warming or heating glue

Tools [2]

13/00 **Cutter blocks**; **Other rotary cutting tools** (B27G 15/00, B27G 17/00 take precedence)
13/02 . in the shape of long arbors, i.e. cylinder cutting blocks (B27G 13/12 takes precedence)
13/04 . . Securing the cutters by mechanical clamping means
13/06 . . Securing the cutters by fluid-pressure clamping means
13/08 . in the shape of disc-like members; Wood-milling cutters (B27G 13/12 takes precedence)
13/10 . . Securing the cutters, e.g. by clamping collars
13/12 . for profile cutting
13/14 . . for cutting grooves or tenons
13/16 . . for rounding rods, e.g. dowels

15/00 **Boring or turning tools**; **Augers**
15/02 . Drills for undercutting holes

17/00 **Manually-operated tools**
17/02 . Hand planes (equipped with power-driven cutter blocks B27C 1/10)
17/04 . Spokeshaves; Scrapers
17/06 . Rasps
17/08 . Mortise chisels

Safety guards or devices

19/00 **Safety guards or devices specially designed for wood saws** (in general F16P); **Auxiliary devices facilitating proper operation of wood saws**
19/02 . for circular saws
19/04 . . for manually-operated power-driven circular saws
19/06 . for band or strap saws
19/08 . Accessories for keeping open the saw kerf, e.g. riving knives, wedge plates
19/10 . Measures preventing splintering of sawn portions of wood

21/00 **Safety guards or devices specially designed for other wood-working machines**

23/00 **Gauging means specially designed for adjusting of tools or guides, e.g. adjusting cutting blades in cutter blocks** (for guides of sawing machines B27B 27/00)

B27H **BENDING**; **COOPERAGE**; **WHEEL-MAKING**

1/00 **Bending wood, e.g. wood stock [2]**

3/00 **Manufacture of constructional elements of tubs, coops or barrels** (assembly, e.g. coopering, B27H 5/00)
3/02 . Manufacture of barrel staves
3/04 . Manufacture of barrel heads or casings

5/00 **Manufacture of tubs, coops or barrels** (from veneer strips or sheets B27D 1/00)
5/02 . Building up with staves
5/04 . . Forming staves into the final shape and assembling same
5/08 . Finishing barrels, e.g. cutting grooves

5/10 . . Trussing or hooping barrels
5/12 . . Making bungs from wood; Drilling or reaming bung holes

7/00 Manufacture of wheels wholly or predominantly made from wood, e.g. cart wheels; **Manufacture of wood-rimmed wheels, e.g. steering wheels [2]**

B27J MECHANICAL WORKING OF CANE, CORK, OR SIMILAR MATERIALS

Note

In this subclass, the following expression is used with the meaning indicated:
– "working of cane" embraces the working of other materials, e.g. of strips of wood or plastics, in the same manner.

1/00 Mechanical working of cane or the like (weaving D03D)
1/02 . Braiding, e.g. basket-making (braiding in general D04C)

3/00 Peeling osier rods (debarking trees or logs B27L 1/00)

5/00 Mechanical working of cork (manufacture by dry processes of articles made from particles or fibres of cork B27N)

7/00 Mechanical working of tree or plant materials not otherwise provided for

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B27K PROCESSES, APPARATUS OR SELECTION OF SUBSTANCES FOR IMPREGNATING, STAINING, DYEING OR BLEACHING OF WOOD, OR FOR TREATING OF WOOD WITH PERMEANT LIQUIDS, NOT OTHERWISE PROVIDED FOR (applying liquids or other fluent materials to surfaces in general B05; coating wood or similar material B44D); CHEMICAL OR PHYSICAL TREATMENT OF CORK, CANE, REED, STRAW OR SIMILAR MATERIALS [2]

1/00 Damping wood
1/02 . Apparatus

3/00 Impregnating wood (dyeing, staining B27K 5/00)
3/02 . Processes; Apparatus
3/04 . . Impregnating in open tanks
3/06 . . Sap stream methods
3/08 . . Impregnating by pressure
3/10 . . . Apparatus
3/12 . . Impregnating by coating the surface of the wood with an impregnating paste
3/14 . . Bandage methods
3/15 . . Impregnating involving polymerisation **[2]**

Note

In groups B27K 3/16 to B27K 3/34, in the absence of an indication to the contrary, impregnating agents are classified in the last appropriate place.

3/16 . Inorganic impregnating agents
3/18 . . Compounds of alkaline earth metals
3/20 . . Compounds of alkali metals or ammonium
3/22 . . Compounds of zinc or copper
3/24 . . Compounds of mercury
3/26 . . Compounds of iron, aluminium, or chromium
3/28 . . Compounds of arsenic or antimony
3/30 . . Compounds of fluorine
3/32 . . Mixtures of different inorganic impregnating agents
3/34 . Organic impregnating agents
3/36 . . Aliphatic compounds
3/38 . . Aromatic compounds
3/40 . . . halogenated
3/42 . . . nitrated, or nitrated and halogenated
3/44 . . Tar; Mineral oil
3/46 . . . Coal tar
3/48 . . . Mineral oil
3/50 . . Mixtures of different organic impregnating agents
3/52 . Impregnating agents containing mixtures of inorganic and organic compounds

5/00 Treating of wood not provided for in groups B27K 1/00, B27K 3/00
5/02 . Staining or dyeing wood; Bleaching wood (bleaching wood pulp D21C 9/10)
5/04 . Combined bleaching or impregnating and drying of wood
5/06 . Softening or hardening wood

7/00 Chemical or physical treatment of cork (mechanical working of cork B27J 5/00)

9/00 Chemical or physical treatment of reed, straw, or similar material (mechanical working of cane or the like B27J 1/00)

B27L REMOVING BARK OR VESTIGES OF BRANCHES (forestry A01G); SPLITTING WOOD; MANUFACTURE OF VENEER, WOODEN STICKS, WOOD SHAVINGS, WOOD FIBRES OR WOOD POWDER

1/00 **Debarking or removing vestiges of branches from trees or logs** (debarking by chemical treatment B27L 3/00); **Machines therefor [2]**

Note

Tree-feeding devices are covered by group B27B 25/00. **[5]**

1/02 . by rubbing the trunks against each other (B27L 1/04 takes precedence); Equipment for wet practice **[5]**
1/04 . by rubbing the trunks in rotating drums **[5]**
1/05 . . Drums therefor **[5]**
1/06 . Manually-operated or portable devices for debarking or for removing vestiges of branches
1/08 . using rotating rings **[5]**
1/10 . using rotatable tools (B27L 1/04, B27L 1/08, B27L 1/12 take precedence) **[5]**
1/12 . using pliable tools **[5]**
1/14 . using jets of fluid **[5]**

3/00 **Debarking by chemical treatment**

5/00 **Manufacture of veneer** (working veneer or plywood B27D)

5/02 . Cutting strips from a rotating trunk or piece; Veneer lathes
5/04 . . the trunk being rotated about an axis lying outside it
5/06 . Cutting strips from a stationarily-held trunk or piece by a rocking knife carrier, or from rocking trunk or piece by a stationarily-held knife carrier; Veneer-cutting machines
5/08 . Severing sheets or segments from veneer strips; Shearing devices therefor; Making veneer blanks, e.g. trimming to size

7/00 **Arrangements for splitting wood [6]**

7/02 . using rotating members **[6]**
7/04 . . Conical screws **[6]**
7/06 . using wedges, knives or spreaders (B27L 7/02 takes precedence) **[6]**
7/08 . using chopping blocks **[6]**

9/00 **Manufacture of wooden sticks, e.g. toothpicks** (of walking sticks, of sticks for umbrellas B27M 3/38; combined with other operations in the manufacture of matches C06F)

11/00 **Manufacture of wood shavings, chips, powder, or the like** (disintegrating in general B02C; edge trimming sawing blades or sawing tools combined with means to disintegrate waste B27B 33/20; obtaining fibres for spinning D01B 1/00; wet methods D21B 1/12); **Tools therefor [2]**

11/02 . of wood shavings or the like
11/04 . . of wood wool
11/06 . of wood powder or sawdust (grinding-stones B24D)
11/08 . of wood fibres, e.g. produced by tearing

B27M WORKING OF WOOD NOT PROVIDED FOR IN SUBCLASSES B27B TO B27L; MANUFACTURE OF SPECIFIC WOODEN ARTICLES

1/00 **Working of wood not provided for in subclasses B27B to B27L, e.g. by stretching [2]**

1/02 . by compressing
1/04 . by punching out
1/06 . by burning or charring, e.g. cutting with hot wire (as surface treatment B44B)
1/08 . by multi-step processes **[2]**

3/00 **Manufacture or reconditioning of specific semi-finished or finished articles** (features of copying devices B23Q; manufacture of plywood or veneer, shaping plywood or veneer into articles B27D; of central layers for plywood B27D 1/06; nailing or stapling machines in general B27F 7/00; of elements for cooperage or wheel-making B27H)

3/02 . of roofing elements, e.g. shingles
3/04 . of flooring elements, e.g. parqueting blocks (assembling wooden elements on backings of other substances B32B, e.g. B32B 37/00)
3/06 . . of composite floor plates by assembling or jointing the parqueting blocks
3/08 . of specially-shaped wood laths or strips
3/10 . of airscrew blades
3/12 . of railings, stairs, stair stringers, ladders, or parts thereof
3/14 . of railroad sleepers
3/16 . of tool handles or tools, e.g. mallets
3/18 . of furniture
3/20 . of lasts; of shoes, e.g. sabots; of parts of shoes, e.g. heels
3/22 . of sport articles, e.g. bowling pins, frames of tennis rackets, skis, paddles
3/24 . of household utensils, e.g. spoons, clothes hangers, clothes pegs
3/26 . of smokers utensils, e.g. pipes
3/28 . of dowels or bolts
3/30 . of bobbins
3/32 . of tapered poles, e.g. mine props
3/34 . of cases, trunks, or boxes, of wood or equivalent material which cannot satisfactorily be bent without softening (nailing or stapling in general B25C, B27F; of cardboard, paper, or similarly workable material B31B)
3/36 . . Machines or devices for attaching blanks together, e.g. for making wire-bound boxes
3/38 . of walking sticks or of sticks for umbrellas

B27N MANUFACTURE BY DRY PROCESSES OF ARTICLES, WITH OR WITHOUT ORGANIC BINDING AGENTS, MADE FROM PARTICLES OR FIBRES CONSISTING OF WOOD OR OTHER LIGNOCELLULOSIC OR LIKE ORGANIC MATERIAL (containing cementitious material B28B; shaping of substances in a plastic state B29C; fibreboards made from fibrous suspensions D21J; drying F26B 17/00) **[4]**

Note

This subclass does not cover treatment of compositions which are in a plastic state, or worked by the same type of process or apparatus as plastics, which is covered by subclass B29B or B29C. **[4]**

1/00 Pretreatment of moulding material [4]

1/02 . Mixing the material with binding agent (mixing in general B01F) **[4]**

3/00 Manufacture of substantially flat articles, e.g. boards, from particles or fibres [4]

3/02 . from particles **[4]**

3/04 . from fibres **[4]**

3/06 . Making particle boards or fibreboards, with preformed covering layers, the particles or fibres being compressed with the layers to a board in one single pressing operation **[4]**

3/08 . Moulding or pressing (presses in general B30B) **[4]**

3/10 . . Moulding of mats **[4]**

3/12 . . . from fibres **[4]**

3/14 . . . Distributing or orienting the particles or fibres **[4]**

3/16 . . Transporting the material from mat moulding stations to presses (B27N 3/22 takes precedence); Apparatus specially adapted for transporting the material or component parts therefor, e.g. cauls (transport devices in general B65G) **[4]**

3/18 . . Auxiliary operations, e.g. preheating, humidifying, cutting-off **[4]**

3/20 . . characterised by using platen-presses **[4]**

3/22 . . . Charging or discharging **[4]**

3/24 . . characterised by using continuously acting presses having endless belts or chains moved within the compression zone **[4]**

3/26 . . characterised by using continuously acting presses having a heated press drum and an endless belt to compress the material between belt and drum **[4]**

3/28 . . characterised by using extrusion presses **[4]**

5/00 Manufacture of non-flat articles [4]

5/02 . Hollow articles **[4]**

7/00 After-treatment, e.g. reducing swelling or shrinkage, surfacing; **Protecting the edges of boards against access of humidity [4]**

9/00 Arrangements for fireproofing (fireproofing materials C09K 21/00) **[4]**

B28 WORKING CEMENT, CLAY, OR STONE

B28B SHAPING CLAY OR OTHER CERAMIC COMPOSITIONS, SLAG OR MIXTURES CONTAINING CEMENTITIOUS MATERIAL, E.G. PLASTER (foundry moulding B22C; working stone or stone-like material B28D; shaping of substances in a plastic state, in general B29C; making layered products not composed wholly of these substances B32B; shaping in situ, see the relevant classes of section E)

Note

In this subclass, the following term is used with the meaning indicated:
– "the material" means:
(a) clay or other ceramic compositions;
(b) slag;
(c) mixtures with water-setting properties given by clay, cementitious material, or slag.

Subclass index

1/00 Producing shaped articles from the material (using presses B28B 3/00; shaping on moving conveyers B28B 5/00; producing tubular articles B28B 21/00)

1/02 . by turning or jiggering
1/04 . by tamping or ramming (followed by pressing B28B 3/02)
1/08 . by vibrating or jolting
1/087 . . by means acting on the mould **[6]**
1/093 . . by means directly acting on the material, e.g. by cores wholly or partly immersed in the material (internal vibrators for compacting concrete in situ E04G 21/08) **[6]**
1/10 . . and applying pressure otherwise than by the use of presses
1/14 . by simple casting, the material being neither forcibly fed nor positively compacted (for molten material B28B 1/54)
1/16 . . for producing layered articles (coating B28B 11/04)
1/20 . by centrifugal or rotational casting (slip-casting involving rotation of the mould B28B 1/28; for molten material B28B 1/54)
1/24 . by injection moulding
1/26 . by slip-casting, i.e. by casting a suspension or dispersion of the material in a liquid-absorbent or porous mould, the liquid being allowed to soak into or pass through the walls of the mould; Moulds therefor (B28B 1/52 takes precedence)
1/28 . . involving rotation of the mould
1/29 . by profiling or strickling the material in open moulds or on moulding surfaces
1/30 . by applying the material on to a core, or other moulding surface to form a layer thereon (to form a permanent layer B28B 19/00)
1/32 . . by projecting, e.g. spraying (spraying in general B05B, B05D)
1/34 . . . by centrifugal force
1/38 . . by dipping (in general B05C, B05D)
1/40 . . by wrapping, e.g. winding
1/42 . . . using mixtures containing fibres, e.g. for making sheets by slitting the wound layer
1/44 . by forcing cores into filled moulds for forming hollow articles
1/48 . by removing material from solid section preforms for forming hollow articles, e.g. by punching or boring
1/50 . specially adapted for producing articles of expanded material, e.g. cellular concrete (chemical aspects C04B)
1/52 . specially adapted for producing articles from mixtures containing fibres (by wrapping on to mandrels B28B 1/42)
1/54 . specially adapted for producing articles from molten material, e.g. slag (chemical aspects C04B)

3/00 Producing shaped articles from the material by using presses (shaping on moving conveyers B28B 5/00); **Presses specially adapted therefor** (presses in general B30B)

3/02 . wherein a ram exerts pressure on the material in a moulding space; Ram heads of special form
3/04 . . with one ram per mould (B28B 3/10 takes precedence)
3/06 . . . with two or more ram and mould sets
3/08 . . with two or more rams per mould
3/10 . . each charge of material being compressed against previously formed body
3/12 . wherein one or more rollers exert pressure on the material
3/14 . . with co-operating pocketed rollers
3/16 . . with co-operating profiled rollers
3/18 . . Roller-and-ring machines, i.e. with roller disposed within a ring and co-operating with the inner surface of the ring
3/20 . wherein the material is extruded
3/22 . . by screw or worm
3/24 . . by reciprocating plunger
3/26 . . Extrusion dies

5/00 **Producing shaped articles from the material in moulds or on moulding surfaces, carried or formed by, in, or on conveyers irrespective of the manner of shaping** (shaping aspects, see the relevant groups)

5/02 . on conveyers of the endless-belt or chain type (in combination with pressing rollers B28B 3/12)

5/04 . in moulds moved in succession past one or more shaping stations (on turntables B28B 5/06)

5/06 . in moulds on a turntable

5/08 . . intermittently rotated

5/10 . in moulds carried on the circumference of a rotating drum

5/12 . . intermittently rotated

7/00 **Moulds**; **Cores**; **Mandrels** (specially adapted for the production of tubular articles B28B 21/00)

7/02 . Moulds with adjustable parts

7/04 . . one or more of the parts being pivotally mounted

7/06 . Moulds with flexible parts

7/08 . Moulds provided with means for tilting or inverting

7/10 . Moulds with means incorporated therein, or carried thereby, for ejecting the moulded article (devices, not forming part of the mould, for ejecting the moulded article B28B 13/06)

7/12 . . by fluid pressure

7/14 . Moulds with means incorporated therein, or carried thereby, for cutting the moulded article into parts (cutting means independent of the mould B28B 11/14)

7/16 . Moulds for making shaped articles with cavities or holes open to the surface

7/18 . . the holes passing completely through the article

7/20 . Moulds for making shaped articles with undercut recesses, e.g. dovetails

7/22 . Moulds for making units for prefabricated buildings; Moulds for making prefabricated stair units

7/24 . Unitary mould structures with a plurality of moulding spaces

7/26 . Assemblies of separate moulds

7/28 . Cores; Mandrels

7/30 . . adjustable, collapsible, or expanding

7/32 . . . inflatable (connection of valves to inflatable elastic bodies B60C 29/00)

7/34 . Moulds, cores, or mandrels of special material, e.g. destructible materials (for slip-casting B28B 1/26)

7/36 . Linings or coatings (lubricating surfaces of moulds, cores, or mandrels B28B 7/38)

7/38 . Treating surfaces of moulds, cores, or mandrels to prevent sticking

7/40 . characterised by means for modifying the properties of the moulding material **[5]**

7/42 . . for heating or cooling, e.g. steam jackets **[5]**

7/44 . . for treating with gases or degassing, e.g. for de-aerating **[5]**

7/46 . . for humidifying or dehumidifying **[5]**

11/00 **Apparatus or processes for treating or working the shaped articles** (specially adapted for tubular articles B28B 21/92; decoration or surface treatment in general B05, B44; compacting concrete in situ in connection with building E04G 21/06; drying F26)

11/02 . for attaching appendages, e.g. handles, spouts

11/04 . for coating (glazing, engobing C04B)

11/06 . . with powdered or granular material

11/08 . for reshaping the surface, e.g. smoothing, roughening, corrugating, making screw-threads

11/10 . . by using presses

11/12 . for removing parts of the articles by cutting

11/14 . for dividing shaped articles by cutting

11/16 . . for extrusion

11/18 . for removing burr

11/22 . for cleaning

11/24 . for curing, setting or hardening (processes for influencing or modifying the setting or hardening ability of mortars, concrete or artificial stone compositions, in general C04B 40/00) **[6]**

13/00 **Feeding the unshaped material to moulds or apparatus for producing shaped articles**; **Discharging shaped articles from such moulds or apparatus** (feeding or discharging devices incorporated in, or operatively associated with, a particular type of shaping apparatus, or specially designed to supply materials to a particular type of shaping apparatus, see the relevant groups for the apparatus)

13/02 . Feeding the unshaped material to moulds or apparatus for producing shaped articles

13/04 . Discharging the shaped articles (conveying systems for ceramic mouldings B65G 49/08)

13/06 . . Removing the shaped articles from moulds (by means incorporated in, or carried by, the moulds B28B 7/10)

15/00 **General arrangement or layout of plant**

17/00 **Details of, or accessories for, apparatus for shaping the material**; **Auxiliary measures taken in connection with such shaping** (moulds B28B 7/00; after-treatment B28B 11/00; feeding or discharging B28B 13/00; arrangements for embedding elements in the material B28B 23/00; details, accessories, or auxiliary measures special to any one type of shaping, machine or method of shaping, see the relevant groups for such machines or methods)

17/02 . Conditioning the material prior to shaping

17/04 . Exhausting or laying dust

19/00 **Machines or methods for applying the material to surfaces to form a permanent layer thereon** (making shaped articles on mandrels B28B 1/30; applying liquids or other fluent materials to surfaces in general B05C; glazing or engobing C04B; applying the material to walls or other fixed structures, see the relevant classes of section E)

Methods, apparatus, or machines, specially adapted for the production of tubular or reinforced articles

21/00 **Methods or machines specially adapted for the production of tubular articles**

21/02 . by casting into moulds

21/04 . . by simple casting, the material being neither positively compacted nor forcibly fed

21/06 . . into moulds having sliding parts (B28B 21/26 takes precedence; forms, shutterings, or falsework for making rooms as a whole, whole stories, or whole buildings in situ E04G 11/02)

21/08 . . by slip-casting; Moulds therefor

21/10 . . using compacting means

21/12 . . . tamping or ramming the material or the mould elements

21/14 . . . vibrating, e.g. the surface of the material

21/16 . . . . one or more mould elements

21/18 . . . using expansible or retractable mould or core elements

21/20 . . . . using inflatable cores, e.g. having a frame inside the inflatable part of the core (connection of valves to inflatable elastic bodies B60C 29/00) **[2]**
21/22 . . . using rotatable mould or core parts
21/24 . . . . using compacting heads, rollers, or the like
21/26 . . . . . with a packer head serving as a sliding mould or provided with guiding means for feeding the material
21/28 . . . . . combined with vibration means
21/30 . . . . Centrifugal moulding
21/32 . . . . . Feeding the material into the moulds
21/34 . . . . . combined with vibrating or other additional compacting means
21/36 . . . applying fluid pressure or vacuum to the material (combined with slip-casting B28B 21/08)
21/38 . . . . introducing the material wholly or partly under pressure
21/40 . . . . by evacuating one or more of the mould parts
21/42 . by shaping on or against mandrels or like moulding surfaces
21/44 . . by projecting, e.g. spraying
21/46 . . by dipping
21/48 . . by wrapping, e.g. winding
21/50 . . Details of compression or compacting means
21/52 . by extruding
21/54 . . Mouthpieces for shaping sockets, bends, or like peculiarly-shaped tubular articles
21/56 . incorporating reinforcements
21/58 . . Steel tubes
21/60 . . prestressed reinforcements
21/62 . . . circumferential
21/64 . . . . Winding arrangements
21/66 . . . Reinforcing mats
21/68 . . and applying centrifugal forces
21/70 . by building-up from preformed elements
21/72 . . Producing multilayer tubes
21/74 . . Producing pipe bends, sockets, sleeves; Moulds therefor (combined with extrusion presses B28B 21/54)
21/76 . Moulds
21/78 . . with heating or cooling means, e.g. steam jackets
21/80 . . adapted to centrifugal or rotational moulding
21/82 . . built-up from several parts; Multiple moulds; Moulds with adjustable parts
21/84 . . . Moulds with one or more pivotable parts
21/86 . Cores (in general B28B 7/00)
21/88 . . adjustable, collapsible or expansible (using inflatable cores B28B 21/20)
21/90 . Methods or apparatus for discharging after shaping
21/92 . Methods or apparatus for treating or reshaping
21/94 . . for impregnating or coating by applying liquids or semi-liquids
21/96 . . for smoothing, roughening, corrugating or for removing burr
21/98 . . for reshaping, e.g. by means of reshape moulds

23/00 Arrangements specially adapted for the production of shaped articles with elements wholly or partly embedded in the moulding material (B28B 21/00 takes precedence; in units for prefabricated buildings B28B 7/22)
23/02 . wherein the elements are reinforcing members
23/04 . . the elements being stressed
23/06 . . . for the production of elongated articles
23/08 . . . . the articles being of tubular form
23/10 . . . the shaping being effected by centrifugal or rotational moulding **[2]**
23/12 . . . to form prestressed circumferential reinforcements **[2]**
23/14 . . . . by wrapping, e.g. winding apparatus **[2]**
23/16 . . . . Prestressed reinforcing nets **[2]**
23/18 . . for the production of elongated articles (B28B 23/06 takes precedence) **[2]**
23/20 . . the shaping being effected by centrifugal or rotational moulding (B28B 23/10 takes precedence) **[2]**
23/22 . . assembled from preformed parts **[2]**

B28C PREPARING CLAY; **PRODUCING MIXTURES CONTAINING CLAY OR CEMENTITIOUS MATERIAL, E.G. PLASTER** (preparing material for foundry moulds B22C 5/00)

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "cement" or "mixtures of cement with other substances" includes plaster;
– "clay" includes like ceramic compositions.

1/00 Apparatus or methods for obtaining or processing clay (filtration in general B01D; separation of solids from solids B03, B07; chemical part C04B; by mining or quarrying E21C 41/16, E21C 41/26, E21C 47/10)
1/02 . for producing or processing clay suspensions (producing or processing suspensions in general B01)
1/04 . . Producing suspensions, e.g. by blunging
1/06 . . Processing suspensions
1/08 . . . Separating suspensions, e.g. for obtaining clay, for removing stones (filtration in general B01D; separation of solids from solids B03, B07)
1/10 . for processing clay-containing substances in non-fluid condition (clay slurries B28C 1/02)
1/12 . . Storing and conditioning in storage; Specially adapted storage spaces or devices for their filling or emptying (feeding clay to shaping apparatus B28B 13/00)

1/14 . . specially adapted for homogenising, comminuting or conditioning clay in non-fluid condition or for separating undesired admixtures therefrom (processes involving conversion to a slurry B28C 1/02; conditioning in storage B28C 1/12; comminuting in general B02C; chemical features in eliminating iron or lime C04B)
1/16 . . . for homogenising, e.g. by mixing, kneading
1/18 . . . for comminuting
1/20 . . . for separating undesired admixed bodies
1/22 . . . combined with means for conditioning by heating, humidifying, or vacuum treatment

Mixing clay or cement with other material

Note

In groups B28C 3/00 to B28C 7/00, the following term is used with the meaning indicated:
– "mixing" includes preliminary mixing, e.g. of some of the ingredients, final mixing, and agitating the mixture to prevent segregation thereof.

3/00 Apparatus or methods for mixing clay with other substances (producing clay suspensions B28C 1/02; general arrangement or layout of plant B28C 9/00)

5/00 Apparatus or methods for producing mixtures of cement with other substances, e.g. slurries, mortars, porous or fibrous compositions (controlling the mixing apparatus and supplying the ingredients B28C 7/00; general arrangement or layout of plant B28C 9/00)
5/02 . without using driven mechanical means effecting the mixing (B28C 5/48 takes precedence) **[5]**
5/04 . . Gravitational mixing; Mixing by intermingling streams of ingredients (ingredients projected by fluid pressure B28C 5/06)
5/06 . . the mixing being effected by the action of a fluid (in combination with driven mechanical means B28C 5/38)
5/08 . using driven mechanical means affecting the mixing (B28C 5/40, B28C 5/42, B28C 5/48 take precedence; in combination with the action of a fluid B28C 5/38) **[5]**
5/10 . . Mixing in containers not actuated to effect the mixing
5/12 . . . with stirrers sweeping through the materials
5/14 . . . . the stirrers having motion about a horizontal or substantially horizontal axis
5/16 . . . . the stirrers having motion about a vertical or steeply inclined axis
5/18 . . Mixing in containers to which motion is imparted to effect the mixing
5/20 . . . rotating about a horizontal or substantially horizontal axis during mixing, e.g. without independent stirrers
5/22 . . . . with stirrers held stationary
5/24 . . . . with driven stirrers
5/26 . . . rotating about a vertical or steeply inclined axis during the mixing
5/28 . . . . without independent stirrers
5/30 . . . . with stirrers held stationary
5/32 . . . . with driven stirrers
5/34 . . Mixing on or by conveyers
5/36 . . . Endless-belt mixers
5/38 . wherein the mixing is effected both by the action of a fluid and by directly-acting driven mechanical means, e.g. stirring means
5/40 . Mixing specially adapted for preparing mixtures containing fibres
5/42 . Apparatus specially adapted for being mounted on vehicles with provision for mixing during transport (vehicle aspect B60P 3/16)
5/44 . Apparatus specially adapted for drive by muscle power
5/46 . Arrangements for applying super- or sub-atmospheric pressure during mixing; Arrangements for cooling or heating during mixing
5/48 . wherein the mixing is effected by vibrations (mixers with vibrating mechanisms in general B01F 11/00) **[5]**

7/00 Controlling the operation of apparatus for producing mixtures of clay or cement with other substances; **Supplying or proportioning the ingredients for mixing clay or cement with other substances**; **Discharging the mixture**
7/02 . Controlling the operation of the mixing
7/04 . Supplying or proportioning the ingredients
7/06 . . Supplying the solid ingredients, e.g. by means of endless conveyers or jigging conveyers
7/08 . . . by means of scrapers or skips
7/10 . . . by means of rotary members
7/12 . . Supplying or proportioning liquid ingredients
7/14 . Supply means incorporated in or mounted on mixers
7/16 . Discharge means

9/00 General arrangement or layout of plant [2]
9/02 . for producing mixtures of clay or cement with other materials **[2]**
9/04 . the plant being mobile (B28C 5/42 takes precedence) **[2]**

B28D WORKING STONE OR STONE-LIKE MATERIALS (machinery for, or methods of, mining or quarrying E21C)

1/00 Working stone or stone-like materials, e.g. brick, concrete, not provided for elsewhere; **Machines, devices, tools therefor** (fine working of gems, jewels, crystals B28D 5/00; working by grinding or polishing B24; devices or means for dressing or conditioning abrasive surfaces B24B 53/00)
1/02 . by sawing
1/04 . . with circular saw blades or saw discs (B28D 1/10 takes precedence)
1/06 . . with reciprocating saw blades (B28D 1/10 takes precedence)
1/08 . . with saw blades of endless cutter-type, e.g. chain saws, strap saws (B28D 1/10 takes precedence)
1/10 . . with provision for measuring
1/12 . . Saw blades specially adapted for working stone
1/14 . by boring or drilling (rotary drilling machines B23B; percussive tools B25D; earth or rock drilling E21B) **[1,7]**

1/16 . by turning
1/18 . by milling, e.g. channelling by means of milling tools
1/20 . by planing, e.g. channeling by means of planing tools
1/22 . by cutting, e.g. incising
1/24 . . with cutting discs
1/26 . by impact tools, e.g. by chisels or other tools having a cutting edge (portable percussive machines B25D)
1/28 . . without cutting edge
1/30 . to form contours, i.e. curved surfaces, irrespective of the method of working used (for artistic purposes B44B)
1/32 . Methods or apparatus specially adapted for working materials which can easily be split, e.g. mica, slate, schist

3/00 Dressing mill discs or rollers (dressing the tools of sawing machines or sawing devices B23D 63/00; treating the cutting members of cutting machines to facilitate cutting B26D 7/08)
3/02 . Machines
3/04 . . for grooving rollers

5/00 Fine working of gems, jewels, crystals, e.g. of semiconductor material; **Apparatus therefor** (working by grinding or polishing B24; for artistic purposes B44B; by non-mechanical methods C04B 41/00; non-mechanical after-treatment of single crystals C30B 33/00) **[3]**
5/02 . by rotary tools, e.g. drills
5/04 . by tools other than of rotary type, e.g. reciprocating tools

7/00 Accessories specially adapted for use with machines or devices of the other groups of this subclass
7/02 . for removing or laying dust, e.g. by spraying liquids; for cooling work
7/04 . for supporting or holding work

B29 WORKING OF PLASTICS; WORKING OF SUBSTANCES IN A PLASTIC STATE IN GENERAL

(1) This class does not cover the working of plastics sheet material in a manner analogous to the working of paper, which is covered by class B31. **[4]**

(2) In this class, the following term is used with the meaning indicated:
– "plastics" means macromolecular compounds or compositions based on such compounds.

(3) In this class, the following rules apply:
(a) The working of plastics is, as far as possible, classified primarily according to the particular shaping technique used, e.g. in subclass B29C. **[4]**
(b) Classification according to production of particular articles in subclass B29D is restricted to:
(i) aspects which are characteristic for the production of a particular article, and not classifiable in subclass B29B or B29C;
(ii) combined operations for making the particular article which are not fully classifiable in subclass B29C. **[4]**
(c) Products per se are not classified in this class. However, if a product is characterised by the way it is produced and not by its structure or composition, the production method should be classified in this class. **[2010.01]**

(4) The codes of subclass B29K are only for use as indexing codes associated with subclasses B29B, B29C, or B29D so as to provide information concerning moulding materials or materials for reinforcements, fillers or preformed parts, e.g. inserts. **[4]**

(5) The codes of subclass B29L are only for use as indexing codes associated with subclass B29C, so as to provide information concerning the articles produced by the techniques classified in subclass B29C. **[4]**

B29B PREPARATION OR PRETREATMENT OF THE MATERIAL TO BE SHAPED; MAKING GRANULES OR PREFORMS; RECOVERY OF PLASTICS OR OTHER CONSTITUENTS OF WASTE MATERIAL CONTAINING PLASTICS [4]

Note

In this subclass, it is desirable to add the indexing codes of subclass B29K. **[4]**

Subclass index

7/00 **Mixing**; **Kneading** (in general B01F; combined with calendering B29C 43/24, with injection B29C 45/46, with extrusion B29C 47/36) **[4]**
7/02 . non-continuous, with mechanical mixing or kneading devices, i.e. batch type **[4]**
7/04 . . with non-movable mixing or kneading devices **[4]**
7/06 . . with movable mixing or kneading devices **[4]**
7/08 . . . shaking, oscillating or vibrating **[4]**
7/10 . . . rotary **[4]**
7/12 . . . . with single shaft **[4]**
7/14 . . . . . with screw or helix **[4]**
7/16 . . . . . with paddles or arms **[4]**
7/18 . . . . with more than one shaft **[4]**
7/20 . . . . . with intermeshing devices, e.g. screws **[4]**
7/22 . . Component parts, details or accessories; Auxiliary operations **[4]**
7/24 . . . for feeding **[4]**
7/26 . . . for discharging, e.g. doors **[4]**
7/28 . . . for measuring, controlling or regulating, e.g. viscosity control **[4]**
7/30 . continuous, with mechanical mixing or kneading devices **[4]**
7/32 . . with non-movable mixing or kneading devices **[4]**
7/34 . . with movable mixing or kneading devices **[4]**
7/36 . . . shaking, oscillating or vibrating **[4]**
7/38 . . . rotary (B29B 7/52 takes precedence) **[4]**
7/40 . . . . with single shaft **[4]**
7/42 . . . . . with screw or helix **[4]**
7/44 . . . . . with paddles or arms **[4]**
7/46 . . . . with more than one shaft **[4]**
7/48 . . . . . with intermeshing devices, e.g. screws **[4]**
7/50 . . . . with rotary casing **[4]**
7/52 . . . with rollers or the like, e.g. calenders **[4]**
7/54 . . . . with a single roller co-operating with a stationary member **[4]**
7/56 . . . . with co-operating rollers **[4]**
7/58 . . Component parts, details or accessories; Auxiliary operations **[4]**
7/60 . . . for feeding, e.g. end guides for the incoming material **[4]**
7/62 . . . Rollers, e.g. with grooves **[4]**
7/64 . . . Stripping the material from the rollers **[4]**
7/66 . . . Recycling the material **[4]**
7/68 . . . Positioning of rollers **[4]**
7/70 . . . Conditioning of rollers, e.g. cleaning **[4]**
7/72 . . . Measuring, controlling or regulating **[4]**
7/74 . using other mixers or combinations of dissimilar mixers **[4]**
7/76 . . with stream impingement mixing head **[4]**
7/78 . . by gravity, e.g. falling particle mixers **[4]**
7/80 . Component parts, details or accessories; Auxiliary operations (B29B 7/22, B29B 7/58 take precedence) **[4]**
7/82 . . Heating or cooling **[4]**
7/84 . . Venting or degassing **[4]**
7/86 . . for working at sub- or superatmospheric pressure **[4]**
7/88 . . Adding charges **[4]**
7/90 . . . Fillers or reinforcements **[4]**

7/92 . . . . Wood chips or wood fibres **[4]**
7/94 . . . Liquid charges **[4]**

9/00 **Making granules** (in general B01J; chemical aspects C08J 3/12) **[4]**
9/02 . by dividing preformed material **[4]**
9/04 . . in the form of plates or sheets **[4]**
9/06 . . in the form of filamentary material, e.g. combined with extrusion **[4]**
9/08 . by agglomerating smaller particles **[4]**
9/10 . by moulding the material, i.e. treating it in the molten state **[4]**
9/12 . characterised by structure or composition **[4]**
9/14 . . fibre-reinforced **[4]**
9/16 . Auxiliary treatment of granules **[4]**

11/00 **Making preforms** (B29C 61/06 takes precedence) **[4]**
11/02 . by dividing preformed material, e.g. sheets, rods **[4]**
11/04 . by assembling preformed material **[4]**
11/06 . by moulding the material **[4]**
11/08 . . Injection moulding **[4]**
11/10 . . Extrusion moulding **[4]**
11/12 . . Compression moulding **[4]**
11/14 . characterised by structure or composition **[4]**
11/16 . . comprising fillers or reinforcements **[4]**

13/00 **Conditioning or physical treatment of the material to be shaped** (chemical aspects C08J 3/00) **[4]**
13/02 . by heating (B29B 13/06, B29B 13/08 take precedence) **[4]**
13/04 . by cooling **[4]**
13/06 . by drying (B29B 13/08 takes precedence) **[4]**
13/08 . by using wave energy or particle radiation **[4]**
13/10 . by grinding, e.g. by triturating; by sieving; by filtering **[4]**

15/00 **Pretreatment of the material to be shaped, not covered by groups B29B 7/00 to B29B 13/00 [4]**
15/02 . of crude rubber, gutta-percha, or similar substances (tapping latex A01G; chemical aspects C08C) **[4]**
15/04 . . Coagulating devices **[4]**
15/06 . . Washing devices **[4]**
15/08 . of reinforcements or fillers (chemical aspects C08J, C08K) **[4]**
15/10 . . Coating or impregnating (applying liquids in general B05) **[4]**
15/12 . . . of reinforcements of indefinite length **[4]**
15/14 . . . . of filaments or wires **[4]**

17/00 **Recovery of plastics or other constituents of waste material containing plastics** (chemical recovery C08J 11/00) **[4]**
17/02 . Separating plastics from other materials **[4]**
17/04 . Disintegrating plastics (B29B 9/02, B29B 11/02, B29B 13/10 take precedence) **[8]**

B29C **SHAPING OR JOINING OF PLASTICS**; **SHAPING OF SUBSTANCES IN A PLASTIC STATE, IN GENERAL**; **AFTER-TREATMENT OF THE SHAPED PRODUCTS, E.G. REPAIRING** (working in the manner of metal B23; grinding, polishing B24; cutting B26D, B26F; making preforms B29B 11/00; making laminated products by combining previously unconnected layers which become one product whose layers will remain together B32B 37/00 to B32B 41/00) **[4]**

(1) Attention is drawn to Note (3) following the title of class B29. **[4]**
(2) In this subclass:
– repairing of articles made from plastics or substances in a plastic state, e.g. of articles shaped or produced by using techniques covered by this subclass or subclass B29D, is classified in group B29C 73/00;
– component parts, details, accessories or auxiliary operations which are applicable to more than one moulding technique are classified in groups B29C 31/00 - B29C 37/00;
– component parts, details, accessories or auxiliary operations which are only applicable or only of use for one specific shaping technique are classified only in the relevant subgroups of groups B29C 39/00 - B29C 71/00. **[4,5]**
(3) In this subclass, it is desirable to add the indexing codes of subclasses B29K and B29L. **[4]**

Subclass index

Component parts, details or accessories; **Auxiliary operations [4]**

31/00 Handling, e.g. feeding of the material to be shaped (in general B65G) **[4]**
31/02 . Dispensing from vessels, e.g. hoppers **[4]**
31/04 . Feeding, e.g. into a mould cavity (to presses in general B30B 15/30) **[4]**
31/06 . . in measured doses (in general G01F) **[4]**
31/08 . . of preforms **[4]**
31/10 . . of several materials **[4]**

33/00 Moulds or cores; **Details thereof or accessories therefor [4]**
33/02 . with incorporated heating or cooling means **[4]**
33/04 . . using liquids, gas or steam **[4]**
33/06 . . using radiation **[4]**
33/08 . . for dielectric heating **[4]**
33/10 . with incorporated venting means **[4]**
33/12 . with incorporated means for positioning inserts, e.g. labels **[4]**
33/14 . . against the mould wall **[4]**
33/16 . . . using magnetic means **[4]**
33/18 . . . using vacuum **[4]**
33/20 . Opening, closing or clamping **[4]**
33/22 . . by rectilinear movement **[4]**
33/24 . . . using hydraulic or pneumatic means **[4]**
33/26 . . by pivotal movement **[4]**
33/28 . . . using hydraulic or pneumatic means **[4]**
33/30 . Mounting, exchanging or centering **[4]**
33/32 . . using magnetic means **[4]**
33/34 . movable, e.g. to or from the moulding station **[4]**
33/36 . . continuously movable **[4]**
33/38 . characterised by the material or the manufacturing process (B29C 33/44 takes precedence; manufacture of moulds or parts thereof from metal B22, B23) **[4]**
33/40 . . Plastics, e.g. foam, rubber **[4]**
33/42 . characterised by the shape of the moulding surface, e.g. ribs, grooves **[4]**
33/44 . with means for, or specially constructed to facilitate, the removal of articles, e.g. of undercut articles **[4]**
33/46 . . using fluid pressure **[4]**
33/48 . . with means for collapsing or disassembling **[4]**
33/50 . . . elastic **[4]**
33/52 . . soluble or fusible **[4]**
33/54 . . made of powdered or granular material **[4]**
33/56 . Coatings; Releasing, lubricating or separating agents **[4]**
33/58 . . Applying the releasing agents **[4]**
33/60 . . Releasing, lubricating or separating agents **[4]**
33/62 . . . based on polymers or oligomers **[4]**
33/64 . . . . Silicone **[4]**
33/66 . . . . Cellulose; Derivatives thereof **[4]**
33/68 . . Release sheets **[4]**
33/70 . Maintenance **[4]**
33/72 . . Cleaning **[4]**
33/74 . . Repairing **[4]**
33/76 . Cores (B29C 33/02 to B29C 33/70 take precedence) **[4]**

35/00 Heating, cooling or curing, e.g. crosslinking, vulcanising; **Apparatus therefor** (moulds with incorporated heating or cooling means B29C 33/02; curing devices for plastics dental prostheses A61C 13/14; before moulding B29B 13/00; chemical aspects C08J 3/00) **[4]**
35/02 . Heating or curing, e.g. crosslinking, vulcanising (cold vulcanisation B29C 35/18) **[4]**
35/04 . . using liquids, gas or steam **[4]**
35/06 . . . for articles of indefinite length **[4]**
35/08 . . by wave energy or particle radiation **[4]**
35/10 . . . for articles of indefinite length **[4]**
35/12 . . Dielectric heating **[4]**
35/14 . . . for articles of indefinite length **[4]**
35/16 . Cooling **[4]**
35/18 . Cold vulcanisation **[4]**

37/00 Component parts, details, accessories or auxiliary operations, not covered by group B29C 33/00 or B29C 35/00 [4]
37/02 . Deburring or deflashing (by grinding or polishing B24B) **[4]**
37/04 . . of welded articles, e.g. deburring or deflashing in combination with welding **[4]**

Particular shaping techniques, e.g. moulding, joining; **Apparatus therefor [4]**

39/00 Shaping by casting, i.e. introducing the moulding material into a mould or between confining surfaces without significant moulding pressure; **Apparatus therefor** (B29C 41/00 takes precedence) **[4]**
39/02 . for making articles of definite length, i.e. discrete articles **[4]**
39/04 . . using movable moulds (B29C 41/02 takes precedence) **[4]**
39/06 . . . continuously movable, e.g. along a production line **[4]**
39/08 . . . Introducing the material into the mould by centrifugal force **[4]**
39/10 . . incorporating preformed parts or layers, e.g. casting around inserts or for coating articles **[4]**
39/12 . . Making multilayered or multicoloured articles **[4]**
39/14 . for making articles of indefinite length **[4]**
39/16 . . between endless belts **[4]**
39/18 . . incorporating preformed parts or layers, e.g. casting around inserts or for coating articles **[4]**
39/20 . . Making multilayered or multicoloured articles **[4]**
39/22 . Component parts, details or accessories; Auxiliary operations **[4]**
39/24 . . Feeding the material into the mould **[4]**
39/26 . . Moulds or cores **[4]**
39/28 . . . with means to avoid flashes **[4]**
39/30 . . . with means for cutting the article **[4]**
39/32 . . . with joints or the like for making the mould impervious **[4]**
39/34 . . . for undercut articles **[4]**
39/36 . . Removing moulded articles **[4]**
39/38 . . Heating or cooling **[4]**
39/40 . . Compensating volume change, e.g. retraction **[4]**
39/42 . . Casting under special conditions, e.g. vacuum **[4]**
39/44 . . Measuring, controlling or regulating **[4]**

41/00 **Shaping by coating a mould, core or other substrate, i.e. by depositing material and stripping-off the shaped article**; **Apparatus therefor** (with compacting pressure B29C 43/00) **[4]**

41/02 . for making articles of definite length, i.e. discrete articles **[4]**
41/04 . . Rotational or centrifugal casting, i.e. coating the inside of a mould by rotating the mould **[4]**
41/06 . . . about two or more axes **[4]**
41/08 . . Coating a former, core or other substrate by spraying or fluidisation, e.g. spraying powder **[4]**
41/10 . . . by fluidisation **[4]**
41/12 . . Spreading-out the material on a substrate **[4]**
41/14 . . Dipping a core **[4]**
41/16 . . Slip casting, i.e. applying a slip or slurry on a perforated or porous or absorbent surface with the liquid being drained away **[4]**
41/18 . . Slush casting, i.e. pouring moulding material into a hollow mould with excess material being poured off **[4]**
41/20 . . incorporating preformed parts or layers, e.g. moulding around inserts or for coating articles **[4]**
41/22 . . Making multilayered or multicoloured articles **[4]**
41/24 . for making articles of indefinite length **[4]**
41/26 . . by depositing flowable material on a rotating drum **[4]**
41/28 . . by depositing flowable material on an endless belt **[4]**
41/30 . . incorporating preformed parts or layers, e.g. moulding around inserts or for coating articles **[4]**
41/32 . . Making multilayered or multicoloured articles **[4]**
41/34 . Component parts, details or accessories; Auxiliary operations **[4]**
41/36 . . Feeding the material on to the mould, core or other substrate **[4]**
41/38 . . Moulds, cores or other substrates **[4]**
41/40 . . . Cores **[4]**
41/42 . . Removing articles from moulds, cores or other substrates **[4]**
41/44 . . . Articles of indefinite length **[4]**
41/46 . . Heating or cooling **[4]**
41/48 . . Compensating volume change, e.g. retraction **[4]**
41/50 . . Shaping under special conditions, e.g. vacuum **[4]**
41/52 . . Measuring, controlling or regulating **[4]**

43/00 **Compression moulding, i.e. applying external pressure to flow the moulding material**; **Apparatus therefor** (shaping or impregnating by compression composites comprising reinforcements other than fibres of short length B29C 70/40; presses in general B30B) **[4,6]**

43/02 . of articles of definite length, i.e. discrete articles **[4]**
43/04 . . using movable moulds **[4]**
43/06 . . . continuously movable **[4]**
43/08 . . . . with circular movement **[4]**
43/10 . . Isostatic pressing, i.e. using non-rigid pressure-exerting members against rigid parts or dies **[4]**
43/12 . . . using bags surrounding the moulding material **[4]**
43/14 . . in several steps **[4]**
43/16 . . Forging **[4]**
43/18 . . incorporating preformed parts or layers, e.g. compression moulding around inserts or for coating articles **[4]**
43/20 . . Making multilayered or multicoloured articles **[4]**
43/22 . of articles of indefinite length **[4]**
43/24 . . Calendering **[4]**
43/26 . . in several steps (B29C 43/30 takes precedence) **[4]**
43/28 . . incorporating preformed parts or layers, e.g. compression moulding around inserts or for coating articles **[4]**
43/30 . . Making multilayered or multicoloured articles **[4]**
43/32 . Component parts, details or accessories; Auxiliary operations **[4]**
43/34 . . Feeding the material to the mould or the compression means **[4]**
43/36 . . Moulds for making articles of definite length, i.e. discrete articles **[4]**
43/38 . . . with means to avoid flashes **[4]**
43/40 . . . with means for cutting the article **[4]**
43/42 . . . for undercut articles **[4]**
43/44 . . Compression means for making articles of indefinite length **[4]**
43/46 . . . Rollers **[4]**
43/48 . . . Endless belts **[4]**
43/50 . . Removing moulded articles **[4]**
43/52 . . Heating or cooling **[4]**
43/54 . . Compensating volume change, e.g. retraction **[4]**
43/56 . . Compression moulding under special conditions, e.g. vacuum **[4]**
43/58 . . Measuring, controlling or regulating **[4]**

44/00 **Shaping by internal pressure generated in the material, e.g. swelling, foaming [6]**

44/02 . for articles of definite length, i.e. discrete articles **[6]**
44/04 . . consisting of at least two parts of chemically or physically different materials, e.g. having different densities **[6]**
44/06 . . . Making multilayered articles **[6]**
44/08 . . using several expanding steps **[6]**
44/10 . . Applying counter-pressure during expanding **[6]**
44/12 . . Incorporating or moulding on preformed parts, e.g. inserts, reinforcements **[6]**
44/14 . . . the preformed part being a lining **[6]**
44/16 . . . . shaped by the expansion of the material **[6]**
44/18 . . . Filling preformed cavities **[6]**
44/20 . for articles of indefinite length **[6]**
44/22 . . consisting of at least two parts of chemically or physically different materials, e.g. having different densities **[6]**
44/24 . . . Making multilayered articles **[6]**
44/26 . . using several expanding steps **[6]**
44/28 . . Expanding the moulding material on continuous moving surfaces **[6]**
44/30 . . Expanding the moulding material between endless belts or rollers **[6]**
44/32 . . Incorporating or moulding on preformed parts, e.g. linings, inserts, reinforcements **[6]**
44/34 . Component parts, details or accessories; Auxiliary operations **[6]**
44/36 . . Feeding the material to be shaped **[6]**
44/38 . . . into a closed space, i.e. to make articles of definite length **[6]**
44/40 . . . . by gravity, e.g. by casting **[6]**
44/42 . . . . using pressure difference, e.g. by injection, by vacuum **[6]**
44/44 . . . . in the form of expandable particles or beads **[6]**
44/46 . . . into an open space or onto moving surfaces, i.e. to make articles of indefinite length **[6]**

44/48 . . . . by gravity, e.g. casting onto, or between, moving surfaces **[6]**
44/50 . . . . using pressure difference, e.g. by extrusion, by spraying **[6]**
44/52 . . . . . between moving surfaces **[6]**
44/54 . . . . in the form of expandable particles or beads **[6]**
44/56 . . After-treatment of articles, e.g. for altering the shape **[6]**
44/58 . . Moulds **[6]**
44/60 . . Measuring, controlling or regulating **[6]**

45/00 Injection moulding, i.e. forcing the required volume of moulding material through a nozzle into a closed mould; **Apparatus therefor** (injection blow-moulding B29C 49/06) **[4]**

45/02 . Transfer moulding, i.e. transferring the required volume of moulding material by a plunger from a "shot" cavity into a mould cavity **[4]**
45/03 . Injection moulding apparatus (transfer moulding B29C 45/02) **[4]**
45/04 . . using movable moulds (B29C 45/08 takes precedence) **[4]**
45/06 . . . on a turntable **[4]**
45/07 . . using movable injection units **[4]**
45/08 . . . moving with the mould during the injection operation **[4]**
45/10 . . using moulds or injection units usable in different arrangements or combinations to each other **[4]**
45/12 . . using two or more fixed moulds, e.g. in tandem **[4]**
45/13 . . using two or more injection units co-operating with a single mould **[4]**
45/14 . incorporating preformed parts or layers, e.g. injection moulding around inserts or for coating articles **[4]**
45/16 . Making multilayered or multicoloured articles **[4]**
45/17 . Component parts, details or accessories; Auxiliary operations **[4]**
45/18 . . Feeding the material into the injection moulding apparatus **[4]**
45/20 . . Injection nozzles **[4]**
45/22 . . . Multiple nozzle systems **[4]**
45/23 . . . Feed stopping equipment **[4]**
45/24 . . . Cleaning equipment **[4]**
45/26 . . Moulds **[4]**
45/27 . . . Sprue channels **[4]**
45/28 . . . . Closure devices therefor **[4]**
45/30 . . . . Flow control means disposed within the sprue channel, e.g. "torpedo" construction **[4]**
45/32 . . . having several axially spaced mould cavities **[4]**
45/33 . . . having transversely, e.g. radially, movable mould parts **[4]**
45/34 . . . having venting means **[4]**
45/36 . . . having means for locating or centering cores **[4]**
45/37 . . . Mould cavity walls **[4]**
45/38 . . Cutting-off equipment for sprues or ingates **[4]**
45/40 . . Removing or ejecting moulded articles **[4]**
45/42 . . . using means movable from outside the mould between mould parts **[4]**
45/43 . . . using fluid under pressure **[4]**
45/44 . . . for undercut articles **[4]**
45/46 . . Means for plasticising or homogenising the moulding material or forcing it into the mould **[4]**
45/47 . . . using screws (B29C 45/54 takes precedence) **[4]**
45/48 . . . . Plasticising screw and injection screw **[4]**
45/50 . . . . Axially movable screw **[4]**
45/52 . . . . . Non-return devices **[4]**
45/53 . . . using injection ram or piston **[4]**
45/54 . . . . and plasticising screw **[4]**
45/56 . . . using mould parts movable during or after injection, e.g. injection-compression moulding **[4]**
45/57 . . . Exerting after-pressure on the moulding material **[4]**
45/58 . . . Details **[4]**
45/60 . . . . Screws **[4]**
45/62 . . . . Barrels or cylinders **[4]**
45/63 . . . . Venting or degassing means **[4]**
45/64 . . Mould opening, closing or clamping devices **[4]**
45/66 . . . mechanical **[4]**
45/67 . . . hydraulic **[4]**
45/68 . . . hydro-mechanical **[4]**
45/70 . . Means for plasticising or homogenising the moulding material or forcing it into the mould, combined with mould opening, closing or clamping devices **[4]**
45/72 . . Heating or cooling **[4]**
45/73 . . . of the mould **[4]**
45/74 . . . of the injection unit **[4]**
45/76 . . Measuring, controlling or regulating **[4]**
45/77 . . . of velocity or pressure of moulding material **[4]**
45/78 . . . of temperature **[4]**
45/80 . . . of relative position of mould parts **[4]**
45/82 . . . Hydraulic circuits **[4]**
45/83 . . Lubricating means **[4]**
45/84 . . Safety devices **[4]**

47/00 Extrusion moulding, i.e. expressing the moulding material through a die or nozzle which imparts the desired form; **Apparatus therefor** (extrusion blow-moulding B29C 49/04; extrusion presses in general B30B 11/22) **[4]**

47/02 . incorporating preformed parts or layers, e.g. extrusion moulding around inserts or for coating articles **[4]**
47/04 . of multilayered or multicoloured articles **[4]**
47/06 . . Multilayered articles **[4]**
47/08 . Component parts, details or accessories; Auxiliary operations **[4]**
47/10 . . Feeding the material to the extruder **[4]**
47/12 . . Extrusion nozzles or dies **[4]**
47/14 . . . with broad opening, e.g. for sheets **[4]**
47/16 . . . . adjustable **[4]**
47/18 . . . . with die parts oscillating relative to each other **[4]**
47/20 . . . with annular opening, e.g. for tubular articles **[4]**
47/22 . . . . adjustable **[4]**
47/24 . . . . with die parts rotatable relative to each other **[4]**
47/26 . . . . Multiple annular extrusion nozzles **[4]**
47/28 . . . . Cross-head annular extrusion nozzles **[4]**
47/30 . . . Multi-port extrusion nozzles **[4]**
47/32 . . . Roller-extrusion nozzles **[4]**
47/34 . . Conveyers for extruded material **[4]**
47/36 . . Means for plasticising or homogenising the moulding material or forcing it through the nozzle or die **[4]**
47/38 . . . using screws **[4]**

47/40 . . . . using at least two intermeshing screws **[4]**
47/42 . . . . . using sub-screws, e.g. planetary screws **[4]**
47/44 . . . . using axially movable screws **[4]**
47/46 . . . . using screws extruding in opposite directions **[4]**
47/48 . . . . using screws arranged coaxially, one within the other **[4]**
47/50 . . . . using at least two screws, one after the other, e.g. multi-stage plasticisers **[4]**
47/52 . . . using rollers or discs **[4]**
47/54 . . . using press rams or pistons **[4]**
47/56 . . . using more than one extruder to feed one die **[4]**
47/58 . . . Details **[4]**
47/60 . . . . Screws **[4]**
47/62 . . . . . having more than one screw-thread **[4]**
47/64 . . . . . having incorporated mixing devices **[4]**
47/66 . . . . Barrels or cylinders **[4]**
47/68 . . . . Filters **[4]**
47/70 . . . . Flow dividers **[4]**
47/72 . . . . Feedback means **[4]**
47/74 . . . . By-pass means **[4]**
47/76 . . . . Venting or degassing means **[4]**
47/78 . . Heating or cooling the material to be extruded or the stream of extruded material **[4]**
47/80 . . . at plasticising zone **[4]**
47/82 . . . . Heating the cylinders **[4]**
47/84 . . . . Heating the screws **[4]**
47/86 . . . at nozzle zone **[4]**
47/88 . . . Heating or cooling the stream of extruded material **[4]**
47/90 . . . . with calibration or sizing **[4]**
47/92 . . Measuring, controlling or regulating **[4]**
47/94 . . Lubricating **[4]**
47/96 . . Safety devices **[4]**

49/00 Blow-moulding, i.e. blowing a preform or parison to a desired shape within a mould; **Apparatus therefor [4]**

49/02 . Combined blow-moulding and manufacture of the preform or the parison **[4]**
49/04 . . Extrusion blow-moulding **[4]**
49/06 . . Injection blow-moulding **[4]**
49/08 . Biaxial stretching during blow-moulding **[4]**
49/10 . . using mechanical means **[4]**
49/12 . . . Stretching rods **[4]**
49/14 . . . Clamps **[4]**
49/16 . . using pressure difference, e.g. pre-blowing **[4]**
49/18 . using several blowing steps (B29C 49/16 takes precedence) **[4]**
49/20 . of articles having inserts or reinforcements **[4]**
49/22 . using multilayered preforms or parisons **[4]**
49/24 . Lining or labelling **[4]**
49/26 . . inner lining of tubes **[4]**
49/28 . Blow-moulding apparatus **[4]**
49/30 . . having movable moulds or mould parts **[4]**
49/32 . . . moving “to and fro” **[4]**
49/34 . . . . the mould parts moving “hand-over-hand” **[4]**
49/36 . . . rotatable about one axis **[4]**
49/38 . . . mounted on movable endless supports **[4]**
49/40 . . . . on co-operating drums **[4]**
49/42 . Component parts, details or accessories; Auxiliary operations **[4]**
49/44 . . for applying pressure through the walls of an inflated bag **[4]**
49/46 . . characterised by using particular environment or blow fluids other than air **[4]**
49/48 . . Moulds **[4]**
49/50 . . . having cutting or deflashing means **[4]**
49/52 . . . having decorating or printing means **[4]**
49/54 . . . for undercut articles **[4]**
49/56 . . Opening, closing or clamping means **[4]**
49/58 . . Blowing means **[4]**
49/60 . . . Blow-needles **[4]**
49/62 . . Venting means **[4]**
49/64 . . Heating or cooling preforms, parisons or blown articles **[4]**
49/66 . . . Cooling by refrigerant introduced into the blown article **[4]**
49/68 . . . Ovens specially adapted for heating preforms or parisons **[4]**
49/70 . . Removing or ejecting blown articles from the mould **[4]**
49/72 . . Deflashing outside the mould **[4]**
49/74 . . . Deflashing the neck portion **[4]**
49/76 . . Neck calibration **[4]**
49/78 . . Measuring, controlling or regulating **[4]**
49/80 . . . Testing, e.g. for leaks **[4]**

51/00 Shaping by thermoforming, e.g. shaping sheets in matched moulds or by deep-drawing; **Apparatus therefor [4]**

51/02 . Combined thermoforming and manufacture of the preform **[4]**
51/04 . Combined thermoforming and prestretching, e.g. biaxial stretching **[4]**
51/06 . . using pressure difference **[4]**
51/08 . Deep-drawing or matched-mould forming, i.e. using mechanical means only **[4]**
51/10 . Forming by pressure difference, e.g. vacuum **[4]**
51/12 . of articles having inserts or reinforcements **[4]**
51/14 . using multilayered preforms or sheets **[4]**
51/16 . Lining or labelling **[4]**
51/18 . Thermoforming apparatus **[4]**
51/20 . . having movable moulds or mould parts **[4]**
51/22 . . . rotatable about an axis **[4]**
51/24 . . . mounted on movable endless supports **[4]**
51/26 . Component parts, details or accessories; Auxiliary operations **[4]**
51/28 . . for applying pressure through the wall of an inflated bag or diaphragm **[4]**
51/30 . . Moulds **[4]**
51/32 . . . having cutting means **[4]**
51/34 . . . for undercut articles **[4]**
51/36 . . . specially adapted for vacuum forming **[4]**
51/38 . . . Opening, closing or clamping means **[4]**
51/40 . . . Venting means **[4]**
51/42 . . Heating or cooling **[4]**
51/44 . . Removing or ejecting moulded articles **[4]**
51/46 . . Measuring, controlling or regulating **[4]**

53/00 Shaping by bending, folding, twisting, straightening or flattening; **Apparatus therefor** (B29C 61/10 takes precedence) **[4]**

53/02 . Bending or folding (B29C 53/22, B29C 53/34, B29C 53/36, B29C 53/56 take precedence) **[4]**
53/04 . . of plates or sheets **[4]**
53/06 . . . Forming folding lines by pressing or scoring **[4]**

53/08 . . of tubes **[4]**
53/10 . . of blown tubular films, e.g. gusseting **[4]**
53/12 . . helically, e.g. for making springs **[4]**
53/14 . Twisting **[4]**
53/16 . Straightening or flattening **[4]**
53/18 . . of plates or sheets **[4]**
53/20 . . of tubes **[4]**
53/22 . Corrugating **[4]**
53/24 . . of plates or sheets **[4]**
53/26 . . . parallel with direction of feed **[4]**
53/28 . . . transverse to direction of feed **[4]**
53/30 . . of tubes (by blow-moulding B29C 49/00) **[4]**
53/32 . Coiling (B29C 53/56 takes precedence) **[4]**
53/34 . Rim rolling (of tube ends B29C 57/12) **[4]**
53/36 . Bending and joining, e.g. for making hollow articles (B29C 53/56 takes precedence; from paper B31C) **[4]**
53/38 . . by bending sheets or strips at right angles to the longitudinal axis of the article being formed and joining the edges **[4]**
53/40 . . . for articles of definite length, i.e. discrete articles **[4]**
53/42 . . . . using internal forming surfaces, e.g. mandrels **[4]**
53/44 . . . . . rotatable about the axis of the article **[4]**
53/46 . . . . using external forming surfaces, e.g. sleeves **[4]**
53/48 . . . for articles of indefinite length, i.e. bending a strip progressively **[4]**
53/50 . . . . using internal forming surfaces, e.g. mandrels **[4]**
53/52 . . . . using external forming surfaces, e.g. sleeves **[4]**
53/54 . . . . Guiding, aligning or shaping edges **[4]**
53/56 . Winding and joining, e.g. winding spirally **[4]**
53/58 . . helically **[4]**
53/60 . . . using internal forming surfaces, e.g. mandrels **[4]**
53/62 . . . . rotatable about the winding axis **[4]**
53/64 . . . . . and moving axially **[4]**
53/66 . . . . . with axially movable winding feed member **[4]**
53/68 . . . . with rotatable winding feed member **[4]**
53/70 . . . . . and moving axially **[4]**
53/72 . . . using external forming surfaces **[4]**
53/74 . . . using a forming surface in the shape of an endless belt which is recycled after the forming operation **[4]**
53/76 . . . about more than one axis **[4]**
53/78 . . . using profiled sheets or strips **[4]**
53/80 . Component parts, details or accessories; Auxiliary operations **[4]**
53/82 . . Cores or mandrels **[4]**
53/84 . . Heating or cooling **[4]**

55/00 **Shaping by stretching, e.g. drawing through a die**; **Apparatus therefor** (B29C 61/08 takes precedence) **[4]**
55/02 . of plates or sheets **[4]**
55/04 . . uniaxial, e.g. oblique **[4]**
55/06 . . . parallel with the direction of feed **[4]**
55/08 . . . transverse to the direction of feed **[4]**
55/10 . . multiaxial **[4]**
55/12 . . . biaxial **[4]**
55/14 . . . . successively **[4]**
55/16 . . . . simultaneously **[4]**
55/18 . . by squeezing between surfaces, e.g. rollers **[4]**
55/20 . . Edge clamps **[4]**
55/22 . of tubes **[4]**
55/24 . . radial **[4]**
55/26 . . biaxial **[4]**
55/28 . of blown tubular films, e.g. by inflation **[4]**
55/30 . Drawing through a die **[4]**

57/00 **Shaping of tube ends, e.g. flanging, belling, closing**; **Apparatus therefor [4]**
57/02 . Belling or enlarging, e.g. combined with forming a groove **[4]**
57/04 . . using mechanical means **[4]**
57/06 . . . elastically deformable **[4]**
57/08 . . using pressure difference **[4]**
57/10 . Closing **[4]**
57/12 . Rim rolling **[4]**

59/00 **Surface shaping, e.g. embossing**; **Apparatus therefor [4]**
59/02 . by mechanical means, e.g. pressing **[4]**
59/04 . . using rollers or endless belts **[4]**
59/06 . . using vacuum drums **[4]**
59/08 . by flame treatment **[4]**
59/10 . by electric discharge treatment (electrodes H01T) **[4]**
59/12 . . in an environment other than air **[4]**
59/14 . by plasma treatment (in general H05H) **[4]**
59/16 . by wave energy or particle radiation **[4]**
59/18 . by liberation of internal stresses, e.g. plastic memory **[4]**

61/00 **Shaping by liberation of internal stresses**; **Making preforms having internal stresses**; **Apparatus therefor** (for surface shaping B29C 59/18; for lining articles B29C 63/38; for joining preformed parts B29C 65/66) **[4]**
61/02 . Thermal shrinking **[4]**
61/04 . Thermal expansion **[4]**
61/06 . Making preforms having internal stresses, e.g. plastic memory **[4]**
61/08 . . by stretching tubes **[4]**
61/10 . . by bending plates or sheets **[4]**

63/00 **Lining or sheathing, i.e. applying preformed layers or sheathings of plastics**; **Apparatus therefor** (B29C 73/00 takes precedence; by blowing B29C 49/00; by thermoforming B29C 51/00) **[4,5]**
63/02 . using sheet or web-like material (B29C 63/26 takes precedence) **[4]**
63/04 . . by folding, winding, bending or the like **[4]**
63/06 . . . around tubular articles **[4]**
63/08 . . . by winding helically **[4]**
63/10 . . . . around tubular articles **[4]**
63/12 . . . by winding spirally **[4]**
63/14 . . . . around tubular articles **[4]**
63/16 . . applied by “rubber” bag or diaphragm **[4]**
63/18 . using tubular layers or sheathings (B29C 63/26 takes precedence) **[4]**
63/20 . . using pressure difference, e.g. vacuum **[4]**
63/22 . using layers or sheathings having a shape adapted to the shape of the article (B29C 63/26 takes precedence) **[4]**
63/24 . using threads **[4]**
63/26 . Lining or sheathing of internal surfaces (B29C 63/38 takes precedence) **[4]**
63/28 . . applied by “rubber” bag or diaphragm **[4]**
63/30 . . using sheet or web-like material **[4]**
63/32 . . . by winding helically **[4]**

63/34 . . using tubular layer or sheathings **[4]**
63/36 . . . being turned inside out **[4]**
63/38 . by liberation of internal stresses **[4]**
63/40 . . using sheet or web-like material **[4]**
63/42 . . using tubular layers or sheathings **[4]**
63/44 . . the shape of the layers or sheathings being adapted to the shape of the articles **[4]**
63/46 . . of internal surfaces **[4]**
63/48 . Preparation of the surfaces **[4]**

65/00 **Joining of preformed parts**; **Apparatus therefor** (for making boxes, cartons, envelopes or bags B31B; for sealing or securing package folds or closures B65B 51/00; joining constructional elements, in general F16B; splicing of light guides G02B 6/255) **[4,5]**
65/02 . by heating, with or without pressure **[4]**
65/04 . . Dielectric heating, e.g. high-frequency welding **[4]**
65/06 . . using friction, e.g. spin welding **[4]**
65/08 . . using ultrasonic vibrations **[4]**
65/10 . . using hot gases **[4]**
65/12 . . . and welding bar **[4]**
65/14 . . using wave energy or particle radiation **[4]**
65/16 . . . Laser beam **[4]**
65/18 . . using heated tool **[4]**
65/20 . . . with direct contact, e.g. using "mirror" **[4]**
65/22 . . . Heated wire **[4]**
65/24 . . . characterised by the means for heating the tool **[4]**

Note

Classification is made in this group only if the details or adaptations of the heating means are of interest. **[4]**

65/26 . . . . Hot fluid **[4]**
65/28 . . . . Flame or combustible material **[4]**
65/30 . . . . Electrical means **[4]**
65/32 . . . . . Induction **[4]**
65/34 . . using heated elements which remain in the joint, e.g. "verlorenes Schweisselement" **[4]**
65/36 . . . heated by induction **[4]**
65/38 . . Impulse heating **[4]**
65/40 . . Applying molten plastics, e.g. hot melt (using welding bar B29C 65/12; by moulding B29C 65/70) **[4]**
65/42 . . . between pre-assembled parts **[4]**
65/44 . . Joining a heated non-plastics element to a plastics element **[4]**
65/46 . . . heated by induction **[4]**
65/48 . using adhesives (heat-activated B29C 65/02; hot melts B29C 65/40; non-mechanical parts of adhesive processes, in general C09J 5/00) **[4]**
65/50 . . using adhesive tape **[4]**
65/52 . . Applying the adhesive **[4]**
65/54 . . . between pre-assembled parts **[4]**
65/56 . using mechanical means **[4]**
65/58 . . Snap connection **[4]**
65/60 . . Riveting **[4]**
65/62 . . Stitching **[4]**
65/64 . . Joining a non-plastics element to a plastics element, e.g. by force (B29C 65/44 takes precedence) **[4]**
65/66 . by liberation of internal stresses, e.g. shrinking of one of the parts to be joined **[4]**
65/68 . . using auxiliary shrinkable element **[4]**
65/70 . by moulding (using a particular moulding technique, see the relevant place for that technique) **[4]**
65/72 . by combined operations, e.g. welding and stitching **[4]**
65/74 . by welding and severing **[4]**
65/76 . Making non-permanent or releasable joints **[4]**
65/78 . Means for handling the parts to be joined, e.g. for making containers or hollow articles **[4]**
65/80 . . Rotatable transfer means **[4]**
65/82 . Testing the joint **[4]**

67/00 **Shaping techniques not covered by groups B29C 39/00 to B29C 65/00, B29C 70/00 or B29C 73/00 [4,6]**
67/02 . Moulding by agglomerating **[4]**
67/04 . . Sintering (combined with compression B29C 43/00) **[4]**
67/06 . . Coagulating **[4]**
67/08 . Screen moulding, e.g. forcing the moulding material through a perforated screen on to a moulding surface **[4]**
67/20 . for porous or cellular articles, e.g. of foam plastics, coarse-pored **[4]**
67/24 . characterised by the choice of material **[4]**

69/00 **Combinations of shaping techniques not provided for in a single one of main groups B29C 39/00 to B29C 67/00, e.g. associations of moulding and joining techniques**; **Apparatus therefor [4]**
69/02 . of moulding techniques only **[4]**

70/00 **Shaping composites, i.e. plastics material comprising reinforcements, fillers or preformed parts, e.g. inserts** (chemical aspects C08, e.g. C08J 5/00) **[6]**

Note

In this group, the following terms or expressions are used with the meanings indicated: **[6]**
– "reinforcement" means a structure in the form of fibres, wires, rods, bars, sections, plates or blocks, which improves the strength of an article; **[6]**
– "filler" means a relatively inert substance in the form of particles, powder, beads, flakes or spheres, which improves the physical properties or increases the bulk or weight of an article; **[6]**
– "preformed part" means a part made of any material, being completely shaped to have a determined form and which is not used as a reinforcement, e.g. wires or nets forced only into the surface of an article; **[6]**
– "insert" means a preformed part incorporated in an article during moulding. **[6]**

70/02 . comprising combinations of reinforcements and fillers incorporated in matrix material, forming one or more layers, with or without non-reinforced or non-filled layers **[6]**
70/04 . comprising reinforcements only, e.g. self-reinforcing plastics **[6]**
70/06 . . Fibrous reinforcements only **[6]**
70/08 . . . comprising combinations of different forms of fibrous reinforcements incorporated in matrix material, forming one or more layers, with or without non-reinforced layers **[6]**
70/10 . . . characterised by the structure of fibrous reinforcements **[6]**
70/12 . . . . using fibres of short length, e.g. in the form of a mat **[6]**

70/14 . . . . . oriented (oriented filler material B29C 70/62) **[6]**
70/16 . . . . using fibres of substantial or continuous length **[6]**
70/18 . . . . . in the form of a mat, e.g. sheet moulding compound (SMC) **[6]**
70/20 . . . . . oriented in a single direction, e.g. roving or other parallel fibres **[6]**
70/22 . . . . . oriented in at least two directions forming a two dimensional structure **[6]**
70/24 . . . . . oriented in at least three directions forming a three dimensional structure **[6]**
70/26 . . Non-fibrous reinforcements only **[6]**
70/28 . . Shaping operations therefor **[6]**

(1) This group covers: **[6]**
– the shaping of coherent fibrous reinforcements which are pre-impregnated or without binder, or of non-coherent reinforcements of fibres placed in a mould or on a support; **[6]**
– the impregnation or introduction of a plastics matrix in reinforcements during shaping. **[6]**

(2) This group does not cover: **[6]**
– the moulding by a single technique of plastics matrix material mixed with and containing reinforcing fibres of short length, which is covered by the appropriate place for that technique; **[6]**
– the pretreatment, e.g. impregnation, of reinforcements per se, i.e. independently of their shaping, which is covered by group B29B 15/08. **[6]**

70/30 . . . Shaping by lay-up, i.e. applying fibres, tape or broadsheet on a mould, former or core; Shaping by spray-up, i.e. spraying of fibres on a mould, former or core **[6]**
70/32 . . . . on a rotating mould, former or core **[6]**
70/34 . . . . and shaping or impregnating by compression **[6]**
70/36 . . . . and impregnating by casting, e.g. vacuum casting **[6]**
70/38 . . . . Automated lay-up, e.g. using robots, laying filaments according to predetermined patterns **[6]**
70/40 . . . Shaping or impregnating by compression (B29C 70/34 takes precedence) **[6]**
70/42 . . . . for producing articles of definite length, i.e. discrete articles **[6]**
70/44 . . . . . using isostatic pressure, e.g. pressure difference-, vacuum bag-, autoclave- or expanding rubber-moulding **[6]**
70/46 . . . . . using matched moulds, e.g. for deforming sheet moulding compounds (SMC), prepregs **[6]**
70/48 . . . . . and impregnating the reinforcements in the closed mould, e.g. resin transfer moulding (RTM) **[6]**
70/50 . . . . for producing articles of indefinite length, e.g. prepregs, sheet moulding compounds (SMC), cross moulding compounds (XMC) **[6]**
70/52 . . . . . Pultrusion, i.e. forming and compressing by continuously pulling through a die **[6]**
70/54 . . . Component parts, details or accessories; Auxiliary operations **[6]**
70/56 . . . . Tensioning reinforcements before or during shaping **[6]**
70/58 . comprising fillers only **[6]**

Note

Moulding of plastics matrix material mixed with fillers by a single technique is classified in the appropriate place for that technique. **[6]**

70/60 . . comprising a combination of distinct filler types incorporated in matrix material, forming one or more layers, and with or without non-filled layers **[6]**
70/62 . . the filler being oriented during moulding (for fibres of short length B29C 70/14) **[6]**
70/64 . . the filler influencing the surface characteristics of the material, e.g. by concentrating near the surface or by incorporation into the surface by force **[6]**
70/66 . . the filler comprising hollow constituents, e.g. syntactic foam **[6]**
70/68 . by incorporating or moulding on preformed parts, e.g. inserts, layers **[6]**

Note

This group does not cover: **[6]**
– incorporating, or moulding on, preformed parts by a single technique, which is covered by the appropriate place for that technique; **[6]**
– pretreatment of preformed parts per se, i.e. independently of their shaping, which is covered by group B29B 15/00. **[6]**

70/70 . . Completely encapsulating inserts **[6]**
70/72 . . Encapsulating inserts having non-encapsulated projections, e.g. extremities, terminal portions of electrical components **[6]**
70/74 . . Moulding material on a relatively small portion of the preformed part, e.g. outsert moulding **[6]**
70/76 . . . Moulding on edges or extremities of the preformed part **[6]**
70/78 . . Moulding material on one side only of the preformed part **[6]**
70/80 . . . Moulding sealing material into closure members **[6]**
70/82 . . Forcing wires, nets or the like partially or completely into the surface of an article, e.g. by cutting and pressing (pressing beads or the like into a surface B29C 70/64) **[6]**
70/84 . . Moulding material on preformed parts to be joined **[6]**
70/86 . . Incorporating in coherent impregnated reinforcing layers **[6]**
70/88 . characterised primarily by possessing specific properties, e.g. electrically conductive, locally reinforced **[6]**

71/00 **After-treatment of articles without altering their shape**; **Apparatus therefor** (B29C 44/56, B29C 73/00 take precedence; surface shaping B29C 59/00; chemical aspects C08J 7/00) **[4,5,6]**
71/02 . Thermal after-treatment **[4]**
71/04 . by wave energy or particle radiation **[4]**

73/00 **Repairing of articles made from plastics or substances in a plastic state, e.g. of articles shaped or produced by using techniques covered by this subclass or subclass B29D** (retreading tyres B29D 30/54; devices for covering leaks in pipes or hoses F16L 55/16) **[5]**

73/02 . using liquid or paste-like material (B29C 73/16 takes precedence) **[5]**

73/04 . using preformed elements **[5]**

73/06 . . using plugs sealing in the hole **[5]**

73/08 . . . Apparatus therefor, e.g. for inserting **[5]**

73/10 . . using patches sealing on the surface of the article (B29C 73/14 takes precedence) **[5]**

73/12 . . . Apparatus therefor, e.g. for applying (B29C 73/30 takes precedence) **[5]**

73/14 . . using elements composed of two parts joined together after having been placed one on each side of the article **[5]**

73/16 . Auto-repairing or self-sealing arrangements or agents (sealing compositions, see Section C, e.g. C09K 3/10) **[5]**

73/18 . . the article material itself being self-sealing, e.g. by compression **[5]**

73/20 . . . the article material only consisting in part of a deformable sealing material **[5]**

73/22 . . the article containing elements including a sealing composition, e.g. powder being liberated when the article is damaged **[5]**

73/24 . Apparatus or accessories not otherwise provided for **[5]**

73/26 . . for mechanical pretreatment **[5]**

73/28 . . for clamping and stretching flexible material, e.g. inner tubes **[5]**

73/30 . . for local pressing or local heating **[5]**

73/32 . . . using an elastic element, e.g. inflatable bag **[5]**

73/34 . . . for local heating **[5]**

B29D **PRODUCING PARTICULAR ARTICLES FROM PLASTICS OR FROM SUBSTANCES IN A PLASTIC STATE** (making granules B29B 9/00; making preforms B29B 11/00) **[4]**

(1) Attention is drawn to Note (3) following the title of class B29. **[4]**

(2) In this subclass, it is desirable to add the indexing codes of subclass B29K. **[4]**

1/00 **Producing articles provided with screw threads**

5/00 **Producing elements of slide fasteners**; **Combined making and attaching of elements of slide fasteners [4]**

5/02 . the fasteners having separate interlocking members **[4]**

5/04 . the interlocking members being formed by continuous meander of filamentary material **[4]**

5/06 . the interlocking members being formed by continuous helix **[4]**

5/08 . the interlocking members being formed by profiled or castellated edge of a stringer **[4]**

5/10 . the interlocking members being formed by continuous profiled strip **[4]**

7/00 **Producing flat articles, e.g. films or sheets** (B29D 24/00 takes precedence) **[4]**

7/01 . Films or sheets **[4]**

11/00 **Producing optical elements, e.g. lenses, prisms** (grinding or polishing of optical elements B24B; constructional form of optical elements G02B) **[4]**

11/02 . Artificial eyes from organic plastic material

12/00 **Producing frames**

12/02 . Spectacle frames (constructional form G02C)

15/00 **Producing gear wheels or similar articles with grooves or projections, e.g. control knobs**

16/00 **Producing articles with corrugations** (B29D 23/18 takes precedence) **[4]**

17/00 **Producing carriers of records containing fine grooves or impressions, e.g. disc records for needle playback, cylinder records** (recording sound or other information using formed grooves or the equivalent G11B); **Producing record discs from master stencils [4,6]**

19/00 **Producing buttons or semi-finished parts of buttons**

19/04 . by cutting, milling, turning, stamping, or perforating moulded parts; Surface treatment of buttons

19/06 . . Devices for feeding semi-finished parts to the processing machines

19/08 . . Making holes in buttons or in semi-finished parts thereof

21/00 **Producing hair combs or similar toothed or slotted articles**

21/04 . by sawing, milling, cutting, or similar operations

21/06 . Polishing

22/00 **Producing hollow articles** (tubular articles B29D 23/00; pneumatic tyres B29D 30/00) **[4]**

22/02 . Inflatable articles **[7]**

22/04 . Spherical articles, e.g. balls (B29D 22/02 takes precedence) **[7]**

23/00 **Producing tubular articles** (B29D 24/00 takes precedence) **[4]**

23/14 . Cigar or cigarette holders **[4]**

23/18 . Pleated hoses **[4]**

23/20 . Flexible squeeze tubes, e.g. for cosmetics **[4]**

23/24 . Endless tubes, e.g. inner tubes for pneumatic tyres **[6]**

24/00 **Producing articles with hollow walls [4]**

25/00 **Producing frameless domes**

28/00 **Producing nets or the like** (by knotting D04G) **[4]**

29/00 **Producing belts or bands [4]**

29/06 . Conveyer belts **[4]**

29/08 . Toothed driving belts **[4]**

29/10 . Driving belts having wedge-shaped cross-section **[4]**

30/00 **Producing pneumatic or solid tyres or parts thereof** (producing inner tubes B29D 23/24; constructional form of tyres or parts thereof B60C; connection of valves to inflatable elastic bodies B60C 29/00; testing of tyres G01M 17/02) **[4]**

30/02 . Solid tyres **[4]**

30/04 . Resilient fillings for rubber tyres; Filling tyres therewith **[4]**

30/06 . Pneumatic tyres or parts thereof **[4]**

30/08 . . Building tyres **[4]**

30/10 . . . on round cores, i.e. the shape of the core is approximately identical with the shape of the completed tyre **[4]**

30/12 . . . . Cores **[4]**

30/14 . . . . Rolling-down or pressing-down the layers in the building process **[4]**

30/16 . . . . Applying the layers; Guiding or stretching the layers during application **[4]**

30/18 . . . . Fitting the bead-rings or bead-cores; Folding the textile layers around the rings or cores **[4]**

30/20 . . . by the flat-tyre method, i.e. building on cylindrical drums **[4]**

30/22 . . . . Breaker plies being applied in the unexpanded state **[4]**

30/24 . . . . Drums **[4]**

30/26 . . . . . Accessories or details, e.g. membranes, transferrings **[4]**

30/28 . . . . Rolling-down or pressing-down the layers in the building process **[4]**

30/30 . . . . Applying the layers; Guiding or stretching the layers during application **[4]**

30/32 . . . . Fitting the bead-rings or bead-cores; Folding the textile layers around the rings or cores **[4]**

30/34 . . . by jointly covering two bead-rings, located parallel to each other at a distance apart, with fabric or cord layers **[4]**

30/36 . . Expansion of tyres in a flat form, e.g. of tyres built by the flat-tyre method or by jointly covering two bead-rings **[4]**

30/38 . . Textile inserts, e.g. cord or canvas layers, for tyres (making woven fabrics D03D); Treatment of inserts prior to building the tyre (pretreatment of inserts B29B 15/00; manufacture of layers comprising fibrous parallel reinforcements of substantial or continuous length B29C 70/20) **[4]**

30/40 . . . Chemical pretreatment of textile inserts before building the tyre **[4]**

30/42 . . . Endless textile bands without bead-rings **[4]**

30/44 . . . Stretching or treating the layers before application on the drum (during application B29D 30/30) **[4]**

30/46 . . . Cutting textile inserts to required shape **[4]**

30/48 . . Bead-rings or bead-cores (from wire B21F 37/00); Treatment thereof prior to building the tyre **[4]**

30/50 . . . Covering, e.g. by winding, the separate bead-rings or bead-cores with textile material, e.g. with flipper strips (folding textile layers around bead-rings or bead-cores B29D 30/18, B29D 30/32; jointly covering bead-rings or bead-cores B29D 30/34) **[4]**

30/52 . . Unvulcanised treads, e.g. on used tyres; Retreading (apparatus for forming and vulcanising treads B29C 35/02; apparatus characterised by the means for holding wheels or parts thereof B60B 30/00) **[4,5]**

30/54 . . . Retreading **[4]**

30/56 . . . . Retreading with prevulcanised tread **[4]**

30/58 . . . Applying bands of rubber treads, i.e. applying camel backs **[4]**

30/60 . . . . by winding narrow strips **[4]**

30/62 . . . . by extrusion or injection of the tread on carcass **[4]**

30/64 . . . Tyre spreaders **[4]**

30/66 . . . Moulding treads on to tyre casings, e.g. non-skid treads with spikes **[4]**

30/68 . . . Cutting profiles into the treads of tyres **[4]**

30/70 . . Annular breakers **[4]**

30/72 . . Side-walls **[4]**

33/00 **Producing bushes for bearings [2010.01]**

35/00 **Producing footwear [2010.01]**

(1) Classification is made in this group if the moulding technique is of interest. **[2010.01]**

(2) The assembling of individual parts by mechanical joining is classified in subclass A43D, e.g. by gluing shoe parts A43D 25/00. **[2010.01]**

35/02 . made in one piece using a moulding technique, e.g. by injection moulding or casting **[2010.01]**

35/04 . . having multilayered parts **[2010.01]**

35/06 . having soles or heels formed and joined on to preformed uppers using a moulding technique, e.g. by injection moulding, pressing and vulcanising **[2010.01]**

35/08 . . having multilayered parts **[2010.01]**

35/10 . having preformed soles or heels joined on to preformed uppers using a moulding technique, e.g. by feeding or injecting plastics material between the parts to be joined **[2010.01]**

35/12 . Producing parts thereof, e.g. soles, heels or uppers, by a moulding technique **[2010.01]**

35/14 . . Multilayered parts **[2010.01]**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

B29K INDEXING SCHEME ASSOCIATED WITH SUBCLASSES B29B, B29C OR B29D, RELATING TO MOULDING MATERIALS OR TO MATERIALS FOR REINFORCEMENTS, FILLERS OR PREFORMED PARTS, E.G. INSERTS [4]

(1) This subclass constitutes an indexing scheme associated with subclasses B29B, B29C or B29D. **[4]**

(2) In this subclass, the following term is used with the meaning indicated:
– "rubber" covers:
(a) natural or conjugated diene rubbers;
(b) rubber in general (for a specific rubber, other than a natural rubber or a conjugated diene rubber, see the group provided for such macromolecular compounds). **[4]**

Subclass index

Compositions for moulding materials; **Condition, form or state of moulded material [6]**

1/00 **Use of cellulose, modified cellulose or cellulose derivatives, e.g. viscose, as moulding material [4]**

7/00 **Use of natural rubber as moulding material [4]**

9/00 **Use of rubber derived from conjugated dienes, as moulding material [4]**
9/06 . SB polymers, i.e. butadiene-styrene polymers **[4]**

19/00 **Use of rubber not provided for in a single one of main groups B29K 7/00 to B29K 9/00, as moulding material [4]**

21/00 **Use of unspecified rubbers as moulding material [4]**

23/00 **Use of polyalkenes as moulding material [4]**

25/00 **Use of polymers of vinyl-aromatic compounds as moulding material [4]**

27/00 **Use of polyvinylhalogenides as moulding material [4]**
27/06 . PVC, i.e. polyvinylchloride **[4]**
27/12 . containing fluorine **[4]**
27/18 . . PTFE, i.e. polytetrafluorethene **[4]**

29/00 **Use of polyvinylalcohols, polyvinylethers, polyvinylaldehydes, polyvinylketones or polyvinylketals as moulding material [4]**

31/00 **Use of polyvinylesters as moulding material [4]**

33/00 **Use of polymers of unsaturated acids or derivatives thereof, as moulding material** (B29K 35/00 takes precedence) **[4]**
33/04 . Polymers of esters **[4]**
33/18 . Polymers of nitriles **[4]**
33/20 . . PAN, i.e. polyacrylonitrile **[4]**

35/00 **Use of polymers of unsaturated polycarboxylic acids as moulding material [4]**

45/00 **Use of polymers of unsaturated cyclic compounds having no unsaturated aliphatic groups in a side-chain, e.g. coumarone-indene resins, as moulding material [4]**

55/00 **Use of specific polymers obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of main groups B29K 23/00 to B29K 45/00, as moulding material [4]**
55/02 . ABS polymers, i.e. acrylonitrile-butadiene-styrene polymers **[4]**

59/00 **Use of polyacetals as moulding material [4]**

61/00 **Use of condensation polymers of aldehydes or ketones, as moulding material [4]**
61/04 . Phenoplasts **[4]**
61/20 . Aminoplasts **[4]**

63/00 **Use of epoxy resins as moulding material [4]**

67/00 **Use of polyesters as moulding material [4]**

69/00 **Use of polycarbonates as moulding material [4]**

71/00 **Use of polyethers as moulding material [4]**

73/00 **Use of other polymers having oxygen as the only hetero atom in the main chain, as moulding material [4]**

75/00 **Use of polyureas or polyurethanes as moulding material [4]**

77/00 **Use of polyamides, e.g. polyesteramides, as moulding material [4]**

79/00 **Use of other polymers having nitrogen, with or without oxygen or carbon only, in the main chain, as moulding material [4]**

81/00 **Use of polymers having sulfur, with or without nitrogen, oxygen or carbon only, in the main chain, as moulding material [4]**

83/00 **Use of polymers having silicon, with or without sulfur, nitrogen, oxygen or carbon only, in the main chain, as moulding material [4]**

85/00 **Use of polymers having elements other than silicon, nitrogen, oxygen or carbon only, in the main chain, as moulding material [4]**

86/00 **Use of specific polymers obtained by polycondensation or polyaddition, not provided for in a single one of main groups B29K 59/00 to B29K 85/00, as moulding material [4]**

91/00 **Use of waxes as moulding material [4]**

95/00 **Use of bituminous materials as moulding material [4]**

96/00 **Use of specified macromolecular materials not provided for in a single one of main groups B29K 1/00 to B29K 95/00, as moulding material [4]**
96/02 . Graft polymers (B29K 55/02 takes precedence) **[4]**
96/04 . Block polymers (B29K 55/02 takes precedence) **[4]**

101/00 **Use of unspecified macromolecular compounds as moulding material** (use of unspecified rubbers B29K 21/00) **[4]**
101/10 . Thermosetting resins **[4]**
101/12 . Thermoplastic materials **[6]**

103/00 Use of resin-bonded materials as moulding material [4]
103/04 . Inorganic materials **[4]**
103/06 . . Metal powders, metal carbides or the like **[4]**
103/08 . . Mineral aggregates, e.g. sand, clay or the like **[4]**

105/00 Condition, form or state of moulded material [4]
105/02 . heat-shrinkable **[4]**
105/04 . cellular or porous **[4]**
105/06 . containing reinforcements, fillers or inserts **[4]**
105/08 . . of continuous length, e.g. cords, rovings, mats, fabrics, strands, yarns **[4]**
105/10 . . . oriented **[4]**
105/12 . . of short lengths, e.g. chopped filaments, staple fibres, bristles **[4]**
105/14 . . . oriented **[4]**
105/16 . . Fillers **[4]**
105/18 . . . oriented **[4]**
105/20 . . Inserts **[4]**
105/22 . . . metallic **[4]**
105/24 . cross-linked or vulcanised **[4]**
105/26 . Scrap **[4]**
105/28 . opaque **[4]**
105/30 . reflecting **[4]**
105/32 . transparent **[4]**
105/34 . insulating **[4]**

Compositions for reinforcements [6]

201/00 Use of cellulose, modified cellulose or cellulose derivatives, e.g. viscose, as reinforcement [6]

207/00 Use of natural rubber as reinforcement [6]

209/00 Use of rubber derived from conjugated dienes, as reinforcement [6]
209/06 . SB polymers, i.e. butadiene-styrene polymers **[6]**

219/00 Use of rubber not provided for in a single one of main groups B29K 207/00 to B29K 209/00, as reinforcement [6]

221/00 Use of unspecified rubbers as reinforcement [6]

223/00 Use of polyalkenes as reinforcement [6]

225/00 Use of polymers of vinyl-aromatic compounds as reinforcement [6]

227/00 Use of polyvinylhalogenides as reinforcement [6]
227/06 . PVC, i.e. polyvinylchloride **[6]**
227/12 . containing fluorine **[6]**
227/18 . . PTFE, i.e. polytetrafluoroethene **[6]**

229/00 Use of polyvinylalcohols, polyvinylethers, polyvinylaldehydes, polyvinylketones or polyvinylketals as reinforcement [6]

231/00 Use of polyvinylesters as reinforcement [6]

233/00 Use of polymers of unsaturated acids or derivatives thereof, as reinforcement (B29K 235/00 takes precedence) **[6]**
233/04 . Polymers of esters **[6]**
233/18 . Polymers of nitriles **[6]**
233/20 . . PAN, i.e. polyacrylonitrile **[6]**

235/00 Use of polymers of unsaturated polycarboxylic acids as reinforcement [6]

245/00 Use of polymers of unsaturated cyclic compounds having no unsaturated aliphatic groups in a side-chain, e.g. coumarone-indene resins, as reinforcement [6]

255/00 Use of specific polymers obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of main groups B29K 223/00 to B29K 245/00, as reinforcement [6]
255/02 . ABS polymers, i.e. acrylonitrile-butadiene-styrene polymers **[6]**

259/00 Use of polyacetals as reinforcement [6]

261/00 Use of condensation polymers of aldehydes or ketones, as reinforcement [6]
261/04 . Phenoplasts **[6]**
261/20 . Aminoplasts **[6]**

263/00 Use of epoxy resins as reinforcement [6]

267/00 Use of polyesters as reinforcement [6]

269/00 Use of polycarbonates as reinforcement [6]

271/00 Use of polyethers as reinforcement [6]

273/00 Use of other polymers having oxygen as the only hetero atom in the main chain, as reinforcement [6]

275/00 Use of polyureas or polyurethanes as reinforcement [6]

277/00 Use of polyamides, e.g. polyesteramides, as reinforcement [6]

279/00 Use of other polymers having nitrogen, with or without oxygen or carbon only, in the main chain, as reinforcement [6]

281/00 Use of polymers having sulfur, with or without nitrogen, oxygen or carbon only, in the main chain, as reinforcement [6]

283/00 Use of polymers having silicon, with or without sulfur, nitrogen, oxygen or carbon only, in the main chain, as reinforcement [6]

285/00 Use of polymers having elements other than silicon, nitrogen, oxygen or carbon only, in the main chain, as reinforcement [6]

286/00 Use of specific polymers obtained by polycondensation or polyaddition, not provided for in a single one of main groups B29K 259/00 to B29K 285/00, as reinforcement [6]

295/00 Use of bituminous materials as reinforcement [6]

296/00 Use of specific macromolecular materials not provided for in a single one of main groups B29K 201/00 to B29K 295/00, as reinforcement [6]
296/02 . Graft polymers (B29K 255/02 takes precedence) **[6]**
296/04 . Block polymers (B29K 255/02 takes precedence) **[6]**

301/00 Use of unspecified macromolecular compounds as reinforcement (use of unspecified rubbers B29K 221/00) **[6]**
301/10 . Thermosetting resins **[6]**
301/12 . Thermoplastic materials **[6]**

303/00 Use of resin-bonded materials as reinforcement [6]
303/04 . Inorganic materials **[6]**

303/06 . . Metal powders, metal carbides or the like **[6]**
303/08 . . Mineral aggregates, e.g. sand, clay or the like **[6]**

305/00 Use of metals, their alloys or their compounds, as reinforcement [6]

Note

Alloys or compounds of specified metals are indexed with the same code as the specified metals. **[6]**

305/02 . Aluminium **[6]**
305/04 . Lead **[6]**
305/06 . Tin **[6]**
305/08 . Transition metals **[6]**
305/10 . . Copper **[6]**
305/12 . . Iron **[6]**

307/00 Use of elements other than metals as reinforcement [6]
307/02 . Boron **[6]**
307/04 . Carbon **[6]**

309/00 Use of inorganic materials not provided for in groups B29K 303/00 to B29K 307/00, as reinforcement [6]
309/02 . Ceramics **[6]**
309/04 . . Carbides; Nitrides **[6]**
309/06 . Concrete **[6]**
309/08 . Glass **[6]**
309/10 . Mica **[6]**
309/12 . Asbestos **[6]**

311/00 Use of natural products or their composites, not provided for in groups B29K 201/00 to B29K 309/00, as reinforcement [6]
311/02 . Cork **[6]**
311/04 . Linoleum **[6]**
311/06 . Bone, horn, ivory **[6]**
311/08 . Leather **[6]**
311/10 . Natural fibres, e.g. wool, cotton **[6]**
311/12 . Paper, e.g. cardboard **[6]**
311/14 . Wood, e.g. woodboard, fibreboard **[6]**

Compositions for fillers [6]

401/00 Use of cellulose, modified cellulose or cellulose derivatives, e.g. viscose, as filler [6]

407/00 Use of natural rubber as filler [6]

409/00 Use of rubber derived from conjugated dienes, as filler [6]
409/06 . SB polymers, i.e. butadiene-styrene polymers **[6]**

419/00 Use of rubber not provided for in a single one of main groups B29K 407/00 to B29K 409/00, as filler [6]

421/00 Use of unspecified rubbers as filler [6]

423/00 Use of polyalkenes as filler [6]

425/00 Use of polymers of vinyl-aromatic compounds as filler [6]

427/00 Use of polyvinylhalogenides as filler [6]
427/06 . PVC, i.e. polyvinylchloride **[6]**
427/12 . containing fluorine **[6]**
427/18 . . PTFE, i.e. polytetrafluoroethene **[6]**

429/00 Use of polyvinylalcohols, polyvinylethers, polyvinylaldehydes, polyvinylketones or polyvinylketals as filler [6]

431/00 Use of polyvinylesters as filler [6]

433/00 Use of polymers of unsaturated acids or derivatives thereof, as filler (B29K 435/00 takes precedence) **[6]**
433/04 . Polymers of esters **[6]**
433/18 . Polymers of nitriles **[6]**
433/20 . . PAN, i.e. polyacrylonitrile **[6]**

435/00 Use of polymers of unsaturated polycarboxylic acids as filler [6]

445/00 Use of polymers of unsaturated cyclic compounds having no unsaturated aliphatic groups in a side-chain, e.g. coumarone-indene resins, as filler [6]

455/00 Use of specific polymers obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of main groups B29K 423/00 to B29K 445/00, as filler [6]
455/02 . ABS polymers, i.e. acrylonitrile-butadiene-styrene polymers **[6]**

459/00 Use of polyacetals as filler [6]

461/00 Use of condensation polymers of aldehydes or ketones, as filler [6]
461/04 . Phenoplasts **[6]**
461/20 . Aminoplasts **[6]**

463/00 Use of epoxy resins as filler [6]

467/00 Use of polyesters as filler [6]

469/00 Use of polycarbonates as filler [6]

471/00 Use of polyethers as filler [6]

473/00 Use of other polymers having oxygen as the only hetero atom in the main chain, as filler [6]

475/00 Use of polyureas or polyurethanes as filler [6]

477/00 Use of polyamides, e.g. polyesteramides, as filler [6]

479/00 Use of other polymers having nitrogen, with or without oxygen or carbon only, in the main chain, as filler [6]

481/00 Use of polymers having sulfur, with or without nitrogen, oxygen or carbon only, in the main chain, as filler [6]

483/00 Use of polymers having silicon, with or without sulfur, nitrogen, oxygen or carbon only, in the main chain, as filler [6]

485/00 Use of polymers having elements other than silicon, nitrogen, oxygen or carbon only, in the main chain, as filler [6]

486/00 Use of specific polymers obtained by polycondensation or polyaddition, not provided for in a single one of main groups B29K 459/00 to B29K 485/00, as filler [6]

491/00 Use of waxes as filler [6]

495/00 Use of bituminous materials as filler [6]

496/00 Use of specific macromolecular materials not provided for in a single one of main groups B29K 401/00 to B29K 495/00, as filler [6]

496/02 . Graft polymers (B29K 455/02 takes precedence) **[6]**

496/04 . Block polymers (B29K 455/02 takes precedence) **[6]**

501/00 Use of unspecified macromolecular compounds as filler (use of unspecified rubbers B29K 421/00) **[6]**

501/10 . Thermosetting resins **[6]**

501/12 . Thermoplastic materials **[6]**

503/00 Use of resin-bonded materials as filler [6]

503/04 . Inorganic materials **[6]**

503/06 . . Metal powders, metal carbides or the like **[6]**

503/08 . . Mineral aggregates, e.g. sand, clay or the like **[6]**

505/00 Use of metals, their alloys or their compounds, as filler [6]

Note

Alloys or compounds of specified metals are indexed with the same code as the specified metals. **[6]**

505/02 . Aluminium **[6]**

505/04 . Lead **[6]**

505/06 . Tin **[6]**

505/08 . Transition metals **[6]**

505/10 . . Copper **[6]**

505/12 . . Iron **[6]**

505/14 . . Noble metals, e.g. silver, gold, platinum **[6]**

507/00 Use of elements other than metals as filler [6]

507/02 . Boron **[6]**

507/04 . Carbon **[6]**

509/00 Use of inorganic materials not provided for in groups B29K 503/00 to B29K 507/00, as filler [6]

509/02 . Ceramics **[6]**

509/04 . . Carbides; Nitrides **[6]**

509/06 . Concrete **[6]**

509/08 . Glass **[6]**

509/10 . Mica **[6]**

509/12 . Asbestos **[6]**

511/00 Use of natural products or their composites, not provided for in groups B29K 401/00 to B29K 509/00, as filler [6]

511/02 . Cork **[6]**

511/04 . Linoleum **[6]**

511/06 . Bone, horn, ivory **[6]**

511/08 . Leather **[6]**

511/10 . Natural fibres, e.g. wool, cotton **[6]**

511/12 . Paper, e.g. cardboard **[6]**

511/14 . Wood, e.g. woodboard, fibreboard **[6]**

Compositions for preformed parts, e.g. inserts [6]

601/00 Use of cellulose, modified cellulose or cellulose derivatives, e.g. viscose, for preformed parts, e.g. for inserts [6]

607/00 Use of natural rubber for preformed parts, e.g. for inserts [6]

609/00 Use of rubber derived from conjugated dienes, for preformed parts, e.g. for inserts [6]

609/06 . SB polymers, i.e. butadiene-styrene polymers **[6]**

619/00 Use of rubber not provided for in a single one of main groups B29K 607/00 to B29K 609/00, for preformed parts, e.g. for inserts [6]

621/00 Use of unspecified rubbers for preformed parts, e.g. for inserts [6]

623/00 Use of polyalkenes for preformed parts, e.g. for inserts [6]

625/00 Use of polymers of vinyl-aromatic compounds for preformed parts, e.g. for inserts [6]

627/00 Use of polyvinylhalogenides for preformed parts, e.g. for inserts [6]

627/06 . PVC, i.e. polyvinylchloride **[6]**

627/12 . containing fluorine **[6]**

627/18 . . PTFE, i.e. polytetrafluoroethene **[6]**

629/00 Use of polyvinylalcohols, polyvinylethers, polyvinylaldehydes, polyvinylketones or polyvinylketals for preformed parts, e.g. for inserts [6]

631/00 Use of polyvinylesters for preformed parts, e.g. for inserts [6]

633/00 Use of polymers of unsaturated acids or derivatives thereof, for preformed parts, e.g. for inserts (B29K 635/00 takes precedence) **[6]**

633/04 . Polymers of esters **[6]**

633/18 . Polymers of nitriles **[6]**

633/20 . . PAN, i.e. polyacrylonitrile **[6]**

635/00 Use of polymers of unsaturated polycarboxylic acids for preformed parts, e.g. for inserts [6]

645/00 Use of polymers of unsaturated cyclic compounds having no unsaturated aliphatic groups in a side-chain, e.g. coumarone-indene resins, for preformed parts, e.g. for inserts [6]

655/00 Use of specific polymers obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in a single one of main groups B29K 623/00 to B29K 645/00, for preformed parts, e.g. for inserts [6]

655/02 . ABS polymers, i.e. acrylonitrile-butadiene-styrene polymers **[6]**

659/00 Use of polyacetals for preformed parts, e.g. for inserts [6]

661/00 Use of condensation polymers of aldehydes or ketones, for preformed parts, e.g. for inserts [6]

661/04 . Phenoplasts **[6]**

661/20 . Aminoplasts **[6]**

663/00 Use of epoxy resins for preformed parts, e.g. for inserts [6]

667/00 Use of polyesters for preformed parts, e.g. for inserts [6]

669/00 Use of polycarbonates for preformed parts, e.g. for inserts [6]

671/00 Use of polyethers for preformed parts, e.g. for inserts [6]

673/00 Use of other polymers having oxygen as the only hetero atom in the main chain, for preformed parts, e.g. for inserts [6]

675/00 **Use of polyureas or polyurethanes for preformed parts, e.g. for inserts [6]**

677/00 **Use of polyamides, e.g. polyesteramides, for preformed parts, e.g. for inserts [6]**

679/00 **Use of other polymers having nitrogen, with or without oxygen or carbon only, in the main chain, for preformed parts, e.g. for inserts [6]**

681/00 **Use of polymers having sulfur, with or without nitrogen, oxygen or carbon only, in the main chain, for preformed parts, e.g. for inserts [6]**

683/00 **Use of polymers having silicon, with or without sulfur, nitrogen, oxygen or carbon only, in the main chain, for preformed parts, e.g. for inserts [6]**

685/00 **Use of polymers having elements other than silicon, nitrogen, oxygen or carbon only, in the main chain, for preformed parts, e.g. for inserts [6]**

686/00 **Use of specific polymers obtained by polycondensation or polyaddition, not provided for in a single one of main groups B29K 659/00 to B29K 685/00, for preformed parts, e.g. for inserts [6]**

691/00 **Use of waxes for preformed parts, e.g. for inserts [6]**

695/00 **Use of bituminous materials for preformed parts, e.g. for inserts [6]**

696/00 **Use of specific macromolecular materials not provided for in a single one of main groups B29K 601/00 to B29K 695/00, for preformed parts, e.g. for inserts [6]**

696/02 . Graft polymers (B29K 655/02 takes precedence) **[6]**

696/04 . Block polymers (B29K 655/02 takes precedence) **[6]**

701/00 **Use of unspecified macromolecular compounds for preformed parts, e.g. for inserts** (use of unspecified rubbers B29K 621/00) **[6]**

701/10 . Thermosetting resins **[6]**

701/12 . Thermoplastic materials **[6]**

703/00 **Use of resin-bonded materials for preformed parts, e.g. for inserts [6]**

703/04 . Inorganic materials **[6]**

703/06 . . Metal powders, metal carbides or the like **[6]**

703/08 . . Mineral aggregates, e.g. sand, clay or the like **[6]**

705/00 **Use of metals, their alloys or their compounds, for preformed parts, e.g. for inserts [6]**

Note

Alloys or compounds of specified metals are indexed with the same code as the specified metals. **[6]**

705/02 . Aluminium **[6]**

705/04 . Lead **[6]**

705/06 . Tin **[6]**

705/08 . Transition metals **[6]**

705/10 . . Copper **[6]**

705/12 . . Iron **[6]**

705/14 . . Noble metals, e.g. silver, gold, platinum **[6]**

707/00 **Use of elements other than metals for preformed parts, e.g. for inserts [6]**

707/02 . Boron **[6]**

707/04 . Carbon **[6]**

709/00 **Use of inorganic materials not provided for in groups B29K 703/00 to B29K 707/00, for preformed parts, e.g. for inserts [6]**

709/02 . Ceramics **[6]**

709/04 . . Carbides; Nitrides **[6]**

709/06 . Concrete **[6]**

709/08 . Glass **[6]**

709/10 . Mica **[6]**

709/12 . Asbestos **[6]**

711/00 **Use of natural products or their composites, not provided for in groups B29K 601/00 to B29K 709/00, for preformed parts, e.g. for inserts [6]**

711/02 . Cork **[6]**

711/04 . Linoleum **[6]**

711/06 . Bone, horn, ivory **[6]**

711/08 . Leather **[6]**

711/10 . Natural fibres, e.g. wool, cotton **[6]**

711/12 . Paper, e.g. cardboard **[6]**

711/14 . Wood, e.g. woodboard, fibreboard **[6]**

B29L INDEXING SCHEME ASSOCIATED WITH SUBCLASS B29C, RELATING TO PARTICULAR ARTICLES [4]

Note

This subclass constitutes an indexing scheme associated with subclass B29C. **[4]**

1/00 **Articles provided with screw threads [4]**

5/00 **Elements of slide fasteners [4]**

7/00 **Flat articles, e.g. films or sheets** (B29L 24/00 takes precedence) **[4]**

9/00 **Layered products [4]**

11/00 **Optical elements, e.g. lenses, prisms [4]**

12/00 **Frames [4]**

15/00 **Gear wheels or similar articles with grooves or projections, e.g. control knobs [4]**

16/00 **Articles with corrugations** (B29L 23/18 takes precedence) **[4]**

17/00 **Carriers of records containing fine grooves or impressions, e.g. disc records for needle playback, cylinder records [4]**

19/00 **Buttons or semi-finished parts of buttons [4]**

21/00 **Hair combs or similar toothed or slotted articles [4]**

22/00 **Hollow articles** (tubular articles B29L 23/00; pneumatic tyres B29L 30/00) **[4]**

22/02 . Inflatable articles (balls B29L 31/54) **[5]**

23/00 **Tubular articles** (B29L 24/00 takes precedence) **[4]**

23/14 . Cigar or cigarette holders **[4]**

23/18 . Pleated hoses **[4]**

23/20 . Flexible squeeze tubes, e.g. for cosmetics **[4]**

23/24 . Endless tubes, e.g. inner tubes for pneumatic tyres **[6]**

24/00 **Articles with hollow walls [4]**

25/00 **Frameless domes [4]**

28/00 **Nets or the like [4]**

29/00 **Belts or bands [4]**

30/00 **Pneumatic or solid tyres or parts thereof** (inner tubes B29L 23/24) **[4]**

31/00 **Other particular articles [4]**

31/04 . Bearings **[4]**

31/06 . Rods, e.g. connecting rods **[4]**

31/08 . Blades for rotors, stators, fans, turbines or the like, e.g. screw propellers **[4]**

31/10 . Building elements, e.g. bricks, blocks, tiles, panels, posts, beams **[4]**

31/12 . Chains **[4]**

31/14 . Filters, sieves or screens **[4]**

31/16 . Frictional elements, e.g. brake or clutch linings **[4]**

31/18 . Heat-exchangers or parts thereof **[4]**

31/20 . Fuel-blocks, e.g. nuclear fuel elements **[4]**

31/22 . Hinges **[4]**

31/24 . Pipe joints or couplings (B29L 31/26 takes precedence) **[4]**

31/26 . Sealing devices, e.g. packaging for pistons or pipe joints **[4]**

31/28 . Tools, e.g. cutlery **[4]**

31/30 . Vehicles, e.g. ships or aircraft, or body parts thereof **[4]**

31/32 . Wheels, pinions, pulleys, castors or rollers **[4]**

31/34 . Electrical apparatus, e.g. sparking plugs or parts thereof **[4]**

31/36 . . Plugs, connectors, or parts thereof **[4]**

31/38 . Loudspeaker cones; Acoustic diaphragms **[4]**

31/40 . Test specimens **[4]**

31/42 . Brushes **[4]**

31/44 . Furniture or parts thereof **[4]**

31/46 . Knobs or handles **[4]**

31/48 . Wearing apparel **[4]**

31/50 . . Footwear, e.g. shoes or parts thereof **[4]**

31/52 . Sports equipment; Toys (B29L 31/54 takes precedence) **[4]**

31/54 . Balls **[4]**

31/56 . Stoppers or lids for bottles, jars, or the like **[4]**

31/58 . Upholstery or cushions, e.g. vehicle upholstery or interior padding **[4]**

31/60 . Multitubular or multicompartmented articles, e.g. honeycomb **[4]**

B30 PRESSES

B30B **PRESSES IN GENERAL**; **PRESSES NOT OTHERWISE PROVIDED FOR** (producing ultra-high pressure or ultra-high pressure and high temperature to effect modifications of a substance, e.g. for making artificial diamonds B01J 3/00) **[2]**

Subclass index

1/00 **Presses, using a press ram, characterised by the features of the drive therefor, pressure being transmitted directly, or through simple thrust or tension members only, to the press ram or platen**

1/02 . by lever mechanism (by toggle mechanism B30B 1/10)
1/04 . . operated by hand or foot
1/06 . . operated by cams, eccentrics, or cranks
1/08 . . operated by fluid-pressure means
1/10 . by toggle mechanism
1/12 . . operated by hand or foot
1/14 . . operated by cams, eccentrics, or cranks
1/16 . . operated by fluid-pressure means
1/18 . by screw means
1/20 . . driven by hand
1/22 . . driven through friction disc means
1/23 . . operated by fluid-pressure means **[2]**
1/24 . by rack-and-pinion means
1/26 . by cams, eccentrics, or cranks
1/28 . . the cam, crank, or eccentric being disposed below the lower platen or table and operating to pull down the upper platen or slide
1/30 . by the pull of chains or ropes
1/32 . by plungers under fluid pressure
1/34 . . involving a plurality of plungers acting on the platen (gas operated B30B 1/38)
1/36 . . having telescoping plungers (gas operated B30B 1/38)
1/38 . . wherein the plungers are operated by pressure of a gas, e.g. steam, air
1/40 . by wedge means
1/42 . by magnetic means, e.g. electromagnetic **[2]**

3/00 **Presses characterised by the use of rotary pressing members, e.g. rollers, rings, discs**

3/02 . co-operating with a fixed member
3/04 . co-operating with one another, e.g. with co-operating cones
3/06 . . arranged one within another, e.g. with a roller disposed within a rotating ring and co-operating with the inner surface thereof

5/00 **Presses characterised by the use of pressing means other than those mentioned in groups B30B 1/00 and B30B 3/00**

5/02 . wherein the pressing means is in the form of a flexible element, e.g. diaphragm, urged by fluid pressure **[2]**
5/04 . wherein the pressing means is in the form of an endless band
5/06 . . co-operating with another endless band

7/00 **Presses characterised by a particular arrangement of the pressing members**

7/02 . having several platens arranged one above the other
7/04 . wherein pressing is effected in different directions simultaneously or in turn

9/00 **Presses specially adapted for particular purposes**

9/02 . for squeezing-out liquid from liquid-containing material, e.g. juice from fruits, oil from oil-containing material (kitchen equipment A47J; filtering, e.g. straining solids from liquids, using presses in combination with filtering elements B01D; expelling water from textile fabrics or laundry D06C, D06F; drying F26)
9/04 . . using press rams
9/06 . . . co-operating with permeable casings or strainers
9/08 . . . co-operating with a rotary casing
9/10 . . . without use of a casing
9/12 . . using pressing worms or screws co-operating with a permeable casing
9/14 . . . operating with only one screw or worm
9/16 . . . operating with two or more screws or worms
9/18 . . . with means for adjusting the outlet for the solid
9/20 . . using rotary pressing members, other than worms or screws, e.g. rollers, rings, discs
9/22 . . using a flexible element, e.g. diaphragm, urged by fluid pressure (connection of valves to inflatable elastic bodies B60C 29/00) **[3]**
9/24 . . using an endless pressing band
9/26 . . Permeable casings or strainers
9/28 . for forming shaped articles (from material in powder, granular, or paste form, e.g. briquetting presses, B30B 11/00)
9/30 . for baling; Compression boxes therefor (baling hay, straw, or the like A01F)
9/32 . for consolidating scrap metal or for compacting used cars

11/00 **Presses specially adapted for forming shaped articles from material in particulate or plastic state, e.g. briquetting presses, tabletting presses** (apparatus for forming or shaping of dough A21C 3/00, A21C 11/00; apparatus for shaping clay or mixtures containing cement B28B; apparatus for shaping of plastic or substances in a plastic state B29, e.g. for compression moulding B29C 43/00, for extrusion moulding B29C 47/00)

11/02 . using a ram exerting pressure on the material in a moulding space
11/04 . . co-operating with a fixed mould
11/06 . . . each charge of the material being compressed against the previously formed body

11/08 . . co-operating with moulds carried by a turn-table
11/10 . . . intermittently rotated
11/12 . . co-operating with moulds on the circumference of a rotating drum
11/14 . . co-operating with moulds on a movable carrier other than a turn-table or a rotating drum
11/16 . using pocketed rollers, e.g. two co-operating pocketed rollers
11/18 . using profiled rollers
11/20 . Roller-and-ring machines, i.e. with roller disposed within a ring and co-operating with the inner surface of the ring
11/22 . Extrusion presses; Dies therefor (extruding by the use of roller-and-ring machines B30B 11/20)
11/24 . . using screws or worms
11/26 . . using press rams
11/28 . . using perforated rollers or discs
11/30 . . using directly-acting fluid pressure
11/34 . for coating articles, e.g. tablets

12/00 Presses not provided for in groups B30B 1/00 to B30B 11/00 [2]

13/00 Methods of pressing not special to the use of presses of any one of the preceding main groups B30B 1/00 to B30B 12/00 [2]

15/00 Details of, or accessories for, presses; **Auxiliary measures in connection with pressing** (safety devices F16P)
15/02 . Dies; Inserts therefor; Mountings thereof; Moulds (extrusion dies B30B 11/22)
15/04 . Frames; Guides
15/06 . Platens or press rams
15/08 . Accessory tools, e.g. knives; Mountings therefor
15/10 . Brakes specially adapted for presses
15/12 . Clutches specially adapted for presses
15/14 . Control arrangements for mechanically-driven presses
15/16 . Control arrangements for fluid-driven presses (pumps per se F04; hydraulic accumulators per se F15B; valves per se F16K)
15/18 . . controlling the reciprocating motion of the ram
15/20 . . . controlling the speed of the ram, e.g. the speed of the approach, pressing or return strokes
15/22 . . controlling the degree of pressure applied by the ram during the pressing stroke
15/24 . . controlling the movement of a plurality of actuating members to maintain parallel movement of the platen or press beam
15/26 . Programme control arrangements
15/28 . Arrangements for preventing distortion of, or damage to, presses or parts thereof
15/30 . Feeding material to presses
15/32 . Discharging presses
15/34 . Heating or cooling presses or parts thereof

B31 MAKING PAPER ARTICLES; WORKING PAPER

(1) This class covers subject matter restricted to adaptations or associations of handling sheets, webs, or blanks peculiar to paper-working, e.g. bag or box making, machinery.

(2) This class does not cover:
- making articles directly from paper pulp, which is covered by D21J;
- handling sheets, webs, or blanks of wider applicability, irrespective of whether described or claimed only for paper-working machinery, which is regarded as being of a more comprehensive nature and is covered by B65H.

(3) In this class, the following term is used with the meaning indicated:
- "paper" covers material worked in a manner analogous to paper, e.g. plastics sheet materials, laminated materials or metal foils.

B31B MAKING BOXES, CARTONS, ENVELOPES, OR BAGS (incising, scoring, in general B26D 3/08; combined making and filling B65B)

(1) In this subclass, envelopes or bags are regarded as being essentially flexible containers, the final shape of which is determined by their contents.

(2) In this subclass, the following expression is used with the meaning indicated:
- "boxes or cartons" includes bags formed similarly to cartons, trays with upstanding side-walls, barrels, tubes and cups, other than articles formed by winding.

Subclass index

1/00 Box, carton, envelope or bag making machinery characterised by performing specific operations (machinery for performing operations of general application, see the appropriate subclasses)

1/02 . Feeding or positioning sheets, blanks, or webs
1/04 . . Feeding sheets or blanks
1/06 . . . from stacks
1/08 . . . during envelope- or bag-making operations
1/10 . . Feeding or positioning webs
1/12 . . by air pressure or suction
1/14 . Cutting, e.g. perforating, punching, slitting, trimming
1/16 . . Cutting webs to form sheets or blanks
1/18 . . Slitting webs longitudinally
1/20 . . Cutting sheets or blanks
1/22 . . . Notching; Trimming edges of flaps
1/24 . . . Making window openings
1/25 . Surface scoring (cutting through material B31B 1/14) **[2]**
1/26 . Folding sheets, blanks, or webs
1/28 . . around mandrels, including bottom-forming operations
1/30 . . . the mandrels moving
1/32 . . . . in circular paths
1/34 . . . . about their own axes
1/36 . . by continuously feeding same to stationary members, e.g. plates, ploughs, cores
1/38 . . . the members being forming-tubes
1/40 . . . . acting internally
1/42 . . . . acting externally
1/44 . . by plungers moving through folding dies
1/46 . . . and interconnecting side walls during such movement
1/48 . . . . by folding or tucking in locking flaps
1/50 . . . . . by interengaging tongues and slots
1/52 . . by reciprocating or oscillating members, e.g. fingers other than plungers and dies
1/54 . . . operating on moving material
1/56 . . by rotary members co-operating with blades
1/58 . . by moving endless belts
1/60 . Uniting opposed surfaces or edges; Taping
1/62 . . by adhesives
1/64 . . by applying heat or pressure
1/66 . . . high-frequency electric heating
1/68 . . by stitching, stapling, or riveting

1/70 . . . by corner stapling
1/72 . . by applying and securing strips or sheets
1/74 . Auxiliary operations
1/76 . . Opening and distending flattened articles
1/78 . . . mechanically
1/80 . . . pneumatically
1/82 . . Attaching windows
1/84 . . Forming valves or applying valve inserts (connection of valves to inflatable elastic bodies B60C 29/00)
1/86 . . Forming integral handles or mounting separate handles (making separate handles by multi-step processes B31D 1/06)
1/88 . . Printing or embossing
1/90 . . Attaching accessories not otherwise provided for, e.g. opening or closure devices, tear strings
1/92 . . Delivering
1/94 . . . singly or in succession
1/96 . . . . in overlapping arrangement
1/98 . . . in stacks or bundles

Machinery for making boxes or cartons

3/00 Machinery characterised by making boxes or cartons by folding single-piece sheets, blanks, or webs (B31B 5/00 takes precedence)
3/02 . and having means for feeding or positioning sheets, blanks, or webs
3/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
3/26 . and having means for folding sheets, blanks, or webs
3/28 . . around mandrels, including bottom-forming operations
3/30 . . . the mandrels moving
3/32 . . . . in circular paths
3/34 . . . . about their own axes
3/36 . . by continuously feeding same to stationary members, e.g. plates, ploughs, cores
3/44 . . by plungers moving through folding dies
3/46 . . . and interconnecting side walls during such movement
3/48 . . . . by folding or tucking in locking flaps
3/50 . . . . . by interengaging tongues and slots
3/52 . . by reciprocating or oscillating members, e.g. fingers other than plungers and dies
3/60 . and having means for uniting opposed surfaces or edges, or for taping
3/64 . . by applying heat or pressure
3/72 . . by applying and securing strips or sheets
3/74 . and having means for effecting auxiliary operations

5/00 Machinery characterised by making boxes or cartons by folding single-piece sheets which can be set-up from a collapsed condition, including setting-up and recollapsing to break creases
5/02 . and having means for feeding or positioning sheets
5/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
5/26 . and having means for folding sheets, blanks, or webs
5/36 . . by continuously feeding same to stationary members, e.g. plates, ploughs, cores
5/60 . and having means for uniting opposed surfaces or edges, or for taping
5/74 . and having means for effecting auxiliary operations
5/76 . . Opening and distending flattened articles
5/78 . . . mechanically
5/80 . . . pneumatically

7/00 Machinery characterised by making lined or internally-reinforced boxes or cartons (B31B 11/00 takes precedence)
7/02 . and having means for feeding or positioning sheets, blanks, or webs
7/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
7/26 . and having means for folding sheets, blanks, or webs
7/28 . . around mandrels, including bottom-forming operations
7/30 . . . the mandrels moving
7/32 . . . . in circular paths
7/44 . . by plungers moving through folding dies
7/46 . . . and interconnecting side walls during such movement
7/60 . and having means for uniting opposed surfaces or edges, or for taping
7/74 . and having means for effecting auxiliary operations

9/00 Machinery characterised by making boxes or cartons having shouldered walls
9/02 . and having means for feeding or positioning sheets, blanks, or webs
9/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
9/26 . and having means for folding sheets, blanks, or webs
9/60 . and having means for uniting opposed surfaces or edges, or for taping
9/74 . and having means for effecting auxiliary operations

11/00 Machinery characterised by making boxes or cartons having partitions or like inserts not integral with walls (making partitions, inserts, or reinforcements for boxes or cartons B31D)
11/02 . and having means for feeding or positioning sheets, blanks, or webs
11/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
11/26 . and having means for folding sheets, blanks, or webs
11/60 . and having means for uniting opposed surfaces or edges, or for taping
11/74 . and having means for effecting auxiliary operations

13/00 Machinery characterised by assembling drawer-and-shell boxes or cartons
13/02 . and having means for feeding or positioning sheets, blanks, or webs
13/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
13/26 . and having means for folding sheets, blanks, or webs
13/28 . . around mandrels, including bottom-forming operations
13/30 . . . the mandrels moving
13/32 . . . . in circular paths
13/34 . . . . about their own axes
13/60 . and having means for uniting opposed surfaces or edges, or for taping
13/74 . and having means for effecting auxiliary operations

15/00 Machinery characterised by making covered or externally-reinforced boxes or cartons
15/02 . and having means for feeding or positioning sheets, blanks, or webs
15/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming

15/26 . and having means for folding sheets, blanks, or webs
15/60 . and having means for uniting opposed surfaces or edges, or for taping
15/74 . and having means for effecting auxiliary operations

17/00 Machinery characterised by making other boxes or cartons by assembling several separate sheets, blanks, or webs
17/02 . and having means for feeding or positioning sheets, blanks, or webs
17/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
17/26 . and having means for folding sheets, blanks, or webs
17/28 . . around mandrels, including bottom-forming operations
17/30 . . . the mandrels moving
17/32 . . . . in circular paths
17/44 . . by plungers moving through folding dies
17/46 . . . and interconnecting side walls during such movement
17/52 . . by reciprocating or oscillating members, e.g. fingers other than plungers and dies
17/60 . and having means for uniting opposed surfaces or edges, or for taping
17/74 . and having means for effecting auxiliary operations

Machinery for making envelopes or bags

Note

Machinery for making boxes or cartons as well as envelopes or bags is classified in groups B31B 3/00 to B31B 17/00.

19/00 Machinery characterised by making rectangular envelopes or bags of flat form, i.e. without structural provision at the base for thickness of contents (B31B 21/00, B31B 23/00 take precedence)
19/02 . and having means for feeding or positioning sheets, blanks, or webs
19/10 . . Feeding or positioning webs
19/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
19/16 . . Cutting webs to form sheets or blanks
19/18 . . Slitting webs longitudinally
19/20 . . Cutting sheets or blanks
19/26 . and having means for folding sheets, blanks, or webs
19/36 . . by continuously feeding same to stationary members, e.g. plates, ploughs, cores
19/52 . . by reciprocating or oscillating members, e.g. fingers other than plungers and dies
19/60 . and having means for uniting opposed surfaces or edges, or for taping
19/62 . . by adhesives
19/64 . . by applying heat or pressure
19/66 . . . high-frequency electric heating
19/68 . . by stitching, stapling, or riveting
19/74 . and having means for effecting auxiliary operations
19/82 . . Attaching windows
19/84 . . Forming valves or applying valve inserts (connection of valves to inflatable elastic bodies B60C 29/00)
19/86 . . Forming integral handles or mounting separate handles (making separate handles by multi-step processes B31D 1/06)
19/88 . . Printing or embossing
19/90 . . Attaching accessories not otherwise provided for, e.g. opening or closure devices, tear strings
19/92 . . Delivering
19/94 . . . singly or in succession
19/96 . . . . in overlapping arrangement
19/98 . . . in stacks or bundles

21/00 Machinery characterised by making rectangular envelopes or bags of flat form, i.e. without structural provision at the base for thickness of contents, from sheets or blanks, e.g. from flattened tubes
21/02 . and having means for feeding or positioning sheets or blanks
21/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
21/26 . and having means for folding sheets or blanks
21/60 . and having means for uniting opposed surfaces or edges, or for taping
21/74 . and having means for effecting auxiliary operations

23/00 Machinery characterised by making rectangular envelopes or bags of flat form, i.e. without structural provision at the base for thickness of contents, from webs, e.g. from flattened tubular webs (machinery characterised by cutting sheets or blanks from webs and working them to form such envelopes or bags B31B 21/00)
23/02 . and having means for feeding or positioning webs
23/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
23/26 . and having means for folding webs
23/60 . and having means for uniting opposed surfaces or edges, or for taping
23/74 . and having means for effecting auxiliary operations

25/00 Machinery characterised by making pointed or tapered envelopes or bags
25/02 . and having means for feeding or positioning sheets, blanks, or webs
25/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
25/26 . and having means for folding sheets, blanks, or webs
25/60 . and having means for uniting opposed surfaces or edges, or for taping
25/74 . and having means for effecting auxiliary operations

27/00 Machinery characterised by making interconnected envelopes or bags
27/02 . and having means for feeding or positioning sheets, blanks, or webs
27/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
27/26 . and having means for folding sheets, blanks, or webs
27/60 . and having means for uniting opposed surfaces or edges, or for taping
27/74 . and having means for effecting auxiliary operations

29/00 Machinery characterised by making envelopes or bags with structural provision at the base for thickness or contents (B31B 31/00 to B31B 37/00 take precedence)
29/02 . and having means for feeding or positioning sheets, blanks, or webs
29/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
29/26 . and having means for folding sheets, blanks, or webs
29/60 . and having means for uniting opposed surfaces or edges, or for taping

29/74 . and having means for effecting auxiliary operations
29/84 . . Forming valves or applying valve inserts (connection of valves to inflatable elastic bodies B60C 29/00)

31/00 Machinery characterised by making envelopes or bags with structural provision at the base for thickness of contents, from sheets or blanks, e.g. from flattened tubes (B31B 33/00, B31B 35/00 take precedence)
31/02 . and having means for feeding or positioning sheets or blanks
31/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
31/26 . and having means for folding sheets or blanks
31/60 . and having means for uniting opposed surfaces or edges, or for taping
31/74 . and having means for effecting auxiliary operations

33/00 Machinery characterised by making envelopes or bags with structural provision at the base for thickness of contents, from sheets or blanks, e.g. from flattened tubes, the longitudinal axes of the envelopes or bags being parallel to the direction in which the sheets or blanks are fed
33/02 . and having means for feeding or positioning sheets or blanks
33/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
33/26 . and having means for folding sheets or blanks
33/60 . and having means for uniting opposed surfaces or edges, or for taping
33/74 . and having means for effecting auxiliary operations

35/00 Machinery characterised by making envelopes or bags with structural provision at the base for thickness of contents, from sheets or blanks, e.g. from flattened tubes, the longitudinal axes of the envelopes or bags being perpendicular to the direction in which the sheets or blanks are fed
35/02 . and having means for feeding or positioning sheets or blanks
35/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
35/26 . and having means for folding sheets or blanks
35/60 . and having means for uniting opposed surfaces or edges, or for taping
35/74 . and having means for effecting auxiliary operations

37/00 Machinery characterised by making envelopes or bags with structural provision at the base for thickness of contents, from webs, e.g. from tubular webs (machinery characterised by cutting sheets or blanks from webs and working them to form such envelopes or bags B31B 31/00)
37/02 . and having means for feeding or positioning webs
37/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
37/26 . and having means for folding webs
37/60 . and having means for uniting opposed surfaces or edges, or for taping
37/74 . and having means for effecting auxiliary operations

39/00 Machinery characterised by making lined envelopes or bags
39/02 . and having means for feed or positioning sheets, blanks, or webs
39/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
39/26 . and having means for folding sheets, blanks or webs
39/60 . and having means for uniting opposed surfaces or edges, or for taping
39/74 . and having means for effecting auxiliary operations
39/84 . . Forming valves or applying valve inserts (connection of valves to inflatable elastic bodies B60C 29/00)

41/00 Machinery characterised by making envelopes or bags of other specific form or construction
41/02 . and having means for feeding or positioning sheets, blanks, or webs
41/14 . and having means for cutting, e.g. perforating, punching, slitting, trimming
41/26 . and having means for folding sheets, blanks or webs
41/60 . and having means for uniting opposed surfaces or edges, or for taping
41/74 . and having means for effecting auxiliary operations

43/00 Machinery characterised by making containers by shaping, otherwise than by folding, sheet material under pressure

45/00 Machinery characterised by making containers having corrugated or pleated walls

47/00 Hand tools for making envelopes, bags, boxes or cartons
47/02 . for making envelopes or bags without preshaped bottoms
47/04 . for making envelopes or bags with preshaped bottoms

49/00 Machinery, accessories or processes not provided for in groups B31B 1/00 to B31B 47/00 (forms or constructions of boxes, cartons, envelopes or bags B65D) **[2]**

Note

Processes dependent on the use of specific machinery provided for in groups B31B 1/00 to B31B 45/00 are classified in those groups. **[2]**

49/02 . for making boxes or cartons
49/04 . for making envelopes or bags

B31C **MAKING WOUND ARTICLES, E.G. WOUND TUBES** (characteristics relating to the working of plastics B29; shaping of plastics or substances in a plastic state B29C)

Note

In this subclass, the following term is used with the meaning indicated:
– "winding" means forming two or more complete convolutions.

Subclass index

1/00 **Forming paper tubes or pipes by feeding at right angles to the winding mandrel centre line**
1/02 . Machines therefor having additional mandrels
1/04 . and forming a tube end into a container bottom
1/06 . and inserting into a tube end a bottom to form a container
1/08 . Accessories of machines therefor not otherwise provided for

3/00 **Forming paper tubes or pipes by feeding obliquely to the winding mandrel centre line**
3/02 . and inserting into a tube end a bottom to form a container
3/04 . Seam processing

5/00 **Forming paper tubes or pipes without mandrels**

7/00 **Forming conical paper articles by winding** (winding blanks B31B)
7/02 . Forming truncated cones
7/04 . . on two or more mandrels
7/06 . . . and inserting into a cone end a bottom to form a container
7/08 . Forming pointed cones
7/10 . . on two or more mandrels

9/00 **Simultaneous forming of cylindrical and conical shapes by winding separate webs, e.g. forming bottles** (winding blanks B31B)

11/00 **Paper-winding machinery combined with other machinery**
11/02 . for additionally shaping the articles
11/04 . for applying impregnating by coating-substances during the winding
11/06 . for drying the wound and impregnated articles

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B31D **MAKING OTHER PAPER ARTICLES** (manufacture by dry processes of articles made from particles or fibres consisting of wood or other lignocellulosic or like organic material B27N; making layered products not composed wholly of paper or cardboard B32B; making cardboard or paper D21F, D21H, making articles from wood pulp D21J)

Note

This subclass covers the making, otherwise than by winding, of articles other than boxes, cartons, envelopes, bags, and tubes from paper, other than from paper pulp.

1/00 **Multiple-step processes for making flat articles**
1/02 . the articles being labels or tags (means or processes for attaching threads D05)
1/04 . the articles being napkins, handkerchiefs, towels, doilies, or the like
1/06 . the articles being handles

3/00 **Making articles of cellular structure, e.g. insulating board**
3/02 . honeycombed structures
3/04 . cellular packaging articles, e.g. for bottles

5/00 **Multiple-step processes for making three-dimensional articles** (assembly of garlands A41G 1/00; making receptacles or containers B31B; making tubes B31B, B31C)
5/02 . including pressing
5/04 . including folding or pleating, e.g. Chinese lanterns

99/00 **Subject matter not provided for in other groups of this subclass [8]**

B31F **MECHANICAL WORKING OR DEFORMATION OF PAPER OR CARDBOARD** (cutting, trimming, in general B26; incising, scoring, in general B26D 3/08; making layered products not composed wholly of paper or cardboard B32B; multi-ply material of paper or cardboard, its manufacture D21H)

1/00 **Mechanical deformation of paper or cardboard without removing material including combined deformation and laminating** (embossing combined with application of ink, type marking presses, selective embossing machines B41F, B41J, B41K, B41M; machines or apparatus for embossing decorations or marks B44B 5/00; artists hand tools for embossing B44B 11/04; producing decorative effects by processes for stamping ornamental designs on surfaces B44C 1/24; mechanical deformation during paper or board making, kinds of paper or board D21) **[2]**

1/07 . Embossing (corrugating B31F 1/20) **[3]**

1/08 . Creasing (corrugating B31F 1/20; zig-zag folding B65H 45/20) **[2]**

1/10 . . by rotary tools

1/12 . Crêping paper

1/14 . . by doctor blades arranged crosswise to the web

1/16 . . by elastic belts

1/18 . . by tools arranged in the direction of web feed

1/20 . Corrugating; Corrugating combined with laminating to other paper or cardboard layers (corrugating veneer B27D) **[2]**

1/22 . . Making webs in which the channel of each corrugation is longitudinal with the web feed

1/24 . . Making webs in which the channel of each corrugation is transverse to the web feed

1/26 . . . by interengaging toothed cylinders **[2]**

1/28 . . . . combined with uniting the corrugated webs to flat webs

1/29 . . . by making use of rods, e.g. co-operating with a toothed cylinder **[2]**

1/30 . . . Tools secured to endless chains

1/32 . . Corrugating already corrugated webs

1/36 . Moistening and heating webs to facilitate mechanical deformation and drying deformed webs

5/00 **Attaching together paper or cardboard sheets, strips, or webs**; **Reinforcing edges of paper or cardboard** (means for applying adhesive or glue B05C; stapling in box or like making B31B; attaching the replacement web to the expiring web during web-roll changing B65H 19/18; apparatus for splicing webs during handling B65H 21/00)

5/02 . by crimpling or slotting

5/04 . by exclusive use of adhesives

5/06 . by adhesive tape

5/08 . . for reinforcing edges

7/00 **Processes for working paper not otherwise provided for**

7/02 . Breaking the coating on paper

B32 LAYERED PRODUCTS

B32B LAYERED PRODUCTS, I.E. PRODUCTS BUILT-UP OF STRATA OF FLAT OR NON-FLAT, E.G. CELLULAR OR HONEYCOMB, FORM

(1) This subclass covers :
- layered products comprising different kinds of material or layered products not characterised by the particular kind of material used;
- a product similar to a layered product but comprising only material in the form of a sheet or network embedded in a mass of plastics or of physically-similar substances which mass penetrates the said sheet or network and lies on both sides of the latter (e.g. so that the sheet or network reinforces the plastics substance) provided that the embedded sheet or network extends coherently or connectedly over substantially the whole area of the product; thus the embedded sheet or network may be a fabric or a series of rods connected by cross wires. The manner of making such a product is, however, classified in this subclass only if it is essentially a process of building-up an assembly of layers of which at least one outer layer is preformed. If the embedded material comprises only a series of unconnected rods, the product is not classified in this subclass.

(2) This subclass does not cover :
- processes or apparatus used in, or in connection with, the production or treatment of any product, if the process or apparatus is solely applicable to and fully classifiable in a single other class or subclass for processes or apparatus, e.g. B05, B29C, B29D, B44D, C08J, C09J or C23;
- compositions or preparation or treatment thereof, unless they are essentially restricted to layered products and cannot be fully classified in another class without ignoring this restriction;
- etched metallic pattern on the surface of a printed circuit board. **[3]**

(3) In this subclass, a film formed on a layer by spreading a substance thereon is not considered to constitute a layer itself if it serves only as an adhesive or its purpose is merely to finish a surface of a product.

(4) In this subclass, the following terms or expressions are used with the meanings indicated:
- "layer" is a sheet or strip or anything else having a small thickness relatively to its other dimensions which, together with at least one other layer, exists in a product, whether it pre-existed, e.g. as a separate sheet or strip, or was formed during the production of the layered product. It may or may not be homogeneous or cohesive; it may be an assembly of fibres or pieces of material. It may be discontinuous, e.g. in the form of a grating, honeycomb, or frame. It may or may not be in complete contact with the next layer, e.g. a corrugated layer against a flat layer;
- "layered product" comprises at least two layers secured together. The term "secured" includes any method of uniting layers, e.g. needling, stitching, gluing, nailing, dovetailing or the interposition of an adhesive or adhesive impregnated support. It may also be an intermediate stage in the production of an article which is not layered in its final form, e.g. a panel with a protective layer which is stripped off when the panel is placed in its position of use. The layers are preformed layers or layers formed in situ on a preformed layer and may consist of coherent solid materials, including honeycombs and other cellular materials or of non-coherent solid materials composed of assemblies of strands, strips, fibres, tiles or the like;
- "filamentary layer" means a layer of threads or filaments of any substance (e.g. wires) of more or less unlimited length placed in an orderly arrangement and secured together; it may be woven, knitted, braided, or netted, or formed of threads crossed or laid side and bonded together;
- "fibrous layer" means a random assembly of fibres or filaments, usually of limited length, e.g. felt, fleece; the fibres may or may not be interengaged or connected, e.g. by adhesive.

(5) In groups B32B 1/00 to B32B 33/00, at each level of indentation, in the absence of an indication to the contrary, classification is made in the first appropriate place.

(6) If a layered product is characterised by the way it is produced and not by its structure or composition, the production method should be classified in groups B32B 37/00 or B32B 38/00, or in subclass B29C, for example in groups B29C 45/16 or B29C 47/06. **[2010.01]**

(7) The classification of layered products is provided for in many classes, most of which are confined to a particular kind of material. However, in order that this subclass may provide a basis for making a complete search with respect to layered products, all relevant subject matter is classified in this subclass even though it may also be classified in other classes.

Subclass index

1/00 Layered products essentially having a general shape other than plane

Note

For classification of a product in this group, surface unevennesses or non-uniformities and the shape of individual layers are ignored.

1/02 . Receptacles, e.g. tanks
1/04 . characterised by feature of form at particular places, e.g. in edge regions
1/06 . characterised by fillings or added members in hollow portions
1/08 . Tubular products

3/00 Layered products essentially comprising a layer with external or internal discontinuities or unevennesses, or a layer of non-planar form (continuous layers of fibres or filaments B32B 5/02; foamed layers B32B 5/18); **Layered products essentially having particular features of form** (B32B 1/00 takes precedence)

Note

In this group, channels, voids, and cavities may be filled otherwise than with air, e.g. with gas, with liquid, with other material different from that of the layer in which they occur.

3/02 . characterised by features of form at particular places, e.g. in edge regions
3/04 . . characterised by a layer folded at the edge, e.g. over another layer
3/06 . . for securing layers together; for attaching the product to another member, e.g. to a support (use or provision of nails, stitches, or similar separate fastening elements for these purposes B32B 7/08)
3/08 . . characterised by added members at particular parts
3/10 . characterised by a discontinuous layer, i.e. apertured or formed of separate pieces of material

Note

In this group, a series of spaced separate elements forming in effect a broken surface should be regarded as a layer.

3/12 . . characterised by a layer of regularly-arranged cells whether integral or formed individually or by conjunction of separate strips, e.g. honeycomb structure
3/14 . . characterised by a face layer formed of separate pieces of material
3/16 . . . secured to a flexible backing
3/18 . . characterised by an internal layer formed of separate pieces of material
3/20 . . . of hollow pieces, e.g. tubes; of pieces with channels or cavities
3/22 . . . of spaced pieces
3/24 . . characterised by an apertured layer, e.g. of expanded metal (layer of netting or fibres B32B 5/02)
3/26 . characterised by a particular shape of the outline of the cross-section of a continuous layer; characterised by a layer with cavities or internal voids (regular cells B32B 3/12)
3/28 . . characterised by a layer comprising a deformed thin sheet, e.g. corrugated, crumpled (B32B 29/08 takes precedence) **[3]**
3/30 . . characterised by a layer formed with recesses or projections, e.g. grooved, ribbed

5/00 Layered products characterised by the non-homogeneity or physical structure of a layer (B32B 9/00 to B32B 29/00 take precedence)

Note

In this group, fibres, filaments, granules, or powder forming or included in a layer may be impregnated, bonded together, or embedded in a substance such as synthetic resin. If the substance of the fibres, or the like, or the impregnating, bonding, or embedding substance, is important it is classified in the relevant group for the substance.

5/02 . characterised by structural features of a layer comprising fibres or filaments (formed of particles, e.g. chips, chopped fibres, powder, B32B 5/16)

Note

This group covers, in addition to filamentary and fibrous layers as defined in Note (4) following the title of this subclass, layers of substances having an intrinsic fibrous nature (e.g. paper, wood), if the fibrous nature is important and the particular substance is not important.

5/04 . . characterised by a layer being specifically extensible by reason of its structure or arrangement
5/06 . . characterised by a fibrous layer needled to another layer, e.g. of fibres, of paper
5/08 . . the fibres or filaments of a layer being specially arranged or being of different substances
5/10 . . characterised by a fibrous layer reinforced with filaments
5/12 . . characterised by the relative arrangement of fibres or filaments of adjacent layers
5/14 . characterised by a layer differing constitutionally or physically in different parts, e.g. denser near its faces
5/16 . characterised by features of a layer formed of particles, e.g. chips, chopped fibres, powder
5/18 . characterised by features of a layer containing foamed or specifically porous material
5/20 . . foamed in situ
5/22 . characterised by the presence of two or more layers which comprise fibres, filaments, granules, or powder, or are foamed or specifically porous
5/24 . . one layer being a fibrous or filamentary layer
5/26 . . . another layer also being fibrous or filamentary
5/28 . . . impregnated with or embedded in a plastic substance
5/30 . . one layer comprising granules or powder
5/32 . . both layers being foamed or specifically porous

7/00 Layered products characterised by the relation between layers, i.e. products essentially comprising layers having different physical properties or products characterised by the interconnection of layers (in respect of orientation of features, see the relevant groups for the features concerned, e.g. B32B 5/02 for direction of fibres; in respect of substances B32B 9/00 to B32B 29/00)
7/02 . in respect of physical properties, e.g. hardness

7/04 . characterised by the connection of layers
7/06 . . permitting easy separation
7/08 . . by mechanical connection, e.g. stitching (by interengagement of layers B32B 3/00, e.g. B32B 3/04, B32B 3/06, B32B 3/30; by needling fibrous layers B32B 5/06)
7/10 . . one or both of the layers having adhesive or inter-reactive properties
7/12 . . using an adhesive
7/14 . . . applied in stripes or other spaced arrangement

Layered products characterised by particular substances used

Note

In groups B32B 9/00 to B32B 29/00, the following expressions are used with the meanings indicated:
– "specific substance" covers specified alternative substances if they are all covered by a single main group;
– "particulate layer" means a layer of particles, e.g. chips, chopped fibres, powder.

9/00 Layered products essentially comprising a particular substance not covered by groups B32B 11/00 to B32B 29/00
9/02 . comprising animal or vegetable substances
9/04 . comprising such substance as the main or only constituent of a layer, next to another layer of a specific substance
9/06 . . of paper or cardboard

11/00 Layered products essentially comprising bituminous or tarry substances
11/02 . with fibres or particles embedded in it or bonded with it
11/04 . comprising such substance as the main or only constituent of a layer, next to another layer of a specific substance
11/06 . . of paper or cardboard
11/08 . . of metal
11/10 . next to a fibrous or filamentary layer
11/12 . next to a particulate layer

13/00 Layered products essentially comprising a water-setting substance, e.g. concrete, plaster, asbestos cement, or like builders' material
13/02 . with fibres or particles embedded in it or bonded with it
13/04 . comprising such substances as the main or only constituent of a layer, next to another layer of a specific substance
13/06 . . of metal
13/08 . . of paper or cardboard
13/10 . . of wood; of wood particle board
13/12 . . of synthetic resin
13/14 . next to a fibrous or filamentary layer

15/00 Layered products essentially comprising metal
15/01 . all layers being exclusively metallic **[3]**
15/02 . in a form other than a sheet, e.g. wire, particles
15/04 . comprising metal as the main or only constituent of a layer, next to another layer of a specific substance
15/06 . . of rubber
15/08 . . of synthetic resin
15/082 . . . comprising vinyl resins; comprising acrylic resins **[8]**
15/085 . . . comprising polyolefins **[8]**
15/088 . . . comprising polyamides **[8]**
15/09 . . . comprising polyesters **[8]**
15/092 . . . comprising epoxy resins **[8]**
15/095 . . . comprising polyurethanes **[8]**
15/098 . . . comprising condensation resins of aldehydes, e.g. with phenols, ureas or melamines **[8]**
15/10 . . of wood
15/12 . . of paper or cardboard
15/14 . next to a fibrous or filamentary layer
15/16 . next to a particulate layer
15/18 . comprising iron or steel
15/20 . comprising aluminium or copper

17/00 Layered products essentially comprising sheet glass, or fibres of glass, slag or the like
17/02 . in the form of fibres or filaments
17/04 . . bonded with or embedded in a plastic substance
17/06 . comprising glass as the main or only constituent of a layer, next to another layer of a specific substance
17/08 . . of cellulosic plastic substance
17/10 . . of synthetic resin
17/12 . next to a fibrous or filamentary layer

18/00 Layered products essentially comprising ceramics, e.g. refractory products [4]

19/00 Layered products essentially comprising natural mineral fibres or particles, e.g. asbestos, mica
19/02 . bonded with or embedded in a plastic substance
19/04 . next to another layer of a specific substance
19/06 . next to a fibrous or filamentary layer
19/08 . comprising asbestos

21/00 Layered products essentially comprising wood, e.g. wood board, veneer, wood particle board
21/02 . in the form of fibres, chips, or particles
21/04 . comprising wood as the main or only constituent of a layer, next to another layer of a specific substance
21/06 . . of paper or cardboard
21/08 . . of synthetic resin; of fibre-reinforced resin
21/10 . Next to a fibrous or filamentary layer
21/12 . next to a particulate layer
21/13 . all layers being exclusively wood **[3]**
21/14 . comprising wood board or veneer

23/00 Layered products essentially comprising cellulosic plastic substances
23/02 . in the form of fibres or filaments
23/04 . comprising such substance as the main or only constituent of a layer, next to another layer of a specific substance
23/06 . . of paper or cardboard
23/08 . . of synthetic resin
23/10 . next to a fibrous or filamentary layer
23/12 . next to a particulate layer
23/14 . characterised by containing special compounding ingredients
23/16 . . Modifying agents
23/18 . . Fillers
23/20 . comprising esters
23/22 . comprising ethers

25/00 Layered products essentially comprising natural or synthetic rubber
25/02 . with fibres or particles embedded in it or bonded with it

25/04 . comprising rubber as the main or only constituent of a layer, next to another layer of a specific substance
25/06 . . of paper or cardboard
25/08 . . of synthetic resin
25/10 . next to a fibrous or filamentary layer
25/12 . comprising natural rubber
25/14 . comprising copolymers in which synthetic rubber constituents predominate
25/16 . comprising polydienes or poly-halodienes
25/18 . comprising butyl or halobutyl rubber
25/20 . comprising silicone rubber

27/00 Layered products essentially comprising synthetic resin

27/02 . in the form of fibres or filaments
27/04 . as impregnant, bonding, or embedding substance
27/06 . as the main or only constituent of a layer next to another layer of a specific substance
27/08 . . of synthetic resin of a different kind
27/10 . . of paper or cardboard
27/12 . next to a fibrous or filamentary layer
27/14 . next to a particulate layer
27/16 . specially treated, e.g. irradiated
27/18 . characterised by the use of special additives
27/20 . . using fillers, pigments, thixotroping agents
27/22 . . using plasticisers
27/24 . . using solvents or swelling agents
27/26 . . using curing agents
27/28 . comprising copolymers of synthetic resins not wholly covered by any one of the following subgroups
27/30 . comprising vinyl resin; comprising acrylic resin
27/32 . comprising polyolefins
27/34 . comprising polyamides
27/36 . comprising polyesters
27/38 . comprising epoxy resins
27/40 . comprising polyurethanes
27/42 . comprising condensation resins of aldehydes, e.g. with phenols, ureas or melamines

29/00 Layered products essentially comprising paper or cardboard

29/02 . next to a fibrous or filamentary layer
29/04 . next to a particulate layer
29/06 . specially treated, e.g. surfaced, parchmentised
29/08 . Corrugated paper, corrugated cardboard **[3]**

33/00 Layered products characterised by particular properties or particular surface features, e.g. particular surface coatings (surface unevennesses or non-uniformities B32B 3/00); **Layered products designed for particular purposes not covered by another single class**

Methods or apparatus for making layered products; **Treatment of the layers or of the layered products [8]**

Note

In groups B32B 37/00 and B32B 39/00, the following expressions are used with the meanings indicated:
– "laminating" means the action of combining previously unconnected layers to become one product whose layers will remain together;
– "partial laminating" occurs when one layer does not fully cover a surface of another layer, whereby the layer with the greater surface area is laminated on only part of its surface;
– "adhesive" means a layer, or part of a layer, applied in any state or in any manner, which is incorporated for the purpose of bonding. **[8]**

37/00 Methods or apparatus for laminating, e.g. by curing or by ultrasonic bonding [8]

37/02 . characterised by a sequence of laminating steps, e.g. by adding new layers at consecutive laminating stations **[8]**
37/04 . characterised by the partial melting of at least one layer **[8]**
37/06 . characterised by the heating method **[8]**
37/08 . characterised by the cooling method **[8]**
37/10 . characterised by the pressing technique, e.g. using direct action of vacuum or fluid pressure **[8]**
37/12 . characterised by using adhesives **[8]**
37/14 . characterised by the properties of the layers **[8]**
37/15 . . with at least one layer being manufactured and immediately laminated before reaching its stable state, e.g. in which a layer is extruded and laminated while in semi-molten state **[8]**
37/16 . . with all layers existing as coherent layers before laminating **[8]**
37/18 . . . involving the assembly of discrete sheets or panels only **[8]**
37/20 . . . involving the assembly of continuous webs only **[8]**
37/22 . . . involving the assembly of both discrete and continuous layers **[8]**
37/24 . . with at least one layer not being coherent before laminating, e.g. made up from granular material sprinkled onto a substrate (B32B 37/15 takes precedence) **[8]**
37/26 . . with at least one layer which influences the bonding during the laminating process, e.g. release layers or pressure equalising layers **[8]**
37/28 . involving assembly of non-flat intermediate products which are flattened at a later step, e.g. tubes **[8]**
37/30 . Partial laminating **[8]**

38/00 Ancillary operations in connection with laminating processes [8]

38/04 . Punching, slitting or perforating **[8]**
38/06 . Embossing **[8]**
38/08 . Impregnating **[8]**
38/10 . Removing layers, or parts of layers, mechanically or chemically (punching, slitting or perforating B32B 38/04) **[8]**
38/12 . Deep-drawing **[8]**
38/14 . Printing or colouring **[8]**
38/16 . Drying; Softening; Cleaning **[8]**
38/18 . Handling of layers or the laminate **[8]**

39/00 Layout of apparatus or plants, e.g. modular laminating systems [8]

41/00 Arrangements for controlling or monitoring lamination processes; **Safety arrangements [8]**

41/02 . Safety arrangements **[8]**

43/00 Operations specially adapted for layered products and not otherwise provided for, e.g. repairing; **Apparatus therefor [8]**

PRINTING

B41 PRINTING; LINING MACHINES; TYPEWRITERS; STAMPS [4]

B41B MACHINES OR ACCESSORIES FOR MAKING, SETTING, OR DISTRIBUTING TYPE; TYPE; PHOTOGRAPHIC OR PHOTOELECTRONIC COMPOSING DEVICES (photographic devices in general G03)

Subclass index

1/00 Elements or appliances for hand composition; Chases, quoins, or galleys

1/02 . Printing letters; Type
1/04 . Quadrats or quads; Spaces or other justifiers
1/06 . for special purposes
1/08 . . for inserting latest news
1/10 . . for inserting advertisements
1/12 . . for setting musical notations
1/14 . Composing rules, e.g. of brass
1/16 . Reglets
1/18 . Chases
1/20 . Quoins or other binding means
1/22 . Composing tables; Type cases; Storage cabinets; Washing or cleaning devices therefor
1/24 . . Washing or cleaning devices
1/26 . Composing or setting sticks
1/28 . Galleys

Machines or other mechanical apparatus for composing

3/00 Apparatus for mechanical composition using prefabricated type, i.e. without casting equipment

3/02 . Mechanical composing machines using single types or logotypes and having slide magazines therefor, e.g. flat, cylindrical, radial, single magazines
3/04 . Means for distributing type
3/06 . Justifying means

5/00 Devices for making type or lines (for mechanical composition B41B 7/00, B41B 9/00, B41B 11/00)

5/02 . Matrices
5/04 . Casting devices
5/06 . . mechanically operated
5/08 . Tools or auxiliaries
5/10 . . for polishing or finishing type (polishing in general B24B)
5/12 . . for making type in the form of lines, e.g. by drawing or casting
5/14 . . for cutting spaces

7/00 Kinds or types of apparatus for mechanical composition in which the type is cast or moulded from matrices

7/02 . operating with fixed combinations of matrices (details B41B 9/00)
7/04 . . for casting individual characters or spaces, e.g. "monotype" machines
7/06 . . for composing, justifying, and casting complete lines of matrices, e.g. "monoline" machines
7/08 . operating with separate matrices for individual characters or spaces which are selected and assembled (details B41B 11/00)
7/10 . . in which a line is composed of matrices and in which single types or spaces are cast, e.g. stringer type
7/12 . . in which a justified line is composed of matrices and a type line is cast in one piece
7/14 . . . the matrices being composed by hand
7/16 . . . the lines of matrices being composed and justified by machine operation, e.g. "linotype", "intertype" machines
7/18 . . . . the matrices being guided by wires, e.g. "typograph" machines

9/00 Details of, or accessories for, machines for mechanical composition using fixed combinations of matrices from which type is cast or moulded

9/02 . Combinations of matrices
9/04 . Carriers for combinations of matrices, e.g. blocks, cylinders, wheels, bars
9/06 . Mechanisms for effecting relative movements of matrix carriers and moulds for character or space selection
9/08 . Moulding or casting devices
9/10 . . Moulds
9/12 . . Justifying devices
9/14 . . Supply devices for molten metal
9/16 . Devices for handling type after casting
9/18 . . Ejector mechanisms
9/20 . . Trimming devices

11/00 Details of, or accessories for, machines for mechanical composition using matrices for individual characters which are selected and assembled for type casting or moulding

11/02 . Matrices
11/04 . Space bands
11/06 . Storage devices for matrices or space bands
11/08 . . Magazines for matrices
11/10 . . . for composing by hand
11/12 . . . Attachment of magazines to machines; Magazine-selection or magazine-shift mechanisms (controlling selection or shifting B41B 27/42)
11/14 . . . with escapement devices
11/16 . . Boxes for space bands; Escapements or guides for releasing space bands
11/18 . Devices or arrangements for assembling matrices and space bands (control devices therefor B41B 27/44)
11/20 . . Assembler guide channels
11/22 . . Assembler cover plates or framework
11/24 . . Belt conveyers co-operating with assembler guides
11/26 . . Devices for feeding or guiding space bands into association with matrices
11/28 . . Star wheels or other stacking devices for matrices and space bands; Guides associated therewith
11/30 . . Assembler elevators or associated mechanisms, e.g. braking devices, retaining pawls, line resistants, delivery slides
11/32 . . Transfer channels or line-delivery carriages
11/34 . . First elevators or associated mechanisms
11/36 . . for presenting matrices or space bands directly to moulds
11/38 . Devices for aligning or clamping lines of matrices and space bands
11/40 . . Jaw clamps; Operating devices therefor
11/42 . . . for quadding and centring
11/44 . . . for justifying
11/46 . . Aligning devices
11/48 . . Cleaning devices for aligning jaws (cleaning matrices B41B 11/96)
11/50 . . Vice frames; Devices for releasing or locking
11/52 . Moulding or casting devices or associated mechanisms
11/54 . . Moulds; Liners therefor
11/56 . . . Mould wheels; Slides or driving gear therefor
11/58 . . . . with locking wedges
11/60 . . . . adjustable or removable
11/62 . . . . with interchangeable moulds
11/64 . . . . with a series of moulds and mechanism for selecting individual moulds
11/66 . . . mounted on reciprocable carriages
11/68 . . . with provision for adjusting length or width of slot; with a plurality of slots
11/70 . . . for casting type-bars of special form, e.g. with projections
11/72 . . Devices for trimming type-bars; Cleaning devices for trimming knives; Ejectors for type-bars
11/74 . . Devices for supplying molten metal
11/76 . . . Pots (melting pots for casting stereotype plates B41D 3/20)
11/78 . . . . movable towards, and away from, mould
11/80 . . . . with stirrers or means for removing dross
11/82 . . . . associated with mechanisms for introducing metal in solid form
11/84 . . . . Throats or mouthpieces; Wipers for mouthpieces
11/86 . . . . Heaters for pots; Temperature-control devices
11/88 . . . Pumps; Stop-motions or safety devices therefor
11/90 . Arrangements or devices for distributing matrices or space bands after casting or moulding
11/92 . . Second elevators
11/94 . . Screw conveyers
11/96 . Devices for cooling or cleaning matrices

Photographic or photoelectronic composing devices

13/00 Equipment specially adapted for photographing mounted characters or the like, e.g. advertisements, lines

13/02 . the characters being composed or mounted by hand, and photographed simultaneously
13/04 . . with means for justifying
13/06 . . . by elastic or extensible type-line carriers
13/08 . . . by optical line correction
13/10 . the characters being progressively photographed one by one

15/00 Photographic composing machines with movable character carriers for composing lines of characters prior to photography

15/02 . with means for photographing complete lines
15/04 . . and with carriers for individual characters
15/06 . . and with carriers for complete sets of characters, e.g. slidable elongated members, rotary wheels
15/08 . with means for photographing composed characters in succession
15/10 . Details
15/12 . . Character carriers; Cleaning devices therefor
15/14 . . . with a single character, or with combinations of different styles of a single character
15/16 . . . with combinations of different characters
15/18 . . . with parts of characters for building up complex characters, e.g. oriental characters
15/20 . . Devices for handling or storing character carriers
15/22 . . . Magazines
15/24 . . . for justifying purposes
15/26 . . . for repeating a character
15/28 . . Photographic devices (in general G03)
15/30 . . . Composing cameras
15/32 . . . Film-handling mechanisms
15/34 . . . Adjusting enlargement or register; Correcting exposure time

17/00 Photographic composing machines having fixed or movable character carriers and without means for composing lines prior to photography

17/02 . with manually-adjustable character carriers to enable characters to be photographed in succession
17/04 . with a carrier for all characters in at least one fount
17/06 . . with an adjustable carrier
17/08 . . with a fixed carrier
17/10 . . with a continuously-movable carrier
17/12 . . with means for moving the optical path for photographing characters, e.g. intermittently
17/14 . . . continuously
17/16 . . with means for moving the film in its plane for photographing characters in succession
17/18 . Details
17/20 . . Character carriers; Cleaning devices therefor

17/22 . . . with a single character; with a single character in more than one style
17/24 . . . with all characters
17/26 . . . . on belts
17/28 . . . . on polygonal rods
17/30 . . . . on a sheet of square or rectangular shape
17/32 . . . . on a flat disc
17/34 . . . . on a cylinder
17/36 . . . with selection indicators
17/38 . . . with means for indicating the width
17/40 . . . . in caliper form
17/42 . . . . in coded form

19/00 Photoelectronic composing machines [3]
19/01 . having electron-beam tubes producing an image of at least one character which is photographed **[3]**
19/02 . . the characters appearing on the screen in succession **[3]**
19/04 . . . at the same place **[3]**
19/06 . . . at different predetermined places **[3]**
19/08 . . with combinations of characters appearing on the screen at the same time **[3]**
19/10 . . . in unbroken lines or columns **[3]**
19/12 . . . in broken lines or columns **[3]**
19/14 . . . and presenting a text of more than one line **[3]**
19/16 . . Character carriers associated with electron-beam tubes **[3]**

21/00 Common details of photographic composing machines of the kinds covered in groups B41B 17/00 and B41B 19/00
21/02 . Shutters in optical systems (in general G03B)
21/04 . . for selecting characters
21/06 . . for adjusting exposures
21/08 . Light sources; Devices associated therewith, e.g. control devices
21/10 . . Single light sources
21/12 . . Stroboscopic light sources
21/14 . . Combinations of light sources
21/16 . Optical systems (shutters B41B 21/02; light sources B41B 21/08)
21/18 . . defining a single optical path
21/20 . . . with means for moving stepwise
21/22 . . . with means for moving continuously
21/24 . . defining multiple optical paths
21/26 . . . with means for selecting individual optical paths (means for moving the optical path B41B 17/12)
21/28 . . . with means for fount selection
21/30 . Electron-beam tubes or charactrons (in general H01J 31/00)
21/32 . Film carriers; Film-conveying or -positioning devices (film-handling means in line-composing photographic devices B41B 15/32; machines with means for moving the film in its plane for photographing characters in succession B41B 17/16)
21/34 . . with positioning mechanisms
21/36 . . . for feeding films stepwise in line direction
21/38 . . . for feeding films continuously in line direction
21/40 . . . for line spacing
21/42 . . . for subscript or superscript notation
21/44 . . adjustable for enlarging purposes

23/00 Auxiliary devices for modifying, mixing, or correcting text or layout in connection with photographic or photoelectronic composing
23/02 . for mixing by line-by-line projection of parts of texts from a number of films on to another
23/04 . for facilitating hand correction of texts
23/06 . for correcting texts by removing incorrect lines from one film and splicing-in corrected lines from another film

Marking record carriers used for controlling composing machines; **Control, indicating, or safety devices or systems for composing machines of various kinds or types**

25/00 Apparatus specially adapted for preparation of record carriers for controlling composing machines (for casting individual characters or spaces, e.g. in "monotype" machines, B41B 7/04; methods for marking or reproducing record carriers having digital data thereon in general G06K 1/00)
25/10 . incorporating devices for line justification, e.g. counting and indicating devices for length of line
25/12 . . comprising elements which circulate from and to magazines
25/14 . . operating without space bands
25/16 . . using a binary code for the width of the matrices
25/18 . combined with type-setting machines
25/20 . Auxiliary devices; Devices serving special purposes
25/22 . . for indicating length of line
25/24 . . for error correction
25/26 . . for changing the fount of type

27/00 Control, indicating, or safety devices or systems for composing machines of various kinds or types (computers in general G06F)
27/02 . Systems for controlling all operations
27/04 . . Keyboards
27/06 . . . operable by input of recorded or stored information, e.g. on punched tapes
27/08 . . . . from several sources
27/10 . . with direct control of all operations by input of recorded or stored information
27/12 . . . on tapes
27/14 . . . . on punched tapes
27/16 . . . . on magnetic tapes
27/18 . . . from memory devices
27/20 . . . . from electromagnetic devices, e.g. memory matrices
27/22 . . . from several sources
27/24 . . of several associated machines
27/26 . . with means for temporarily arresting input of recorded or stored information to introduce time delays
27/28 . Control, indicating, or safety devices for individual operations or machine elements (in devices for supplying molten metal B41B 11/86, B41B 11/88; for light sources B41B 21/08)
27/30 . . for arresting or varying speed of one operation in response to failure or variation in speed of another operation
27/32 . . for line-justification operations
27/34 . . . without the use of space bands
27/36 . . . using electronic devices
27/38 . . for measuring length of composed lines; for reading composed characters
27/40 . . for proof-printing operations

27/41 . . Printing mechanisms coupled to typographical composing machines
27/42 . . for controlling selection of shifting of matrix magazines
27/44 . . for controlling assembly of matrices and space bands
27/46 . . . for controlling insertion of space bands (for line justification B41B 27/32)
27/48 . . for deleting errors or inserting corrections (devices, non-fluid media or methods for cancelling or correcting errors in typewriters or selective printing mechanisms B41J 29/26)
27/50 . . operated by coupled machines

B41C **PROCESSES FOR THE MANUFACTURE OR REPRODUCTION OF PRINTING SURFACES** (photomechanical processes for producing printing surfaces G03F; photoelectrical processes for producing printing surfaces G03G)

1/00 **Forme preparation**
1/02 . Engraving; Heads therefor (recording on record carriers, heads therefor G11B) **[5]**

Note

Attention is drawn to the title of class B41 and to subclass H04N, in particular to the Notes following the title of that subclass and to group H04N 1/00. **[5]**

1/04 . . using heads controlled by an electric information signal
1/045 . . . Mechanical engraving heads **[5]**
1/05 . . . Heat-generating engraving heads, e.g. laser beam, electron beam **[5]**
1/055 . Thermographic processes for producing formes (B41C 1/02 takes precedence) **[5]**
1/06 . Transferring (B41C 1/10, B41C 1/18 take precedence) **[5]**
1/08 . by embossing, e.g. with a typewriter (typewriters adapted therefor B41J 3/38)
1/10 . for lithographic printing; Master sheets for transferring a lithographic image to the forme (B41C 1/055 takes precedence; neutralising or similar differentiation treatments of lithographic printing formes B41N 3/08) **[5]**
1/12 . Multicolour formes
1/14 . for stencil printing or silk-screen printing (B41C 1/055 takes precedence) **[5]**
1/16 . Formes with areas rendered ink-resistant by covering with an amalgam; Printing plates for amalgam printing **[5]**
1/18 . Curved printing formes or printing cylinders

3/00 **Reproduction or duplicating of printing formes**
3/02 . Stereotyping (casting stereotype plates B41D 3/00) **[2]**
3/04 . to produce rubber printing blocks
3/06 . to produce printing blocks from plastics
3/08 . Electrotyping; Application of backing layers thereon **[5]**

B41D **APPARATUS FOR THE MECHANICAL REPRODUCTION OF PRINTING SURFACES FOR STEREOTYPE PRINTING**; **SHAPING ELASTIC OR DEFORMABLE MATERIAL TO FORM PRINTING SURFACES** (marking or engraving metal by the action of a high concentration of electric current B23H 9/06; type, machines, or accessories for making, setting, or distributing type B41B; processes for the manufacture or reproduction of printing surfaces B41C; machines or apparatus for engraving in general, or for embossing B44B 3/00, B44B 5/00; chemical etching of metal C23F 1/00; electrolytic etching C25F 3/00; photomechanical reproduction G03F)

1/00 **Preparing or treating stereotype matrices**
1/02 . using brushes
1/04 . using cylinders or rollers
1/06 . using presses, e.g. toggle or like lever-and-link type presses
1/08 . . using hydraulic presses
1/10 . Performing secondary operations on matrices
1/12 . . Humidifying or moistening
1/14 . . Drying

Producing printing surfaces

3/00 **Casting stereotype plates**; **Machines, moulds, or devices therefor**
3/02 . Horizontal moulds for casting flat plates
3/04 . Moulds, e.g. horizontal, for casting curved, e.g. semi-cylindrical, plates
3/06 . . Vertical moulds
3/08 . Moulds, e.g. horizontal, for casting tubular, i.e. cylindrical, plates
3/10 . . Vertical moulds
3/12 . Multiple-mould stereotype casting machines
3/14 . Details
3/16 . . Matrix clamps
3/18 . . Devices for closing or opening moulds
3/20 . . Melting pots
3/22 . . . with pumps for conveying the molten metal into the casting chambers or boxes
3/24 . . . with control valves
3/26 . . . with devices for stirring the molten metal
3/28 . . Devices for cooling the moulds

5/00 **Working, treating, or handling stereotype plates**
5/02 . by bending
5/04 . of flat plates
5/06 . of curved plates

7/00 **Shaping elastic or deformable material, e.g. rubber, plastics material, to form printing surfaces** (making rubber printing blocks B41C 3/04)

7/02 . by impression

7/04 . Forming printing surfaces by covering printing forms with a thin elastic skin, e.g. rubber foil, and retaining the latter thereon; Obtaining reduced or enlarged printing surfaces by using thin elastic transfer foils (pantographic instruments for copying, reducing, or enlarging B43L 13/10)

99/00 **Subject matter not provided for in other groups of this subclass [8]**

B41F **PRINTING MACHINES OR PRESSES** (machines for manufacturing footwear incorporating printing or embossing apparatus A43D, e.g. A43D 8/26, A43D 95/14; presses in general B30B; making of printing surfaces B41C, B41D; manifolding devices, office printing machines B41L; stencilling B41L; printing processes not dependent on the use of special machines B41M; duplicating or marking by sublimation or volatilisation of design B41M 5/035; thermography B41M 5/26; embossing decorations or marks B44B 5/00; handling thin or filamentary material B65H; electrography, electrophotography, magnetography G03G) **[4]**

Note

Attention is drawn to Notes (1) and (2) following the title of subclass B41L. **[6]**

Subclass index

1/00 **Platen presses, i.e. presses in which printing is effected by at least one essentially-flat pressure-applying member co-operating with a flat type-bed**

1/02 . Hand-operated platen presses
1/04 . for mono-impression printing, e.g. on sheets
1/06 . . with platen maintained parallel to bed during movement (preparing stereotype matrices using presses B41D 1/06)
1/08 . . on webs
1/10 . for multi-impression printing in one or more colours, e.g. on webs
1/12 . . on sheets
1/14 . . . using swinging platens, or forme supports
1/16 . for offset printing
1/18 . for lithography
1/20 . for perfecting sheets, i.e. for printing on both sides of sheets
1/22 . specially adapted for printing heads, e.g. letter heads
1/24 . specially adapted for proof printing
1/26 . Details
1/28 . . Sheet-conveying, -aligning or -clamping devices (in general B65H)
1/30 . . . using rotary grippers
1/32 . . . using air pressure, e.g. vacuum
1/34 . . . Registering devices, e.g. gauges
1/36 . . . Clamps for conveying sheets and for holding same on the platens
1/38 . . Platens or type-beds
1/40 . . Inking units
1/42 . . . using flat inking elements, e.g. discs
1/44 . . . using inking ribbons
1/46 . . . using rollers
1/48 . . . pivoting around the platen or base
1/50 . . . supported on carriages for movement in or on runways
1/52 . . . . Carriage driving gear
1/54 . . Printing-pressure control devices
1/56 . . Auxiliary devices
1/58 . . . Arrangements of counting devices for counting sheets
1/60 . . Safety devices
1/62 . . . for preventing injury to operator
1/64 . . . . to the hands of the operator
1/66 . . . responsive to incorrect operating conditions

3/00 **Cylinder presses, i.e. presses essentially comprising at least one cylinder co-operating with at least one flat type-bed**

3/02 . with impression cylinder or cylinders rotating unidirectionally
3/04 . . intermittently; Stop-cylinder presses
3/06 . . continuously
3/08 . . . Single-revolution presses
3/10 . . . Two-revolution presses
3/12 . . Twin presses, i.e. with more than one cylinder or type-bed
3/14 . with impression cylinder or cylinders rotating in opposite directions during each working cycle

3/16 . . Twin presses, i.e. with more than one cylinder or type-bed
3/18 . of special construction or for particular purposes
3/20 . . with fixed type-beds and travelling impression cylinders
3/22 . . . with more than one type-bed
3/24 . . . with cylinders travelling around type-beds having upper and lower printing surfaces
3/26 . . with type-beds and impression cylinders simultaneously movable relative to one another
3/28 . . Proof-print presses for relief printing, lithography or intaglio printing, i.e. presses for checking accuracy of printing surfaces
3/30 . . for lithography (proof-print presses B41F 3/28)
3/32 . . . Damping devices
3/34 . . . for offset printing
3/36 . . for intaglio or heliogravure printing (proof-print presses B41F 3/28)
3/38 . . . Wiping mechanisms
3/40 . . for perfecting sheets, i.e. for printing on both sides thereof
3/42 . . for multicolour printing on sheets
3/44 . . for monocolour or multicolour printing on one side of webs, or for perfecting webs, i.e. monocolour or multicolour printing on both sides of webs
3/46 . Details
3/48 . . Press frames
3/51 . . Type-beds; Supports therefor (B41F 3/52 take precedence) **[3]**
3/52 . . Apparatus for cooling, heating, or drying printing surfaces **[3]**
3/54 . . Impression cylinders; Supports therefor (blankets or like coverings B41N 10/00)
3/56 . . . Devices for adjusting cylinders relative to type-beds and setting in adjusted position
3/58 . . Driving, synchronising, or control gear
3/60 . . . for type-beds
3/62 . . . . Applications of linkwork or gearing for producing reciprocatory or angular motion
3/64 . . . . . of crank motions
3/66 . . . . . of rack-and-pinion gearing
3/68 . . . . . with pinion rotating unidirectionally
3/70 . . . . Applications of directly-coupled motors
3/72 . . . . . of fluid motors
3/74 . . . . Applications of clutches
3/76 . . . . Applications of braking devices or of devices for stopping type-bed in registered position
3/78 . . . . . Air cushions
3/80 . . . for impression cylinders
3/81 . . Inking units **[3]**
3/82 . Auxiliary devices
3/84 . . Arrangements of counting devices (in printing machines in general B41F 33/02) **[2]**
3/86 . . Numbering devices

Rotary machines

5/00 Rotary letterpress machines
5/02 . for printing on sheets
5/04 . for printing on webs
5/06 . . with several printing units in sequential arrangement
5/08 . . with several printing units in both superimposed and sequential arrangement
5/10 . . with several printing units arranged side by side
5/12 . . for printing on one side and on the other side of webs between the same forme and impression cylinders
5/14 . . with several impression cylinders arranged around a forme cylinder
5/16 . . for multicolour printing
5/18 . . . using one impression cylinder co-operating with several forme cylinders
5/20 . specially adapted for proof printing
5/22 . for indirect printing **[3]**
5/24 . for flexographic printing **[3]**

7/00 Rotary lithographic machines
7/02 . for offset printing
7/04 . . using printing units incorporating one forme cylinder, one transfer cylinder, and one impression cylinder, e.g. for printing on webs
7/06 . . . for printing on sheets
7/08 . . using one transfer cylinder co-operating with several forme cylinders for printing on sheets or webs, e.g. sampling of colours on one transfer cylinder
7/10 . . using one impression cylinder co-operating with several transfer cylinders for printing on sheets or webs, e.g. satellite-printing units
7/12 . . using two cylinders one of which serves two functions, e.g. as a transfer and impression cylinder in perfecting machines
7/14 . . with two or more impression cylinders coacting with a single transfer cylinder
7/15 . . . for printing on more than one web simultaneously **[6]**
7/16 . for printing on non-deformable material, e.g. sheet metal
7/18 . specially adapted for proof printing
7/20 . Details
7/24 . . Damping devices
7/26 . . . using transfer rollers **[3]**
7/28 . . . using brushes
7/30 . . . using spraying elements
7/32 . . . Ducts, containers, or like supply devices for liquids
7/34 . . . Endless bands
7/36 . . . Inking-rollers serving also to apply ink repellent
7/37 . . . with supercooling for condensation of air moisture (cooling forme or impression cylinders B41F 13/22) **[6]**
7/38 . . . Absorbent pads
7/40 . . . Devices for tripping or lifting damping rollers; Supporting, adjusting, or removing arrangements therefor (such arrangements or devices for inking rollers B41F 31/30)

9/00 Rotary intaglio printing presses
9/01 . for indirect printing **[3,5]**
9/02 . for multicolour printing
9/04 . specially adapted for proof printing
9/06 . Details
9/08 . . Wiping mechanisms
9/10 . . . with doctors, scrapers, or like devices
9/12 . . . with absorbent pads
9/14 . . . with continuous flexible surfaces, e.g. endless bands

9/16 . . . Removing or recovering ink from wiping mechanisms
9/18 . . Auxiliary devices for exchanging forme cylinders

11/00 Rotary presses or machines having forme cylinders carrying a plurality of printing surfaces, or for performing letterpress, lithographic, or intaglio processes selectively or in combination
11/02 . for securities (security printing B41M 3/14) **[3]**

13/00 Common details of rotary presses or machines
13/004 . Electric or hydraulic features of drives **[6]**
13/008 . Mechanical features of drives, e.g. gears, clutches **[6]**
13/012 . . Taking-up backlash **[6]**
13/016 . Brakes **[6]**
13/02 . Conveying or guiding webs through presses or machines (web handling in general B65H, e.g. step-by-step advancement B65H 20/00, turning or reversing B65H 23/32)
13/03 . . Threading webs into printing machines **[6]**
13/04 . . intermittently
13/06 . . Turning-bar arrangements
13/08 . Cylinders
13/10 . . Forme cylinders
13/11 . . . Gravure cylinders **[6]**
13/12 . . . Registering devices
13/14 . . . . with means for displacing the cylinders
13/16 . . . . with means for displacing the printing formes on the cylinders
13/18 . . Impression cylinders
13/187 . . . for rotogravure **[6]**
13/193 . . Transfer cylinders; Offset cylinders **[6]**
13/20 . . Supports for bearings or supports for forme, offset, or impression cylinders
13/21 . . . Bearer rings **[6]**
13/22 . . Means for cooling or heating forme or impression cylinders
13/24 . . Cylinder-tripping devices; Cylinder-impression adjustments
13/26 . . . Arrangement of cylinder bearings
13/28 . . . . Bearings mounted eccentrically of the cylinder axis
13/30 . . . . Bearings mounted on sliding supports
13/32 . . . . Bearings mounted on swinging supports
13/34 . . . Cylinder-lifting or -adjusting devices
13/36 . . . . Cams, eccentrics, wedges, or the like
13/38 . . . . electrically or magnetically operated
13/40 . . . . fluid-pressure operated
13/42 . . Guards or covers, e.g. for preventing ingress or egress of foreign matter
13/44 . Arrangements to accommodate interchangeable cylinders of different sizes to enable machine to print on areas of different sizes
13/46 . Printing units for inserting latest news
13/48 . Arrangements to enable printing to be effected over selected areas of a single forme cylinder (by inking selected areas B41F 31/18)
13/50 . . by effecting relative movement of forme and impression cylinders during printing cycle
13/52 . . by projecting and retracting parts of the surface of the forme cylinder
13/54 . Auxiliary folding, cutting, collecting, or depositing of sheets or webs (in general B26D, B65H; gathering sheets or signatures in bookbinding B42C 1/00)
13/56 . . Folding or cutting
13/58 . . . lengthwise
13/60 . . . crosswise
13/62 . . . Folding-cylinders or drums
13/64 . . Collecting
13/66 . . . and stapling
13/68 . . Adding inserts
13/70 . . Depositing

15/00 Screen printers (for selective printing B41J 2/005)
15/02 . Manually-operable devices
15/04 . . for multicolour printing
15/06 . . with auxiliary equipment, e.g. for drying printed articles
15/08 . Machines
15/10 . . for multicolour printing
15/12 . . with auxiliary equipment, e.g. for drying printed articles
15/14 . Details
15/16 . . Printing tables
15/18 . . . Supports for workpieces
15/20 . . . . with suction-operated elements
15/22 . . . . for single sheets
15/24 . . . . for webs
15/26 . . . . for articles with flat surfaces
15/28 . . . . for elongated flat articles, e.g. strips, bands
15/30 . . . . for articles with curved surfaces
15/32 . . . . for articles with conical surfaces
15/34 . . Screens; Frames; Holders therefor
15/36 . . . flat
15/38 . . . curved
15/40 . . Inking units
15/42 . . . comprising squeegees or doctors
15/44 . . Squeegees or doctors (doctors of rotary intaglio printing presses B41F 9/10)
15/46 . . . with two or more operative parts

16/00 Transfer printing apparatus (apparatus or machines for applying decalcomanias B65C) **[4]**
16/02 . for textile material **[4]**

17/00 Printing apparatus or machines of special types or for particular purposes, not otherwise provided for (hand stamps, plier-like tools for printing or punching tickets or the like B41K; addressing machines or other office printing equipment B41L; coding or marking of packaging material or of completed packages in packaging machines B65B 61/00; ticket-printing and issuing apparatus G07B)
17/02 . for printing books or manifolding sets
17/04 . for printing calendars
17/08 . for printing on filamentary or elongated articles or material, or on articles with cylindrical surfaces
17/10 . . on articles or material of indefinite length, e.g. wires, hoses, tubes or yarns
17/12 . . . at an angle to axis
17/13 . . . for printing on rolls of material, the roll serving as impression cylinder, e.g. strip printers **[2009.01]**
17/14 . . on articles of finite length
17/16 . . . on end or bottom surfaces thereof
17/18 . . . on curved surfaces of articles of varying cross-section, e.g. bottles, lamp glasses
17/20 . . . on articles of uniform cross-section, e.g. pencils, rulers, resistors
17/22 . . . . by rolling contact
17/24 . for printing on flat surfaces of polyhedral articles
17/26 . . by rolling contact

17/28 . for printing on curved surfaces of conical or frusto-conical articles
17/30 . for printing on curved surfaces of essentially spherical, or part-spherical, articles
17/32 . . on lamp bulbs
17/34 . . on articles with surface irregularities, e.g. fruit, nuts
17/36 . for printing on tablets, pills, or like small articles
17/38 . for printing on knitted fabrics

19/00 Apparatus or machines for carrying out printing operations combined with other operations (auxiliary perforating apparatus associated with printing devices B41G 7/00; coding or marking in association with packaging B65B 61/00; label dispensers having printing equipment B65C) **[2]**
19/02 . with embossing (printing with a printer's forme combined with embossing B41M 1/24)
19/04 . . using intaglio printing formes and wipers
19/06 . . Printing and embossing between a negative and a positive forme after inking and wiping the negative forme; Printing from an ink band treated with colour or "gold"
19/08 . Simultaneous moulding and printing

Common details of printing machinery

21/00 Devices for conveying sheets through printing apparatus or machines (through platen presses B41F 1/28; feeding sheets to or from printing apparatus or machines B65H)
21/02 . Pins **[3,5]**
21/04 . Grippers **[3,5]**
21/05 . . In-feed grippers **[3,5]**
21/06 . . Suction-operated grippers
21/08 . Combinations of endless conveyers and grippers
21/10 . Combinations of transfer drums and grippers **[3]**
21/12 . Adjusting leading edges, e.g. front stops **[3]**
21/14 . Adjusting lateral edges, e.g. side stops **[3]**

22/00 Means preventing smudging of machine parts or printed articles (B41F 23/00 takes precedence) **[6]**

23/00 Devices for treating the surfaces of sheets, webs, or other articles in connection with printing (cleaning in general B08B; as a final step in the manufacture of such articles, see appropriate subclasses, e.g. B29C 71/00, D21H 23/00 or D21H 25/00; surface treatment in general, see the relevant places, e.g. applying liquids or other fluent materials B05, of metals C23G)
23/02 . by dampening (in rotary lithographic machines B41F 7/24)
23/04 . by heat drying, by cooling, by applying powders
23/06 . . Powdering devices, e.g. for preventing set-off
23/08 . Print-finishing devices, e.g. for glossing prints

25/00 Devices for pressing sheets or webs against cylinders, e.g. for smoothing purposes (apparatus for taking-out curl from webs in general B65H 23/34)

27/00 Devices for attaching printing elements or formes to supports (attaching by chemical means B41N 6/00) **[5]**
27/02 . Magnetic devices
27/04 . for attaching printing elements to flat type-beds
27/06 . for attaching printing elements to forme cylinders
27/08 . for attaching printing formes to flat type-beds
27/10 . for attaching non-deformable curved printing formes to forme cylinders
27/12 . for attaching flexible printing formes
27/14 . for attaching printing formes to intermediate supports, e.g. adapter members

30/00 Devices for attaching coverings or make-ready devices; **Guiding devices for coverings** (make-ready devices B41N 6/00; blankets or like coverings B41N 10/00) **[5]**
30/02 . attaching to impression cylinders **[5]**
30/04 . attaching to transfer cylinders **[5]**
30/06 . attaching of endless or like continuously-fed coverings **[5]**

31/00 Inking arrangements or devices (inking units for platen presses B41F 1/40; inking units for cylinder presses B41F 3/81; applying liquids or other fluent materials to surfaces, in general B05; for typewriters or selective printing mechanisms B41J)
31/02 . Ducts, containers, supply or metering devices (level control in general G05D 9/00) **[3]**
31/03 . . Ink agitators **[6]**
31/04 . . with duct-blades or like metering devices
31/05 . . . Positioning devices therefor **[6]**
31/06 . . Troughs or like reservoirs with immersed, or partly immersed, rollers or cylinders
31/07 . . . for rotogravure **[6]**
31/08 . . with ink-ejecting means, e.g. pumps, nozzles
31/10 . . Applications of feed or duct rollers (messenger or moving transfer rollers B41F 31/14)
31/12 . . . adjustable for regulating supply
31/13 . . Means for driving fountain rollers **[6]**
31/14 . . Applications of messenger or other moving transfer rollers
31/15 . Devices for moving vibrator-rollers **[6]**
31/16 . Continuous, e.g. endless, band apparatus
31/18 . for inking selected parts of printing formes
31/20 . Ink-removing or collecting devices
31/22 . for inking from interior of cylinder
31/24 . Absorbent pads
31/26 . Construction of inking rollers (inking-rollers serving also to apply ink repellent in rotary lithographic machines B41F 7/36)
31/28 . Spray apparatus, e.g. containing brushes
31/30 . Arrangements for tripping, lifting, adjusting, or removing inking rollers; Supports, bearings, or forks therefor
31/32 . . Lifting or adjusting devices (for damping rollers B41F 7/40)
31/34 . . . Cam, eccentric, wedge, or like devices
31/36 . . . fluid-pressure operated
31/38 . . . magnetically operated

33/00 Indicating, counting, warning, control, or safety devices (arrangements of counting devices in platen presses B41F 1/00, in cylinder presses B41F 3/84, in typewriters or selective printing mechanisms B41J 29/20; ink supply or metering devices B41J 31/02; such devices in general, see the relevant subclasses, e.g. counting in general G06M) **[3]**
33/02 . Arrangements of indicating devices, e.g. counters **[2]**
33/04 . Tripping devices or stop-motions (cylinder-tripping devices of rotary presses or machines B41F 13/24; arrangements for tripping inking rollers B41F 31/30) **[2]**
33/06 . . for starting or stopping operation of sheet or web feed
33/08 . . for starting or stopping operation of cylinders

33/10 . . for starting or stopping operation of damping or inking units
33/12 . . for starting or stopping the machine as a whole
33/14 . . Automatic control of tripping devices by feelers, photoelectric devices, pneumatic devices, or other detectors
33/16 . Programming systems for automatic control of sequence of operations
33/18 . Web break detection (B41F 33/04 takes precedence) **[6]**

35/00 Cleaning arrangements or devices
35/02 . for forme cylinders
35/04 . for inking rollers
35/06 . for offset cylinders

B41G APPARATUS FOR BRONZE PRINTING, LINE PRINTING, OR FOR BORDERING OR EDGING SHEETS OR LIKE ARTICLES; **AUXILIARY APPARATUS FOR PERFORATING IN CONJUNCTION WITH PRINTING** (perforating in general B26D; production of decorations B44C; perforating in conjunction with sheet or web delivery B65H 35/00; folding or unfolding thin material, e.g. sheets, webs, B65H 45/00, B65H 47/00)

1/00 Apparatus for bronze printing or for like operations (applying granular materials or metallic foils for decorative purposes B44C 1/00)
1/02 . platen type
1/04 . cylinder type

3/00 Apparatus for printing lines

5/00 Apparatus for bordering or edging sheets or like articles, e.g. for producing black rims on mourning cards

7/00 Auxiliary perforating apparatus associated with printing devices (apparatus or machines for carrying-out printing operations combined with operations other than perforating B41F 19/00)

B41J TYPEWRITERS; **SELECTIVE PRINTING MECHANISMS, I.E. MECHANISMS PRINTING OTHERWISE THAN FROM A FORME**; **CORRECTION OF TYPOGRAPHICAL ERRORS** (composing B41B; printing on special surfaces B41F; laundry marking B41K; erasers, rubbers or erasing devices B43L 19/00; fluid media for correction of typographical errors by coating C09D 10/00; recording the results of measuring G01; recognition or presentation of data, marking record carriers in digital fashion, e.g. by punching, G06K; franking or ticket-printing and issuing apparatus G07B; electric keyboard switches, in general H01H 13/70, H03K 17/94; coding in connection with keyboards or like devices, in general H03M 11/00; receivers or transmitters for transmission of digital information H04L; transmission or reproduction of documents, or the like, e.g. facsimile transmission, H04N 1/00; printing mechanisms specially adapted for apparatus, e.g. cash registers, weighing machines, producing records of their own performance, see the relevant subclasses)

(1) This subclass covers:
– manually controlled power-operated apparatus or apparatus of this type with additional control by input of recorded information, e.g. on punched cards or tapes;
– the "print-out" features of apparatus controlled by record carriers or electric signals in so far as these are of general interest, e.g. impression, inking, line-spacing mechanisms, printing heads. **[5]**

(2) This subclass does not cover:
– electrical features of apparatus controlled by record carriers or electric signals and of interest apart from the "print-out" features of said apparatus;
– apparatus controlled by record carriers or electric signals, as a whole. **[5]**

(3) In this subclass, the following term is used with the meaning indicated:
– "paper" covers also similar flexible copy material; **[3]**
– "printing material" covers both paper and temporary record carriers from which records are transferred to a paper, but does not cover printing masters, e.g. formes. **[5]**

Subclass index

KINDS OF APPARATUS

COMMON DETAILS OR ACCESSORIES

Kinds of typewriters or of selective printing mechanisms

1/00 **Typewriters or selective printing mechanisms characterised by the mounting, arrangement, or disposition of the types or dies** (non-selective embossing B44B 5/00)

1/02 . with separate or detached types or dies
1/04 . with types or dies carried upon levers or radial arms, e.g. manually operated (B41J 1/16 takes precedence)
1/06 . . on power-operated levers or arms
1/08 . with types or dies carried on sliding bars or rods
1/10 . . on end surfaces thereof
1/12 . . on side surfaces thereof, e.g. fixed thereto
1/14 . . . the types or dies being movable relative to the bars or rods (mounted on flexible bars or rods B41J 1/16)
1/16 . with types or dies arranged in stationary or sliding cases or frames or upon flexible strips, plates, bars, or rods
1/18 . with types or dies strung on wires or rods
1/20 . with types or dies mounted on endless bands or the like
1/22 . with types or dies mounted on carriers rotatable for selection
1/24 . . the plane of the type or die face being perpendicular to the axis of rotation (B41J 1/60 takes precedence)
1/26 . . . Carriers moving for impression (B41J 1/27 takes precedence) **[3]**
1/27 . . . Carriers moving during impression **[3]**
1/28 . . . Carriers stationary for impression, e.g. with the types or dies not moving relative to the carriers
1/30 . . . . with the types or dies moving relative to the carriers or mounted on flexible carriers
1/32 . . the plane of the type or die face being parallel to the axis of rotation, e.g. with type on the periphery of cylindrical carriers (B41J 1/60 takes precedence)
1/34 . . . Carriers rotating during impression
1/36 . . . Carriers sliding for impression, e.g. manually operated
1/38 . . . . power operated
1/40 . . . Carriers swinging for impression
1/42 . . . . about an axis parallel to the axis of rotation of the carrier
1/44 . . . Carriers stationary for impression
1/46 . . . . Types or dies fixed on wheel, drum, cylinder, or like carriers
1/48 . . . . . with a plurality of carriers, one for each character space
1/50 . . . . . with one or more carriers travelling across copy material in letter-space direction
1/52 . . . . . with copy material moving in the letter-space direction, and carrier mounting being fixed relative to the machine
1/54 . . . . Types or dies movable on wheel, drum, cylinder, or like carriers
1/56 . . . . Types or dies on shuttles or like loose carriers
1/58 . . . . Types or dies upon arcuate bars
1/60 . with types or dies on spherical, truncated-spherical, or like surfaces

2/00 **Typewriters or selective printing mechanisms characterised by the printing or marking process for which they are designed** (mounting, arrangement, or disposition of types or dies B41J 1/00; marking methods B41M 5/00; structure or manufacture of heads, e.g. inductive, for recording by magnetisation or demagnetisation of a record carrier G11B 5/127; heads for reproducing capacitive information G11B 9/07) **[5]**

(1) This group covers devices reproducing only a discrete number of tones, whereas group H04N 1/00 covers devices used for the reproduction of documents or the like, which devices are capable of reproducing continuous tone value scales. **[5]**

(2) In this group, the following expressions are used with the meanings indicated:
– "ink jet" involves the projection of ink on to the printing material, e.g. paper, through a nozzle as a stream of droplets or particles of colouring matter;
– "continuous ink jet" means a jet of ink transformed into a continuous stream of droplets or particles of colouring matter after having left the nozzle;
– "ink spray" means a spray of ink transported by a stream of charged particles or air on to the printing material. **[5]**

2/005 . characterised by bringing liquid or particles selectively into contact with a printing material (printing by selective application of impact or pressure on a printing or impression-transfer material B41J 2/22) **[5]**
2/01 . . Ink jet **[5]**
2/015 . . . characterised by the jet generation process (B41J 2/215 takes precedence) **[5]**
2/02 . . . . generating a continuous ink jet **[5]**
2/025 . . . . . by vibration **[5]**
2/03 . . . . . by pressure **[5]**
2/035 . . . . . by electric or magnetic field **[5]**
2/04 . . . . generating single droplets or particles on demand **[5]**
2/045 . . . . . by pressure, e.g. electromechanical transducers **[5]**
2/05 . . . . . produced by the application of heat **[5]**
2/055 . . . . . Devices for absorbing or preventing back-pressure **[5]**
2/06 . . . . . by electric or magnetic field **[5]**
2/065 . . . . . involving the preliminary making of ink protuberances **[5]**
2/07 . . . characterised by jet control (B41J 2/205 takes precedence) **[5]**
2/075 . . . . for many-valued deflection **[5]**
2/08 . . . . . charge-control type **[5]**

2/085 . . . . . Charge means, e.g. electrodes **[5]**
2/09 . . . . . Deflection means **[5]**
2/095 . . . . . electric field-control type **[5]**
2/10 . . . . . magnetic field-control type **[5]**
2/105 . . . . for binary-valued deflection **[5]**
2/11 . . . . for ink spray **[5]**
2/115 . . . . synchronising the droplet separation and charging time **[5]**
2/12 . . . . testing or correcting charge or deflection **[5]**
2/125 . . . . Sensors, e.g. deflection sensors **[5]**
2/13 . . . . for inclination of printed pattern **[5]**
2/135 . . . Nozzles **[5]**
2/14 . . . . Structure thereof **[5]**
2/145 . . . . Arrangement thereof **[5]**
2/15 . . . . . for serial printing **[5]**
2/155 . . . . . for line printing **[5]**
2/16 . . . . Production of nozzles **[5]**
2/165 . . . . Prevention of nozzle clogging, e.g. cleaning, capping or moistening for nozzles **[5]**
2/17 . . . characterised by ink handling **[5]**
2/175 . . . . Ink supply systems **[5]**
2/18 . . . . Ink recirculation systems **[5]**
2/185 . . . . . Ink-collectors; Ink-catchers **[5]**
2/19 . . . . for removing air bubbles **[5]**
2/195 . . . . for monitoring ink quality **[5]**
2/20 . . . . for preventing or detecting contamination of compounds **[5]**
2/205 . . . for printing a discrete number of tones (B41J 2/21 takes precedence) **[5]**
2/21 . . . for multi-colour printing **[5]**
2/215 . . by passing a medium, e.g. consisting of an air or particle stream, through an ink mist **[5]**
2/22 . characterised by selective application of impact or pressure on a printing material or impression- transfer material **[5]**
2/225 . . ballistic, e.g. using solid balls or pellets **[5]**
2/23 . . using print wires **[5]**
2/235 . . . Print head assemblies **[5]**
2/24 . . . . serial printer type (B41J 2/25, B41J 2/265 take precedence) **[5]**
2/245 . . . . line printer type (B41J 2/25, B41J 2/265 take precedence) **[5]**
2/25 . . . . Print wires **[5]**
2/255 . . . . . Arrangement of the print ends of the wires **[5]**
2/26 . . . . . Connection of print wire and actuator **[5]**
2/265 . . . . Guides for print wires **[5]**
2/27 . . . Actuators for print wires **[5]**
2/275 . . . . of clapper type (B41J 2/28 takes precedence) **[5]**
2/28 . . . . of spring charge type, i.e. with mechanical power under electro-magnetic control **[5]**
2/285 . . . . of plunger type **[5]**
2/29 . . . . of moving-coil type **[5]**
2/295 . . . . using piezo-electric elements **[5]**
2/30 . . . Control circuits for actuators **[5]**
2/305 . . . Ink supply apparatus (ink ribbons, ink-ribbon mechanisms B41J 31/00 to B41J 35/00) **[5]**
2/31 . . using a print element with projections on its surface impacted or impressed by hammers **[5]**
2/315 . characterised by selective application of heat to a heat sensitive printing or impression-transfer material (B41J 2/385, B41J 2/435 take precedence) **[5]**
2/32 . . using thermal heads **[5]**
2/325 . . . by selective transfer of ink from ink carrier, e.g. from ink ribbon or sheet **[5]**
2/33 . . . . from ink roller **[5]**
2/335 . . . Structure of thermal heads **[5]**
2/34 . . . . comprising semiconductors **[5]**
2/345 . . . characterised by the arrangement of resistors or conductors **[5]**
2/35 . . . providing current or voltage to the thermal head **[5]**
2/355 . . . . Control circuits for heating-element selection **[5]**
2/36 . . . . . Print density control **[5]**
2/365 . . . . . by compensation for variation in temperature **[5]**
2/37 . . . . . by compensation for variation in current **[5]**
2/375 . . . Protection arrangements against overheating **[5]**
2/38 . . Preheating, i.e. heating to a temperature insufficient to cause printing **[5]**
2/385 . characterised by selective supply of electric current or selective application of magnetism to a printing or impression-transfer material (B41J 2/005 takes precedence; electrography, magnetography G03G) **[5]**
2/39 . . using multi-stylus heads **[5]**
2/395 . . . Structure of multi-stylus heads **[5]**
2/40 . . . providing current or voltage to the multi-stylus head **[5]**
2/405 . . . . Selection of the stylus or auxiliary electrode to be supplied (electronic switching circuits in general H03K 17/00) **[5]**
2/41 . . for electrostatic printing (B41J 2/39 takes precedence) **[5]**
2/415 . . . by passing charged particles through a hole or a slit **[5]**
2/42 . . for heating selectively **[5]**
2/425 . . for removing surface layer selectively from electro-sensitive material, e.g. matel coated paper **[5]**
2/43 . . for magnetic printing **[5]**
2/435 . characterised by selective application of radiation to a printing material or impression-transfer material (optical elements, systems, or apparatus G02B; modulation or deflection of light G02F; electrophotography G03G) **[5]**
2/44 . . using single radiation source, e.g. lighting beams or shutter arrangements (B41J 2/475 takes precedence) **[5]**
2/445 . . . using liquid crystals **[5]**
2/447 . . using arrays of radiation sources (B41J 2/475 takes precedence) **[6]**
2/45 . . . using light-emitting diode arrays **[5]**
2/455 . . . using laser arrays **[5]**
2/46 . . . characterised by using glass fibres **[5]**
2/465 . . using masks, e.g. light-switching masks (photographic composing B41B) **[5]**
2/47 . . using the combination of scanning and modulation of light **[5]**
2/475 . . for heating selectively **[5]**
2/48 . . . melting ink on a film or melting ink granules **[5]**
2/485 . characterised by the process of building-up characters applicable to two or more kinds of printing or marking processes **[5]**
2/49 . . by writing **[5]**

2/495 . . by selective printing from a rotating helical member **[5]**
2/50 . . by the selective combination of two or more non-identical printing elements **[5]**
2/505 . . from an assembly of identical printing elements **[5]**
2/51 . . . serial printer type **[5]**
2/515 . . . line printer type **[5]**
2/52 . Arrangement for printing a discrete number of tones, not covered by group B41J 2/205, e.g. applicable to two or more kinds of printing or marking process (B41J 2/525 takes precedence; for photomechanical production G03F 5/00) **[5]**
2/525 . Arrangement for multi-colour printing, not covered by group B41J 2/21, e.g. applicable to two or more kinds of printing or marking process (for photomechanical production G03F 3/00) **[5]**

3/00 Typewriters or selective printing or marking mechanisms characterised by the purpose for which they are constructed (cryptographic typewriters G09C 3/00) **[5]**
3/01 . for special character, e.g. for Chinese characters or bar codes **[5]**
3/24 . for perforating or stencil cutting using special types or dies
3/26 . for stenographic writing
3/28 . for printing downwardly on flat surfaces, e.g. of books, drawings, boxes
3/30 . for printing with large type, e.g. on bulletins, tickets
3/32 . for printing in Braille or with keyboards specially adapted for use by blind or disabled persons
3/34 . for printing musical scores
3/36 . for portability
3/37 . . Foldable typewriters **[5]**
3/38 . for embossing, e.g. for making matrices for stereotypes
3/39 . . hand-held (manually-controlled or manually-operable label dispensers having printing equipment B65C 11/02) **[5]**
3/407 . for marking on special material (printing on special surfaces B41F 17/00) **[5]**
3/413 . . for metal **[5]**
3/42 . Two or more complete typewriters coupled for simultaneous operation
3/44 . Typewriters or selective printing mechanisms having dual functions or combined with, or coupled to, apparatus performing other functions (printing mechanisms coupled to typographical composing machines B41B 27/41)
3/46 . . Printing mechanisms combined with apparatus providing a visual indication
3/50 . . Mechanisms producing characters by printing and also producing a record by other means (punching mechanisms G06K) **[5]**
3/51 . . . the printed and recorded information being identical; using type elements with code-generating means (G06K 1/12 takes precedence) **[5]**
3/54 . with two or more sets of type or printing elements (B41J 3/60 takes precedence) **[5]**
3/60 . for printing on both faces of the printing material **[5]**
3/62 . for printing on two or more separate sheets or strips of printing material (B41J 3/54 takes precedence) **[5]**

Common details or accessories

5/00 Devices or arrangements for controlling character selection (methods or arrangements for sensing record carriers G06K 7/00)
5/02 . Character or syllable selected by setting an index
5/04 . . Single-character selection
5/06 . . Multiple-character selection
5/08 . Character or syllable selected by means of keys or keyboards of the typewriter type
5/10 . . Arrangements of keyboards
5/12 . . Construction of key buttons
5/14 . . Construction of key levers
5/16 . . Mounting or connecting key buttons on or to key levers
5/18 . . Locks
5/20 . . . for subsidiary keys, e.g. for shift keys
5/22 . . . Interlocks between keys, e.g. without detent arrangements
5/24 . . . . with detent arrangements
5/26 . . Regulating touch, key dip or stroke, or the like
5/28 . . Multiple-action keys, e.g. keys depressed by two or more amounts or movable in two or more directions to effect different functions or selections
5/30 . Character or syllable selection controlled by recorded information
5/31 . . characterised by form of recorded information
5/32 . . . by printed, embossed, or photographic records, e.g. cards, sheets
5/34 . . . . by strips or tapes
5/36 . . . by punched records, e.g. cards, sheets
5/38 . . . . by strips or tapes
5/40 . . . by magnetic or electrostatic records, e.g. cards, sheets
5/42 . . . . by strips or tapes
5/44 . . characterised by the kind of storage of recorded information
5/46 . . . the storage being on internal storages
5/48 . . . the storage being on external storages
5/50 . . . . on a single storage
5/51 . . . . on more than one separate storage, e.g. on additional correction strips or tapes **[3]**
5/52 . . characterised by the provision of additional devices for producing a punched or like record, e.g. simultaneously

7/00 Type-selecting or type-actuating mechanisms (index setting B41J 5/02)
7/02 . Type-lever actuating mechanisms
7/04 . . Levers mounted on fixed pivots
7/06 . . . and connected to transmission members, e.g. toothed gearing
7/08 . . . . with pin-and-slot or like loose connections; Cam-slot members
7/10 . . . . Chain, belt, flexible-cable, or like members
7/12 . . . U-shaped type-lever on two pivots
7/14 . . . Single key-and-type lever
7/16 . . . Type-head pivoted to, or rotating on, lever
7/18 . . Levers having moving or variable fulcra to alter the mechanical advantage during the stroke
7/20 . . Levers having moving pivots fixed relative to the lever; Type-bars each pivoted on two links
7/22 . . Type-baskets; Bearings or hangers for type-levers
7/24 . . Construction of type-levers (U-shaped levers B41J 7/12)

7/26 . . Special means, e.g. repulsers, for ensuring return of type-levers
7/28 . . Key-lever and type-member returned independently to rest position
7/30 . . Preventing rebound or clash of levers or type-members
7/32 . Type-face selected by operation of sliding members
7/34 . Type-face selected by operation of rotary members
7/36 . Selecting arrangements applied to type-carriers rotating during impression
7/38 . . Type movable on carrier for selection
7/40 . . Type movable on carrier for impression
7/42 . . Timed impression, e.g. without impact
7/44 . . . with impact
7/46 . . Rolling contact during impression
7/48 . Type-carrier arrested in selected position by electromagnetic means
7/50 . Type-face selected by combinations of two movements of type-carrier
7/52 . . by combined rotary and sliding movement
7/54 . Selecting arrangements including combination, permutation, summation, or aggregation means
7/56 . . Summation devices for mechanical movements
7/58 . . . Wedges
7/60 . . . Levers
7/62 . . . Gearing
7/64 . . . Pulley-and-strand mechanism
7/66 . . Movable members, e.g. pins, displaceable according to a code
7/68 . . with means for selectively closing an electric circuit for type presentation
7/90 . Syllable, line, or like type selection
7/92 . Impact adjustment; Means to give uniformity of impression (B41J 9/46, B41J 9/48 take precedence) **[5]**
7/94 . . Character-by-character adjustment
7/96 . Means for checking correctness of setting

9/00 Hammer-impression mechanisms

9/02 . Hammers; Arrangements thereof
9/04 . . of single hammers, e.g. travelling along printing line
9/06 . . . of stationary hammers, e.g. engaging a single type-carrier
9/08 . . . . engaging more than one type-carrier
9/10 . . of more than one hammer, e.g. one for each character position
9/12 . . . each operating in more than one character position
9/127 . . Mounting of hammers **[3]**
9/133 . . Construction of hammer body or tip **[3]**
9/14 . Means for selecting or suppressing individual hammers
9/16 . Means for cocking or resetting hammers
9/18 . . Cams
9/20 . . Springs
9/22 . . Fluid-pressure means
9/24 . . Electromagnetic means
9/26 . Means for operating hammers to effect impression
9/28 . . Cams
9/30 . . Springs
9/32 . . arranged to be clutched to snatch roll
9/34 . . Fluid-pressure means
9/36 . . in which mechanical power is applied under electromagnetic control
9/38 . . Electromagnetic means
9/40 . . including an electro-adhesive clutch
9/42 . with anti-rebound arrangements
9/44 . Control for hammer-impression mechanisms **[5]**
9/46 . . for deciding or adjusting hammer-firing time **[5]**
9/48 . . for deciding or adjusting hammer-drive energy **[5]**
9/50 . . for compensating for the variations of printer drive conditions, e.g. for compensating for the variation of temperature or current supply **[5]**
9/52 . . for checking the operation of print hammers **[5]**
9/54 . . . for checking the breakage of print hammers **[5]**

11/00 Devices or arrangements for supporting or handling copy material in sheet or web form (specially adapted for supporting or handling copy material in short lengths B41J 13/00, in continuous form B41J 15/00; holders for text to be copied B41J 29/00)

11/02 . Platens
11/04 . . Roller platens
11/053 . . . with sound-deadening devices (structure of surface B41J 11/057) **[3]**
11/057 . . . Structure of the surface **[3]**
11/06 . . Flat page-size platens
11/08 . . Bar or like line-size platens
11/10 . . Anvil or like character-size platens
11/13 . . Backings or blankets (for roller platens B41J 11/057) **[3]**
11/14 . . Platen-shift mechanisms; Driving gear therefor
11/16 . . with balancing means
11/18 . Platen-impression arrangements
11/20 . Platen adjustments for varying the strength of impression, for a varying number of papers, for wear or for alignment
11/22 . Paper-carriage guides or races
11/24 . Detents, brakes, or couplings for feed rollers or platens
11/26 . Pin feeds
11/27 . . on or within the platen-rollers
11/28 . . Pin wheels
11/30 . . Pin traction elements other than wheels, e.g. pins on endless bands
11/32 . . Adjustment of pin wheels or traction elements, e.g. laterally
11/34 . . Guides coacting with pin feeds
11/36 . Blanking or long feeds; Feeding to a particular line, e.g. by rotation of platen or feed roller
11/38 . . Manually-operated feeding devices
11/40 . . specially adapted for printing musical scores
11/42 . . Controlling
11/44 . . . by devices, e.g. programme tape or contact wheel, moved in correspondence with movement of paper-feeding devices, e.g. platen rotation
11/46 . . . by marks or formations on the paper being fed
11/48 . Apparatus for condensed record, tally strip, or like work using two or more papers, or sets of papers
11/50 . . in which two or more papers or sets are separately fed in the same direction towards the printing position
11/51 . . . with different feed rates **[3]**
11/52 . . in which one paper or set is moved transversely relative to another
11/53 . . . Devices for holding in place one paper or set during replacement of one or more of the auxiliary papers or sets

11/54 . . in which one paper or set is fed towards printing position from the front of the apparatus
11/55 . . . with means for adjusting a paper or set **[3]**
11/56 . specially constructed to facilitate storage or transport of typewriter
11/58 . Supply holders for sheets or fan-folded webs, e.g. shelves, tables, scrolls, pile holders
11/60 . Erasing or correcting tables
11/62 . Shields or masks
11/64 . Applications of scales or indicators
11/66 . Applications of cutting devices
11/68 . . cutting parallel to the direction of paper feed
11/70 . . cutting perpendicular to the direction of paper feed

13/00 Devices or arrangements specially adapted for supporting or handling copy material in short lengths, e.g. sheets

13/02 . Rollers (roller platens B41J 11/04)
13/03 . . driven, e.g. feed rollers separate from platen
13/036 . . co-operating with a roller platen **[3]**
13/042 . . . Front and rear rollers or sets of front or rear rollers each mounted on a separate carrier **[3]**
13/048 . . . Front and rear rollers both mounted on a common carrier **[3]**
13/054 . . . . on the paper apron concentric with the roller platen **[3]**
13/076 . . Construction of rollers; Bearings therefor
13/08 . Bands or like feeding devices
13/10 . Sheet holders, retainers, or stationary guides
13/12 . . specially adapted for cards, envelopes, or the like
13/14 . . Aprons or guides
13/16 . . . movable for insertion or release of sheets
13/18 . . . concentric with roller platen
13/20 . . Bails
13/22 . . Clamps or grippers
13/24 . . Strips for supporting or holding papers
13/26 . Registering devices
13/28 . . Front lays, stops, or gauges
13/30 . . Side lays or gauges
13/32 . . Means for positioning sheets in two directions under one control, e.g. for format control or orthogonal sheet positioning

15/00 Devices or arrangements specially adapted for supporting or handling copy material in continuous form, e.g. webs

15/02 . Web rolls or spindles; Attaching webs to cores or spindles
15/04 . Supporting, feeding, or guiding devices; Mountings for web rolls or spindles
15/06 . . characterised by being applied to printers having stationary carriages
15/08 . . characterised by being applied to printers having transversely-moving carriages
15/10 . . . and mounted on the carriage
15/12 . . . and coupled to the carriage
15/14 . . . and detached from the carriage
15/16 . Means for tensioning or winding the web
15/18 . Multiple-web feeding apparatus
15/20 . . for webs superimposed during printing (machines for separating superposed webs B65H 41/00)
15/22 . . for feeding webs in separate paths during printing
15/24 . . with means for registering the webs with each other

17/00 Mechanisms for manipulating page-width impression-transfer material, e.g. carbon paper (in manifolding devices B41L; sheet material for duplicating or marking B41M 5/00)

17/02 . Feeding mechanisms
17/04 . . Feed dependent on the record-paper feed, e.g. both moved at the same time
17/06 . . . "Creep" feed, i.e. impression-transfer material fed slower than the record paper
17/07 . . . electromagnetically controlled
17/08 . . Feed independent of the record-paper feed
17/10 . . . electromagnetically controlled
17/12 . . Special adaptations for ensuring maximum life
17/14 . . Automatic arrangements for reversing the feed direction
17/16 . Holders in the machine for sheets of impression-transfer material
17/18 . . pivotable to and from the platen
17/20 . . slidable to and from the platen
17/22 . Supply arrangements for webs or impression-transfer material
17/24 . . Webs supplied from reels or spools attached to the machine (reels per se B65H 75/02)
17/26 . . Webs supplied from trays or like supports attached to the machines
17/28 . Arrangements of guides for the impression-transfer material
17/30 . Constructions of guides for the impression-transfer material
17/32 . Detachable carriers or holders for impression-transfer material mechanism
17/34 . Backings for impression-transfer material, e.g. sheets for reducing friction, shields for preventing imprint
17/36 . Alarms, indicators, or feed-disabling devices responsive to material breakage or exhaustion
17/38 . for dealing with the impression-transfer material after use
17/40 . . for retracting sheets for re-use
17/42 . . for webs

19/00 Character- or line-spacing mechanisms (key actions B41J 25/02)

19/02 . with retarding devices, e.g. brakes
19/04 . Sound-deadening or shock-absorbing devices or measures therein (B41J 19/38 takes precedence)
19/06 . . Resilient mounting of mechanism
19/08 . . Buffers, springs, or like carriage stops
19/10 . . Dash-pots
19/12 . . Gearing made of special material or specially constructed to reduce sound or shock
19/14 . with means for effecting line or character spacing in either direction
19/16 . Special spacing mechanisms for circular, spiral, or diagonal-printing apparatus
19/18 . Character-spacing or back-spacing mechanisms; Carriage-return or release devices therefor
19/20 . . Positive-feed character-spacing mechanisms (controlled by escapements B41J 19/52)
19/22 . . . acting by friction or gripping effect
19/24 . . . Pawl and ratchet
19/26 . . . . moving a paper or like carriage
19/28 . . . . moving a paper or like web or strip, e.g. over a stationary support
19/30 . . . Electromagnetically-operated mechanisms
19/32 . . . Differential or variable-spacing arrangements
19/34 . . Escapement-feed character-spacing mechanisms

19/36 . . . Driving mechanisms, e.g. springs stressed during carriage return
19/38 . . . . adapted for silent return
19/40 . . . Escapements having a single pawl or like detent
19/42 . . . Escapements having two pawls or like detents
19/44 . . . . coacting with two toothed members, e.g. racks or wheels
19/46 . . . . and mounted on a single rocker
19/48 . . . . and mounted on a single slider
19/50 . . . Electromagnetically-controlled escapements
19/52 . . . Escapements controlling positive-feed mechanism
19/54 . . . Construction of universal bars
19/56 . . . Escapements controlling web or strip feed
19/58 . . . Differential or variable-spacing arrangements
19/60 . . Auxiliary feed or adjustment devices
19/62 . . . for back-spacing
19/64 . . . for justifying
19/66 . . Carriage-release mechanisms
19/68 . . Carriage-return mechanisms, e.g. manually actuated
19/70 . . . power driven
19/72 . . . . with power stored during character spacing
19/74 . . with special means to maintain character-spacing or back-spacing elements in engagement during case-shift or like movement
19/76 . Line-spacing mechanisms (special line-feeds, e.g. long feeds, B41J 11/36)
19/78 . . Positive-feed mechanisms
19/80 . . . Pawl-and-ratchet mechanisms
19/82 . . . . moving a paper or like carriage
19/84 . . . . . in the form of a roller rotated for line spacing
19/86 . . . . . the pawl being normally in engagement with the ratchet
19/88 . . . . moving a type carriage
19/90 . . . . moving a paper or like web or strip, e.g. over a stationary support, automatically in response to movements other than carriage return
19/92 . . . Electromagnetically-operated mechanisms
19/94 . . . automatically operated in response to carriage return
19/96 . . . Variable-spacing arrangements
19/98 . . Escapement-feed mechanisms

21/00 Column, tabular, or like printing arrangements; **Means for centralising short lines** (carriage-release mechanisms B41J 19/66; key actions B41J 25/18)
21/02 . Stops or stop-racks
21/04 . Mechanisms for setting or restoring tabulation stops
21/06 . with means for preventing rebound from stops
21/08 . Mechanisms for initiating, effecting, skipping, or stopping tabulation movement; Means for centralising short lines
21/10 . with central, counter, or equivalent stop projected into path of tabulation stops
21/12 . characterised by arrangements of electrical contacts
21/14 . characterised by denominational arrangements
21/16 . controlled by the sensing of marks or formations on the paper being typed, an undersheet, or the platen
21/17 . controlled by stored information **[5]**
21/18 . characterised by applications of scales or indicators

23/00 Power drives for actions or mechanisms (B41J 9/00 take precedence)
23/02 . Mechanical power drives
23/04 . . with driven mechanism arranged to be clutched to continuously-operating power source
23/06 . . . by snatch rolls
23/08 . . . by one-revolution or part-revolution clutches
23/10 . . . and arrested in selected position
23/12 . . Mechanism driven by cams engaging rotating roller
23/14 . . Mechanism driven through an oscillating or reciprocating member
23/16 . . Mechanism driven by a spring tensioned by power means
23/18 . . Continuously-cycling drives
23/20 . Fluid-pressure power drives
23/22 . . for key or like type selection
23/24 . . for impression mechanisms
23/26 . . for platen or carriage movements, e.g. for line spacing, letter spacing, or carriage return
23/28 . . for type-carriage movements
23/30 . . for case shift
23/32 . Electromagnetic power drives, e.g. applied to key levers
23/34 . . applied to elements other than key levers
23/36 . . . and acting on type members
23/38 . . . and acting on aligning or case-shift mechanisms

25/00 Actions or mechanisms not otherwise provided for
25/02 . Key actions for specified purposes
25/04 . . Back-spacing
25/06 . . Carriage return
25/08 . . Case shift
25/10 . . Ink-ribbon adjustment
25/12 . . Character spacing
25/14 . . Line spacing
25/16 . . Line spacing and carriage return by a single key
25/18 . . Tabulating
25/20 . Auxiliary type mechanisms for printing distinguishing marks, e.g. for accenting, using dead or half-dead key arrangements, for printing marks in telegraph printers to indicate that machine is receiving
25/22 . for aligning characters for impression (in machines using index setting B41J 5/02)
25/24 . Case-shift mechanisms (B41J 11/14 takes precedence; key actions B41J 25/08); Fount-change arrangements
25/304 . Bodily-movable mechanisms for print heads or carriages movable towards or from paper surface (type carriers sliding for impression B41J 1/36; type carriers swinging for impression B41J 1/40) **[5]**
25/308 . . with print gap adjustment mechanisms **[5]**
25/312 . . with print pressure adjustment mechanisms, e.g. pressure-on-the-paper mechanisms **[5]**
25/316 . . with tilting motion mechanisms relative to paper surface **[5]**
25/32 . Impression mechanisms in which a roller co-operates with stationary type-faces
25/34 . Bodily-changeable print heads or carriages (B41J 1/20, B41J 1/22, B41J 1/60 take precedence) **[5]**

27/00 Inking apparatus
27/02 . with ink applied by pads or rotary discs

27/04 . . Pads or discs; Ink-supply arrangements therefor
27/06 . . Arrangements to ensure maximum life of pads or discs
27/08 . . Arrangements for multicolour work
27/10 . with ink applied by rollers; Ink-supply arrangements therefor
27/12 . . Rollers
27/14 . . Arrangements for multicolour work
27/16 . with ink deposited electrostatically or electromagnetically, e.g. powdered ink
27/18 . . with liquid ink deposited
27/20 . with ink supplied by capillary action, e.g. through porous type-members, through porous platens
27/22 . with inking discs or sectors

29/00 Details of, or accessories for, typewriters or selective printing mechanisms not otherwise provided for
29/02 . Framework
29/04 . Means for attaching machines to baseboards
29/06 . Special supports, platforms, or trolleys for supporting machines on tables
29/08 . Sound-deadening or shock-absorbing stands, supports, cases, or pads separate from machines
29/10 . Sound-deadening devices embodied in machines (B41J 19/04 takes precedence)
29/12 . Guards, shields or dust excluders **[5]**
29/13 . . Cases or covers **[5]**
29/14 . Attachments operated by the leg, e.g. the foot or knee
29/15 . Script supports connected to the typewriter or printer (tables, desks, office furniture, in general A47B) **[5]**
29/16 . Auxiliary receptacles for articles, e.g. erasers, pencils
29/17 . Cleaning arrangements **[5]**
29/18 . Mechanisms for rendering the print visible to the operator (ink-ribbon shifts B41J 35/20) **[5]**
29/19 . . with reflectors or illuminating devices **[5]**
29/20 . Arrangements of counting devices
29/22 . . Line counters
29/24 . . Word counters
29/26 . Devices, non-fluid media or methods for cancelling, correcting errors, underscoring or ruling **[4]**
29/28 . . Writing or like instruments in holders or guides
29/30 . . Wheels
29/32 . . Type-members
29/34 . . . repeatedly actuated
29/36 . . for cancelling or correcting errors by overprinting (B41J 31/00 takes precedence) **[4]**
29/367 . . . sheet media carrying a pigmented transferable correction layer **[4]**
29/373 . . . sheet media bearing an adhesive layer effective to lift off wrongly typed characters **[4]**
29/377 . Cooling or ventilating arrangements **[5]**
29/38 . Drives, motors, controls, or automatic cut-off devices for the entire printing mechanism
29/387 . . Automatic cut-off devices **[5]**
29/393 . . Devices for controlling or analysing the entire machine **[5]**
29/40 . Means for printing fixed, i.e. unchanging, matter in addition to selectable matter
29/42 . Scales and indicators, e.g. for determining side margins
29/44 . . for determining top and bottom margins or indicating exhaust of paper
29/46 . Applications of alarms, e.g. responsive to approach of end of line (responsive to transfer-material breakage or exhaustion B41J 17/36, B41J 35/36)
29/48 . . responsive to breakage or exhaustion of paper or approach of bottom of paper
29/50 . Side-stop mechanisms
29/52 . Top-and-bottom stop mechanisms
29/54 . Locking devices applied to printing mechanisms
29/56 . . and manually actuated
29/58 . . and automatically actuated
29/60 . . . in response to failure of power supply
29/62 . . . by the absence of paper to lock hammer mechanism
29/64 . . . by a function of the printer to lock the keyboard
29/66 . . . . Locking devices actuated when platen reaches the end of a line
29/68 . . . by completion of a page or predetermined number of lines or exhaustion of paper to lock the keyboard
29/70 . . . Interlocks between any two carriage-moving mechanisms, e.g. character-space, back-space, tabulation, carriage-return, or carriage-release mechanisms

Ink ribbons; **Ink-ribbon mechanisms**

31/00 Ink ribbons (sheet material for duplicating or marking B41M 5/00; storing webs or tapes, e.g. on reels, B65H 75/00); **Renovating or testing ink ribbons**
31/02 . Ink ribbons characterised by the material from which they are woven
31/04 . . woven from synthetic material
31/05 . Ink ribbons having coatings other than impression-material coatings
31/06 . . the coatings being directly on the base material, i.e. below impression-transfer material; Ink ribbons having base material impregnated with material other than impression material
31/08 . . the coatings being superimposed on impression-transfer material
31/09 . Ink ribbons characterised by areas carrying media for obliteration or removal of typing errors **[4]**
31/10 . Ink ribbons having arrangements to facilitate threading through a machine
31/12 . Ink ribbons having arrangements to prevent undesired contact between the impression-transfer material and machine parts or other articles
31/14 . Renovating or testing ink ribbons
31/16 . . while fitted in the machine using the ink ribbons

32/00 Ink-ribbon cartridges [3]
32/02 . for endless ribbons **[3]**

33/00 Apparatus or arrangements for feeding ink ribbons or like character-size impression-transfer material (ink-ribbon cartridges B41J 32/00)
33/02 . Ribbon arrangements
33/04 . . mounted on moving carriages
33/06 . . Ribbons associated, but not moving, with typewriter platens, e.g. extending transversely to the length of the platen
33/08 . . . and extending parallel to the length of the platen
33/10 . . Arrangements of endless ribbons
33/12 . . Ribbons carried by coaxially-mounted spools
33/14 . Ribbon-feed devices or mechanisms
33/16 . . with drive applied to spool or spool spindle
33/18 . . . by ratchet mechanism (B41J 33/30 takes precedence)
33/20 . . . by friction

33/22 . . . by gears or pulleys
33/24 . . with drive applied directly to ribbon
33/26 . . . by rollers engaging the ribbon
33/28 . . . by mechanism pulling or gripping the ribbon
33/30 . . Escapement mechanisms
33/32 . . Electromagnetic devices
33/34 . . driven by motors independently of the machine as a whole
33/36 . . with means for adjusting feeding rate
33/38 . . Slow, e.g. "creep", feed mechanisms
33/382 . . . the ribbon being fed only during carriage return
33/384 . . . . and attached to the carriage during writing
33/386 . . . the ribbon being fed only by operation of the line-spacing mechanism
33/388 . . . the ribbon being fed only when type impression takes place
33/40 . . with arrangements for reversing the feed direction
33/42 . . . manually
33/44 . . . automatically
33/46 . . . . and characterised by its application to mechanism in which two spools are driven by pawl-and-rachet mechanism
33/48 . . . . . comprising two pawls and ratchets, one for each spool
33/50 . . . . . comprising a single pawl or integral double-tooth pawl selectively engageable with two ratchets, one for each spool
33/51 . . . . and characterised by the use of particular reversing control means
33/512 . . . . . using a pivoted reversing-feeler engaging the external periphery of the wound ribbon
33/514 . . . . . using a pivoted reversing-feeler engaging the interior of the wound ribbon
33/516 . . . . . using a reversing-feeler responsive to the tension of the ribbon
33/518 . . . . . the reversing-feeler engaging buttons or the like secured to the ribbon near its ends
33/52 . . Braking devices therefor
33/54 . . for ensuring maximum life of the ribbon (B41J 33/38 takes precedence; by adjustment of vibrator mechanisms B41J 35/14)
33/56 . . . Ribbon adjusted transversely
33/58 . . . Ribbon fed angularly
33/60 . . responsive to telegraph code or other extraneous signals

35/00 Other apparatus or arrangements associated with, or incorporated in, ink-ribbon mechanisms

35/02 . Frames or holders for unwound short lengths of ink ribbons
35/03 . . the holder being movable to inoperative position, e.g. by swinging upwardly
35/04 . Ink-ribbon guides
35/06 . . stationary
35/08 . . with tensioning arrangements
35/10 . . Vibrator mechanisms; Driving gear therefor
35/12 . . . adjustable, e.g. for case shift (key actions B41J 25/02)
35/14 . . . . for multicolour work; for ensuring maximum life of ink ribbon; for rendering ink ribbon inoperative
35/16 . Multicolour arrangements (B41J 35/10 takes precedence)
35/18 . . Colour change effected automatically
35/20 . Ink-ribbon shifts, e.g. for exposing print, for case-shift adjustment, for rendering ink ribbon inoperative
35/22 . Mechanisms permitting the selective use of a plurality of ink ribbons
35/23 . . with two or more ribbon guides
35/24 . Mechanisms specially adapted for feeding impression-transfer materials of foil form
35/26 . Ink-ribbon shields or backings
35/28 . Detachable carriers or holders for ink-ribbon mechanisms
35/30 . Manifolding or like arrangements
35/32 . . for producing a plurality of copies along the printing line by a single ink ribbon
35/34 . . using a plurality of separate ink ribbons, e.g. including one hectographic ink ribbon
35/35 . . using unwound short lengths of ink ribbons
35/36 . Alarms, indicators, or feed-disabling devices responsive to ink-ribbon breakage or exhaustion
35/38 . Feeding the ink ribbon to waste after use

B41K STAMPS; **STAMPING OR NUMBERING APPARATUS OR DEVICES** (marking meat A22C 17/10; embossing combined with printing B41F 19/00; selective printing mechanisms B41J; embossing decorations or marks B44B 5/00; marking or coding completed packages B65B 61/26; ticket printing and issuing, fare registering, non-printing aspects of franking apparatus G07B)

1/00 Portable hand-operated devices without means for supporting or locating the articles to be stamped, i.e. hand stamps; **Inking devices or other accessories therefor**

1/02 . with one or more flat stamping surfaces having fixed images
1/04 . . with multiple stamping surfaces; with stamping surfaces replaceable as a whole
1/06 . . with means for locating the image to be obtained
1/08 . with a flat stamping surface and changeable characters
1/10 . . having movable type-carrying bands or chains
1/12 . . having adjustable type-carrying wheels
1/14 . . having automatic means for changing type-characters
1/16 . . . Numbering devices
1/18 . . . . for pages
1/20 . . with means for locating the image to be obtained
1/22 . with curved stamping surfaces for stamping by rolling contact
1/24 . . Rocking stamps
1/26 . with stamping surfaces adapted for application to non-flat surfaces
1/28 . . flexible
1/30 . for offset or intaglio stamping
1/32 . for stencilling
1/34 . for multicolour stamping

1/36 . Details
1/38 . . Inking devices; Stamping surfaces
1/40 . . . Inking devices operated by stamping movement
1/42 . . . . with pads or rollers movable for inking
1/44 . . . for offset, intaglio, or stencil stamping
1/46 . . . for multicolour stamping
1/48 . . . with ink ribbons, ink sheets, or carbon tape or paper
1/50 . . . Stamping surfaces impregnated with ink, or made of material leaving a mark after stamping contact
1/52 . . . Ink reservoirs, e.g. integral with stamp handles
1/54 . . . Inking pads
1/56 . . Handles
1/58 . . Stands or other means for keeping hand stamps or the like within easy reach

3/00 Apparatus for stamping articles having integral means for supporting the articles to be stamped (means for printing on articles of special shape or having a surface of particular configuration B41F 17/00)
3/02 . with stamping surface located above article-supporting surface
3/04 . . and movable at right angles to the surface to be stamped
3/06 . . . having type-carrying bands or chains
3/08 . . . having adjustable type-carrying wheels
3/10 . . . having automatic means for changing type-characters, e.g. numbering devices
3/12 . . with curved stamping surface for stamping by rolling contact
3/14 . . . for relief stamping
3/16 . . . for intaglio stamping
3/18 . . . for offset stamping
3/20 . . . for stencilling
3/22 . . . with means for producing distorted images
3/24 . . for multicolour stamping
3/26 . with stamping surface located below article-supporting surface
3/28 . . and bearing a positive image
3/30 . . . and having means for varying the image, e.g. by exchanging stamping plates in succession
3/32 . with co-operating stamping and counter-stamping members
3/34 . . in the form of indexable cylinders, e.g. of curved or polygonal cross-section, or of movable chains or bands
3/36 . with means for deforming or punching the copy matter
3/38 . . separate from the stamping means
3/40 . . for numerical or alphabetical characters
3/42 . Stamping apparatus with selection mechanisms for successively stamping and delivering lists or other items giving information, e.g. for warehouse administration, washing lists, supermarket guides
3/44 . Means for handling copy matter
3/46 . . for locating when stationary
3/48 . . for conveying intermittently to or from stamping station
3/50 . . for conveying during stamping operation
3/52 . . for discharging
3/54 . Inking devices
3/56 . . using inking pads
3/58 . . using ink ribbons, ink sheets, or carbon tape or paper
3/60 . . using rollers, e.g. rollers with integral ink-supply devices
3/62 . Details or accessories
3/64 . . Stamping mechanisms controlled by feed of copy matter
3/66 . . Safety devices, e.g. for preventing extraction of copy matter before completion of stamping operation
3/68 . . Cutting or severing devices (in general B26)

5/00 Plier-like tools for stamping, or stamping and delivering, tickets or the like
5/02 . with means for varying the image stamped
5/04 . with devices for collecting counterfoils, or with other means for recording stamping operations (counting devices G06M)
5/06 . . for recording on separate tape
5/08 . . with counting devices

99/00 Subject matter not provided for in other groups of this subclass [8]

B41L APPARATUS OR DEVICES FOR MANIFOLDING, DUPLICATING, OR PRINTING FOR OFFICE OR OTHER COMMERCIAL PURPOSES; **ADDRESSING MACHINES OR LIKE SERIES-PRINTING MACHINES** (printing presses or machines for industrial purposes B41F; stamps, stamping or numbering devices B41K)

(1) This subclass does not cover constituent parts common to manifolding by means of pressure-sensitive layers or intermediaries, to apparatus or machines for duplicating or printing for office or other commercial purposes, or to addressing machines or like series-printing machines, which are covered by subclass B41F.
(2) In this subclass, as indicated by the references, groups B41L 15/00 and B41L 17/00 are intended to cover letterpress and lithographic printing apparatus only in so far as it is specially adapted for office or other commercial purposes; the general constructions or features of apparatus of these types are classified in subclass B41F. Constructions or features determining classification in these groups are, for example: ease of operation by clerical staff, cleanliness of operation in non-industrial environments, the use of printing surfaces constructed for the production of a limited number of copies.
(3) In this subclass, the following terms are used with the meanings indicated:
– "manifolding" means the obtaining of several copies simultaneously by means of pressure-sensitive layers when making an original;

– "duplicating" means the obtaining of successive copies from a master, e.g. a hectographic image;
– "stencilling" involves the use of a printing surface which is perforated to form the image, the ink flowing through the perforations on the copy material.

Subclass index

Manifolding by means of pressure-sensitive layers or intermediaries

1/00 Devices for performing operations in connection with manifolding by means of pressure-sensitive layers or intermediaries, e.g. carbons; Accessories for manifolding purposes

1/02 . Devices for preparatory operations, e.g. for bringing together sheets or webs and interposed carbons; Devices combined with devices for printing, for coating with carbon, for folding
1/04 . Devices for performing operations subsequent to manifolding, e.g. for separating single sheets or webs from single form sets, continuous manifold assemblies from carbons
1/06 . . on single form sets
1/08 . . on continuous manifold assemblies
1/10 . . . Separate folding or disposition of single webs
1/12 . . . Severing webs to obtain single sheets or forms, e.g. by cutting, by bursting
1/14 . . . Severing edge perforations from webs
1/16 . Carriers or supply devices for pressure-sensitive material, e.g. for carbon sheets; Carbon gloves
1/18 . . for carbon webs; Continuous carbon-supply mechanisms
1/20 . Manifolding assemblies, e.g. book-like assemblies
1/22 . . made up of single sheets or forms
1/24 . . . Pads or books
1/26 . . Continuous assemblies made up of webs
1/28 . . . in rolled or wound form
1/30 . . . folded longitudinally
1/32 . . . folded transversely
1/34 . . for making masters for hectographic duplicators
1/36 . . with pressure-sensitive layers or coating other than carbon (sheet materials B41M 5/00)

3/00 Platens or like sheet supports for manifolding using pressure-sensitive layers or intermediaries, e.g. for book-keeping purposes

3/02 . with stationary clamping means for holding the manifolding assembly in registered position, e.g. resilient clamps for holding non-perforated sheets
3/04 . . Bars provided with pins engaging perforations in the elements
3/06 . with movable clamping or guiding means for the elements of the manifolding assembly
3/08 . with non-mechanical means for holding the elements in registered position, e.g. magnetic means
3/10 . with means for moving assembled elements step by step relative to platen or support, e.g. for column or line selection; Means for locating assembled elements when stationary
3/12 . Auxiliary devices
3/14 . . Magazines or storage compartments, e.g. for slips
3/16 . . Web-feeding arrangements
3/18 . . Displaceable covers, e.g. with windows
3/20 . . for facilitating manifolding in books
3/22 . . Applications of ink ribbons; Holding, feeding, or guiding means therefor

5/00 Autographic registers or like apparatus for manifolding by means of pressure-sensitive layers, using movable strips or webs (movable-strip writing or reading apparatus B42D 19/00)

5/02 . with means for limiting movements of webs fed by hand
5/04 . with mechanisms for feeding webs or for arranging web feed; with web-storage arrangements
5/06 . . by means of rollers, wheels, or chains
5/08 . . by reciprocating mechanisms
5/10 . with mechanisms for feeding the pressure-sensitive web or webs separately from the other webs, e.g. transversely
5/12 . with means for indicating exhaustion of web supply
5/14 . with auxiliary means for printing, perforating, or severing the web
5/16 . Accessories, e.g. drawers for storing forms, for money (cash registers G07G)

Apparatus or machines for duplicating or printing for office or other commercial purposes

7/00 **Apparatus for directly duplicating from hectographic originals, i.e. for obtaining copies in mirror image**
7/02 . by passing original and copy-sheet or -web between rollers
7/04 . . with means for guiding original or copy-sheet or -web
7/06 . . with means for severing copy-sheet or -web
7/08 . . with means for moistening or drying

9/00 **Apparatus for indirectly duplicating from hectographic originals by means of hectographic intermediaries or transfer surfaces, i.e. "dry duplicators"**
9/02 . Containers for clay or gelatin
9/04 . with flat supports over which gelatin-paper is stretched
9/06 . . and with carriages for feeding the sheets
9/08 . . and with devices for rolling-in and securing hectographic gelatin-paper webs
9/10 . with rotary cylinders carrying sheets of hectographic gelatin-paper

11/00 **Apparatus for directly duplicating from hectographic masters in mirror image, i.e. "wet duplicators" for producing positive copies**
11/02 . with a flat support carrying the masters
11/04 . . and with carriages for feeding the sheets
11/06 . . for stack duplicating with pressure rollers
11/08 . with rotary cylinders carrying the masters
11/10 . with two rollers between which master is stretched
11/12 . Driving gear; Control thereof
11/14 . Constructional features of masters (chemical aspects B41M)

13/00 **Stencilling apparatus for office or other commercial use** (screen printing B41F 15/00; stencils, stencil materials, carriers therefor B41N 1/24)
13/02 . with flat stencil carriers
13/04 . with curved or rotary stencil carriers
13/06 . . with a single cylinder carrying the stencil
13/08 . . with stencil carried by two or more cylinders, e.g. through the intermediary of endless bands
13/10 . . . Clips or clamps for securing stencils to stencil carriers
13/12 . for special purposes, e.g. for reproducing Braille characters
13/14 . Attachments, e.g. for punching, cutting, severing
13/16 . Driving gear; Control thereof
13/18 . Inking units **[3]**

15/00 **Letterpress printing apparatus specially adapted for office or other commercial purposes** (in general B41F; printing plates or foils, materials therefor B41N 1/00)
15/02 . with flat printing surfaces, e.g. with flat type-beds, surfaces made of thin sheet material or moulded from plastics or rubber
15/04 . . of composed type locked in chases
15/06 . with curved printing surfaces, e.g. cylinders
15/08 . . with stereotypes
15/10 . for multicolour printing; for perfecting
15/12 . Driving gear; Control thereof
15/14 . Attachments, e.g. for punching, cutting, severing

17/00 **Lithographic printing apparatus for office or other commercial purposes** (in general B41F; printing plates or foils, materials therefor B41N 1/00)
17/02 . for direct impression printing
17/04 . . with flat printing surfaces
17/06 . . with curved printing surfaces, e.g. cylinders
17/08 . for offset printing
17/10 . . with flat printing surfaces, e.g. co-operating with travelling offset cylinders
17/12 . . with curved printing surfaces, e.g. forme cylinders
17/14 . of two-cylinder type, e.g. co-operating forme and impression cylinders
17/16 . of three-cylinder type
17/18 . for multicolour printing, e.g. tandem machines; for perfecting
17/20 . without damping means, e.g. using heat-activatable inks, refrigerated printing surfaces
17/22 . Driving gear; Control thereof
17/24 . Attachments, e.g. for punching, cutting, severing

19/00 **Duplicating or printing apparatus or machines for office or other commercial purposes, of special types or for particular purposes and not otherwise provided for** (addressing machines B41L 45/00)
19/02 . having forme cylinders carrying a plurality of printing surfaces, or for performing letterpress and lithographic processes selectively or in combination (in general B41F 11/00)
19/04 . for printing from selected parts of one or more printing surfaces in one cycle, e.g. line printing (by inking selected areas B41L 27/20)
19/06 . . with co-operating forme and impression cylinders
19/08 . . . by effecting relative movement of forme and impression cylinders during printing cycle
19/10 . . . by projecting and retracting parts of the surfaces of the forme cylinders
19/12 . . . by masking parts of the printing surfaces on the forme cylinders
19/14 . . . by selective damping of the copy material
19/16 . . . by selective tripping of impression cylinders

Common details of, or accessories for, apparatus or machines for manifolding, duplicating, or printing for office or other commercial purposes

21/00 **Devices for conveying sheets or webs of copy material through apparatus or machines for manifolding, duplicating, or printing** (mechanisms for conveying copy material through addressing machines or like series-printing machines B41L 47/24)
21/02 . for conveying sheets
21/04 . . Pins
21/06 . . Grippers
21/08 . . . Suction-operated grippers
21/10 . . Combinations of endless conveyers and grippers
21/12 . for conveying webs

23/00 **Devices for treating the surface of sheets, webs, or other articles in connection with printing** (cleaning in general B08B, of metals C23G; as a final step in the manufacture of such articles, see the relevant places, e.g. B29C 71/00, D21H 23/00 or D21H 25/00; after-treatment of prints B41M 7/00)
23/02 . by damping, e.g. by moistening copy-sheets in connection with hectographic printing
23/04 . . using friction rollers
23/06 . . using brushes

23/08 . . using spray elements
23/10 . . using endless bands
23/12 . . using absorbent pads
23/14 . . Ducts, containers, or like supply devices for liquids
23/16 . . Devices for tripping or lifting damping rollers; Supporting, adjusting, or removing arrangements therefor
23/18 . . Construction of damping rollers
23/20 . by heat drying, by cooling, by applying powders
23/22 . . Powdering devices, e.g. for preventing set-off
23/24 . Print-finishing devices, e.g. for glossing prints

25/00 Devices for damping printing surfaces, e.g. moistening printing surfaces in connection with lithographic printing (applying liquids or other fluent materials to surfaces, in general B05)
25/02 . using friction rollers
25/04 . using brushes
25/06 . using spraying elements
25/08 . using endless bands
25/10 . using absorbent pads
25/12 . Ducts, containers, or like supply devices for liquids
25/14 . Inking rollers serving also to apply ink repellent
25/16 . Devices for tripping or lifting damping rollers; Supporting, adjusting, or removing arrangements therefor
25/18 . Construction of damping rollers

27/00 Inking arrangements or devices (inking units for stencilling apparatus B41L 13/18; applying liquids or other fluent materials to surfaces, in general B05) **[3]**
27/02 . adapted for inking by hand
27/04 . Ducts, containers, supply devices or ink-level control devices (level control in general G05D 9/00) **[3]**
27/06 . . Duct-blades or like supply devices
27/08 . . Troughs or like reservoirs with immersed, or partly immersed, rollers
27/10 . . with ink-ejection means, e.g. pumps, nozzles
27/12 . . Feed or duct rollers (messenger or moving transfer rollers B41L 27/16)
27/14 . . . adjustable for regulating supply
27/16 . . Messenger or other moving transfer rollers
27/18 . Continuous, e.g. endless-band, apparatus
27/20 . for inking selected parts of printing formes
27/22 . Ink-removing or collecting devices
27/24 . for inking from interior of cylinder
27/26 . Absorbent pads
27/28 . Construction of inking rollers
27/30 . Spray apparatus, e.g. containing brushes
27/32 . Arrangements for tripping, lifting, adjusting, or removing inking rollers; Supports, bearings, or forks therefor
27/34 . . Lifting or adjusting devices
27/36 . . . Cams, eccentrics, wedges, or the like devices
27/38 . . . fluid-pressure operated
27/40 . . . magnetically operated

29/00 Devices for attaching printing elements or formes to supports
29/02 . magnetic
29/04 . for attaching printing elements to flat type-beds
29/06 . for attaching printing elements to forme cylinders
29/08 . for attaching printing formes to flat type-beds
29/10 . for attaching non-deformable curved printing formes to forme cylinders
29/12 . for attaching flexible printing formes
29/14 . . Clamping devices
29/16 . . . operating automatically during operation of rotary machines to attach the printing formes to the forme cylinders
29/18 . . . . electromagnetic, pneumatic, or hydraulic
29/20 . . . for adjusting position of leading edges of flexible printing formes circumferentially of forme cylinders
29/22 . for attaching printing formes to intermediate supports, e.g. adapter members

31/00 Devices for removing flexible printing formes from forme cylinders

33/00 Pressing flexible printing formes or sheets or webs of copy material against cylinders, e.g. for smoothing purposes

35/00 Cylinders for apparatus or machines for manifolding, duplicating, or printing for office or other commercial purposes
35/02 . Forme cylinders
35/04 . . Registering devices
35/06 . . . with means for displacing the cylinders
35/08 . . . with means for displacing the printing formes on the cylinders
35/10 . Impression cylinders
35/12 . Bearings or supports for forme, offset or transfer, or impression cylinders
35/14 . Means for heating or cooling forme or impression cylinders
35/16 . Cylinder-tripping devices; Cylinder-impression adjustments
35/18 . . Arrangements or dispositions of cylinder bearings, forks, or supports
35/20 . . . Eccentric bearings
35/22 . . . Sliding bearings
35/24 . . . Swinging bearings
35/26 . . Cylinder-lifting or adjusting devices
35/28 . . . Cams, eccentrics, wedges, or the like
35/30 . . . electrically or magnetically operated
35/32 . . . fluid-pressure operated
35/34 . Guards or covers, e.g. for safety purposes, for preventing egress or ingress of foreign matter

38/00 Devices for attaching coverings or make-ready devices; **Guiding devices for coverings** (make-ready devices B41N 6/00; blankets or like coverings B41N 10/00) **[5]**
38/02 . attaching to impression cylinders **[5]**
38/04 . attaching of endless or like continuously-fed coverings **[5]**

39/00 Indicating, counting, warning, control or safety devices (ink-level control devices B41L 27/04; such devices in general, see the relevant subclasses, e.g. counting in general G06M) **[3]**
39/02 . Indicating devices, e.g. counters
39/04 . Tripping devices or stop-motions
39/06 . . for starting or stopping operation of sheet or web feed
39/08 . . for starting or stopping operation of cylinders
39/10 . . for starting or stopping operation of damping or inking units
39/12 . . for starting or stopping the machines as a whole

39/14 . . Automatic control of tripping devices by feelers, photoelectric devices, pneumatic devices, or other detectors
39/16 . Programming systems for automatic control of sequence of operations

41/00 Cleaning arrangements or devices
41/02 . for forme cylinders
41/04 . for inking rollers
41/06 . for offset cylinders

43/00 Auxiliary folding, collecting, or depositing of sheets or webs
43/02 . Folding
43/04 . . lengthwise
43/06 . . crosswise
43/08 . . Folding-cylinders or -drums
43/10 . Collecting
43/12 . . and stapling
43/14 . Adding inserts
43/16 . Depositing

Addressing machines or like series-printing machines

45/00 Kinds or types of addressing machines or of like series-printing machines
45/02 . using printing plates
45/04 . . composed on type-setting machines
45/06 . . for addressing combined with other operations, e.g. franking, collating documents
45/08 . with printing surfaces in the form of belts, or carried by chains
45/10 . . for addressing combined with other operations, e.g. franking, collating documents
45/12 . with separate devices for printing additional texts or images, e.g. for printing receipts on blank sheets or webs

47/00 Details of addressing machines or like series-printing machines (common details of printing machines B41F 21/00 to B41F 35/00)
47/02 . Applications of printing surfaces in addressing machines or like series-printing machines (printing surfaces in general B41N)
47/04 . . of flat or curved plates for relief printing
47/06 . . of flat or curved stencils
47/08 . . of flat or curved plates for hectographic printing
47/10 . . of printing surfaces in the form of belts or chains
47/12 . Auxiliary devices, e.g. for flattening plates, for assembling plates in predetermined order, for wetting stencils
47/14 . Devices or arrangements for storing or handling plates
47/16 . . Magazines
47/18 . . Devices for feeding the plates in their plane
47/20 . . Devices for feeding the plates otherwise than in their plane, e.g. transversely thereto
47/22 . . with means for presenting plates for repeated printing operations
47/24 . Mechanisms for conveying copy material through addressing machines or like series-printing machines (in general B65H)
47/26 . . for conveying or positioning single sheet-like articles, e.g. envelopes
47/28 . . with gauging-rulers or the like, e.g. for facilitating hand-printing of copy material fed from stacks
47/30 . . for conveying webs
47/32 . . . combined with devices for other purposes, e.g. for cutting, severing, gluing
47/34 . . . specially adapted for conveying chains of forms
47/36 . . for conveying sheets or webs for tabulating purposes; Tabulating mechanisms combined with sheet or web conveyers
47/38 . . . with clamping means for head or margin
47/40 . . . with means for automatically reciprocating sheet or web transversely to enable addresses to be printed in columns side by side
47/42 . Printing mechanisms
47/44 . . using flat platens
47/46 . . using line-contact members, e.g. rollers, cylinders
47/48 . . with inking or ink-ribbon devices
47/50 . . using multiple impression-members or -surfaces, e.g. for printing series of addresses with standing context, for printing from selected parts of printing surfaces (applications of counting, numbering, or dating apparatus B41L 49/02)
47/52 . . with movable counter-pressure plates for printing from selected areas of printing surfaces
47/54 . . with means for automatically reciprocating printing plate transversely to enable addresses to be printed in columns side by side
47/56 . Indicating, warning, control or safety devices (B41L 47/58 takes precedence)
47/58 . Arrangements or devices for selecting, or for facilitating selection of, text or image to be printed
47/60 . . Markings applied to printing plates, e.g. code marks, colours, clips, perforations, edge notches, projections
47/62 . . Selecting devices, e.g. cams, windows, position indicators
47/64 . . . Automatic selecting devices with or without overriding manual control, e.g. with scanning-fingers, with presetting controls operable by push-buttons, with programme control by punched tapes

49/00 Accessories or attachments for addressing machines or like series-printing machines
49/02 . Counting, numbering, or dating devices
49/04 . Devices for applying selection markings to printing plates

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B41M PRINTING, DUPLICATING, MARKING, OR COPYING PROCESSES; **COLOUR PRINTING** (correction of typographical errors B41J; processes for applying transfer pictures or the like B44C 1/16; fluid media for correction of typographical errors by coating C09D 10/00; printing textiles D06P)

1/00 Inking and printing with a printer's forme
1/02 . Letterpress printing, e.g. book printing
1/04 . . Flexographic printing
1/06 . Lithographic printing

1/08 . . Dry printing
1/10 . Intaglio printing
1/12 . Stencil printing; Silk-screen printing
1/14 . Multicolour printing
1/16 . . using different inks which flow into one another to produce iridescent effects
1/18 . . Printing one ink over another
1/20 . . by applying differently-coloured inks simultaneously to different parts of the printing surface
1/22 . Metallic printing; Printing with powdered inks
1/24 . combined with embossing (printing machines for carrying out printing operations combined with embossing B41F 19/02) **[2]**
1/26 . Printing on other surfaces than ordinary paper (B41M 1/40 takes precedence)
1/28 . . on metals
1/30 . . on organic plastics, horn, or like materials
1/32 . . on rubber
1/34 . . on glass or ceramic surfaces
1/36 . . on pretreated paper, e.g. on parchment, oiled paper, paper for registration purposes
1/38 . . on wooden surfaces, leather, or linoleum (printing on matches or match boxes when combined with match manufacture C06F 1/18)
1/40 . Printing on bodies of particular shapes
1/42 . Printing without contact between forme and surface to be printed, e.g. by using electrostatic fields **[2]**

3/00 Printing processes to produce particular kinds of printed work, e.g. patterns (special designs or pictures per se B44F; manufacturing printed circuits using printing techniques H05K 3/12) **[5]**
3/02 . Maps; Sea or meteorological charts
3/04 . Music
3/06 . Veined printings; Fluorescent printings; Stereoscopic images; Imitated patterns, e.g. tissues, textiles **[5]**
3/10 . Watermarks
3/12 . Transfer pictures or the like, e.g. decalcomanias
3/14 . Security printing
3/16 . Braille printing (typewriters or selective printing mechanisms for Braille printing B41J 3/32) **[2]**
3/18 . Particular kinds of wallpapers

5/00 Duplicating or marking methods; **Sheet materials for use therein** (by using light-sensitive materials G03; electrography, magnetography G03G)
5/025 . by transferring ink from the master sheet **[4]**
5/03 . . by pressure **[4]**
5/035 . . by sublimation or volatilisation of design **[4]**
5/04 . . using solvent-soluble dyestuffs on the master sheet, e.g. alcohol-soluble **[5]**
5/06 . . using master sheets coated with jelly-like materials, e.g. gelatin
5/08 . . . Sheet materials therefor
5/10 . by using carbon paper or the like
5/124 . using pressure to make a masked colour visible, e.g. to make a coloured support visible, to create an opaque or transparent pattern, or to form colour by uniting colour-forming components **[5]**
5/128 . . Desensitisers; Compositions for fault correction, detection or identification of the layers **[5]**
5/132 . . Chemical colour-forming components; Additives or binders therefor **[5]**
5/136 . . . Organic colour formers, e.g. leuco dyes **[5]**
5/145 . . . . with a lactone or lactam ring **[5]**
5/15 . . . . Spiro-pyrans **[5]**
5/155 . . . Colour-developing components, e.g. acidic compounds; Additives or binders therefor; Layers containing such colour-developing components, additives or binders **[5]**
5/165 . . characterised by the use of microcapsules; Special solvents for incorporating the ingredients **[5]**
5/20 . using electric current (B41M 5/24 takes precedence) **[5]**
5/24 . Ablative recording, e.g. by burning marks; Spark recording **[5]**
5/26 . Thermography (B41M 5/20, B41M 5/24 take precedence; photothermographic systems G03C 1/498) **[5]**
5/28 . . using thermo-chromic compounds or layers containing liquid crystals, microcapsules, bleachable dyes or heat decomposable compounds, e.g. gas liberating **[5]**
5/30 . . using chemical colour formers (B41M 5/34 takes precedence) **[5]**
5/32 . . . one component thereof being a heavy metal compound **[5]**
5/323 . . . Organic colour formers, e.g. leuco dyes **[8]**
5/327 . . . . with a lactone or lactam ring **[8]**
5/333 . . . Colour developing components therefor, e.g. acidic compounds **[8]**
5/337 . . . Additives; Binders **[8]**
5/34 . . Multicolour thermography **[5]**
5/36 . . using a polymeric layer, which may be particulate and which is deformed or structurally changed with modification of its properties, e.g. of its optical, hydrophobic-hydrophilic, solubility or permeability properties **[5]**
5/382 . . Contact transfer or sublimation processes (sublistatic printing B41M 5/035; ink-, dye- or pigment-receptive coatings B41M 5/50) **[8]**
5/385 . . . characterised by the transferable dyes or pigments **[8]**
5/388 . . . . Azo dyes **[8]**
5/39 . . . . Dyes containing one or more carbon-to-nitrogen double bonds, e.g. azomethine **[8]**
5/392 . . . Additives other than colour forming substances, dyes or pigments, e.g. sensitisers, transfer promoting agents **[8]**
5/395 . . . . Macromolecular additives, e.g. binders **[8]**
5/398 . . Processes based on the production of stickiness patterns using powders **[8]**
5/40 . . characterised by the base, intermediate or covering layers; Heat, radiation filtering or absorbing means or layers; combined with layers or compositions suitable for other methods of image registration; Special originals for reproduction by thermography **[5]**
5/41 . . . Base layers **[8]**
5/42 . . . Intermediate or covering layers **[8]**
5/44 . . . . characterised by the macromolecular compounds **[8]**
5/46 . . . characterised by the light-to-heat converting means; characterised by the heat or radiation filtering or absorbing means or layers **[8]**
5/48 . . . combined with other image registration layers or compositions; Special originals for reproduction by thermography **[8]**

5/50 . Recording sheets characterised by the coating used to improve ink, dye or pigment receptivity, e.g. for ink-jet or thermal dye transfer recording (printing on pretreated paper B41M 1/36) **[8]**

5/52 . . Macromolecular coatings **[8]**

7/00 After-treatment of printed works, e.g. heating, irradiating

7/02 . Dusting; Varnishing (devices for treating the surfaces of sheets, webs, or other articles in connection with printing B41F 23/00, B41L 23/00)

9/00 Processes wherein make-ready devices are used (make-ready devices per se B41N 6/00) **[5]**

9/02 . Relief make-readies

9/04 . . photomechanical

99/00 Subject matter not provided for in other groups of this subclass [8]

B41N PRINTING PLATES OR FOILS (photosensitive materials G03); **MATERIALS FOR SURFACES USED IN PRINTING MACHINES FOR PRINTING, INKING, DAMPING, OR THE LIKE**; **PREPARING SUCH SURFACES FOR USE OR CONSERVING THEM**

1/00 Printing plates or foils; **Materials therefor**

1/02 . made of stone

1/04 . metallic

1/06 . . for relief printing or intaglio printing

1/08 . . for lithographic printing

1/10 . . . multiple

1/12 . non-metallic other than stone

1/14 . . Lithographic printing foils

1/16 . Curved printing plates, especially cylinders

1/18 . . made of stone

1/20 . . made of metal

1/22 . . made of other substances

1/24 . Stencils; Stencil materials; Carriers therefor (stencilling apparatus for office or other commercial use B41L 13/00)

3/00 Preparing for use or conserving printing surfaces

3/03 . Chemical or electrical pretreatment **[5]**

3/04 . Graining or abrasion by mechanical means (chemical graining B41N 3/03) **[5]**

3/06 . by use of detergents

3/08 . Damping; Neutralising or similar differentiation treatments of lithographic printing formes **[5]**

6/00 Mounting boards; **Make-ready devices, e.g. underlays, overlays**; **Attaching by chemical means, e.g. vulcanising [5]**

6/02 . Chemical means for fastening printing formes on mounting boards **[5]**

7/00 Shells for rollers of printing machines

7/02 . of leather

7/04 . for damping rollers

7/06 . for inking rollers **[5]**

10/00 Blankets or like coverings; **Coverings for wipers for intaglio printing** (wipers for intaglio printing B41F 9/08) **[5]**

10/02 . Blanket structure **[5]**

10/04 . . multi-layer **[5]**

10/06 . . facilitating fastening to, or location on, supports **[5]**

11/00 Stereotype mats

99/00 Subject matter not provided for in other groups of this subclass [8]

B42 BOOKBINDING; ALBUMS; FILES; SPECIAL PRINTED MATTER

B42B PERMANENTLY ATTACHING TOGETHER SHEETS, QUIRES, OR SIGNATURES, OR PERMANENTLY ATTACHING OBJECTS THERETO (nailing or stapling in general B25C, B27F; machines for both collating or gathering and permanently attaching together sheets or signatures B42C 1/12; temporarily attaching sheets together B42F)

2/00 Permanently attaching together sheets, quires, or signatures by stitching with filamentary material, e.g. textile threads (discontinuously B42B 4/00) **[2]**

2/02 . Machines for stitching with thread **[2]**

2/04 . . with straight needles **[2]**

2/06 . . with curved needles **[2]**

2/08 . . with devices for forming safety knots or with tying mechanisms **[2]**

2/10 . Hand-stitching tools **[2]**

4/00 Permanently attaching together sheets, quires or signatures by discontinuous stitching with filamentary material, e.g. wire [2]

4/02 . Rotary-type stitching machines **[2]**

5/00 Permanently attaching together sheets, quires, or signatures otherwise than by stitching (by deformation thereof B31F; by adhesive peculiar to bookbinding B42C 9/00)

5/02 . by eyelets (for garments A41H 37/02; for shoes A43D 100/00)

5/04 . by laces or ribbons

5/06 . by clips

5/08 . by finger, claw, or ring-like elements passing through the sheets, quires, or signatures

5/10 . . the elements being of castellated or comb-like form

5/12 . . the elements being coils

7/00 Permanently attaching objects, e.g. map sections, to sheets

9/00 Devices common to machines for carrying out the processes according to more than one of main groups B42B 2/00 to B42B 7/00 (auxiliary equipment in making paper articles B31F; auxiliary equipment in printing machines B41; conveyers in general B65G)

9/02 . for opening quires or signatures

9/04 . for conveying downwardly-open signatures

9/06 . for pasting (applying glue or adhesive peculiar to bookbinding B42C 9/00) **[2]**

B42C BOOKBINDING (cutting or perforating machines, devices, or tools B26; folding sheets or webs B31F; ornamenting books B44)

Subclass index

1/00 Collating or gathering sheets combined with processes permanently attaching together sheets or signatures or for interposing inserts (collating or gathering sheets or signatures without permanently attaching them together B65H 39/00) **[2]**

1/10 . Machines for both collating or gathering and interposing inserts

1/12 . Machines for both collating or gathering and permanently attaching together the sheets or signatures

3/00 Making booklets, pads, or form sets from multiple webs

5/00 Preparing the edges or backs of leaves or signatures for binding

5/02 . by rounding or backing

5/04 . by notching or roughening

5/06 . by fanning

7/00 Manufacturing bookbinding cases or covers of loose-leaf binders (book covers B42D 3/00)

9/00 Applying glue or adhesive peculiar to bookbinding

9/02 . for securing back linings, strips, ribbons, or headbands

11/00 Casing-in

11/02 . Machines or equipment for casing-in or applying covers to pamphlets, magazines, pads, or other paper-covered booklets (B42C 11/06 takes precedence)

11/04 . Machines or equipment for casing-in or applying covers to books (B42C 11/06 takes precedence)

11/06 . Machines or equipment for casing-in by welding plastic materials

13/00 Bookbinding presses (general features of presses B30B); **Joint-creasing equipment for bookbinding**; **Drying or setting devices for books**

15/00 Jacketing books

17/00 Rebinding books

19/00 Multi-step processes for making books

19/02 . starting with single sheets

19/04 . starting with signatures

19/06 . starting with webs not provided for elsewhere

19/08 . Conveying between operating stations in machines (conveyers in general B65G)

99/00 Subject matter not provided for in other groups of this subclass [8]

B42D BOOKS; **BOOK COVERS**; **LOOSE LEAVES**; **PRINTED MATTER OF SPECIAL FORMAT OR STYLE NOT OTHERWISE PROVIDED FOR**; **DEVICES FOR USE THEREWITH**; **MOVABLE-STRIP WRITING OR READING APPARATUS** (book stands A47B; reading desks A47B 19/00; book rests A47B 23/00)

Subclass index

1/00 Books or other bound products (match books A24F 27/12; picture books with additional toy effects A63H 33/38; indexing features B42F 21/00; educational or demonstration appliances G09B, e.g. textbooks for teaching foreign languages G09B 19/08)

1/02 . in which the fillings and covers are connected by end papers

1/04 . in which the fillings and the spine portions of the covers are secured integrally, e.g. paper-backs (in French “livres broches”, in German “Broschüren”)

1/06 . in which the fillings and covers are united by other means

1/08 . Albums (filing features thereof B42F)

1/10 . Files with adhesive strips for mounting papers

3/00 Book covers (loose-leaf binders B42F)

3/02 . made of special materials

3/04 . loose

3/06 . with hinges

3/08 . Ornamented covers

3/10 . with locks or closures

3/12 . combined with other articles

3/14 . . with column markers or line or heading indicators

3/16 . . with means for holding books open

3/18 . Other accessories

5/00 Sheets united without binding to form pads or blocks (processes therefor B42B)

5/02 . Form sets (book-keeping forms B42D 12/02)

5/04 . Calendar blocks (special apparatus for printing calendars B41F 17/04)

5/06 . . Tear-off calendar blocks

7/00 Newspapers or the like

9/00 Bookmarkers; **Spot indicators**; **Devices for holding books open** (combined with covers B42D 3/16; indexing tabs for sheets B42F 21/00); **Leaf turners [2]**

9/02 . Automatic bookmarkers

9/04 . Leaf turners

9/06 . . having an arm reset after each operation

9/08 . . having radial arms, one per leaf, operated successively

11/00 Carrying forward or transferring entries from one page to another, e.g. for book-keeping

12/00 Book-keeping books, forms, or arrangements (B42D 11/00 takes precedence) **[2]**

12/02 . Book-keeping forms **[2]**

13/00 Loose leaves modified for binding; **Inserts** (loose leaves modified for temporary attachment B42F 3/00; indexing features B42F 21/00)

15/00 Printed matter of special format or style not otherwise provided for (sheets temporarily attached together or with objects so attached thereto B42F; maps, diagrams G09B 29/00; labels G09F 3/00)

15/02 . Postcards; Greeting, menu, business or like cards; Letter cards or letter-sheets (B42D 15/10 takes precedence; envelopes B65D 27/00)

15/04 . . Foldable or multi-part cards or sheets

15/08 . . . Letter-cards or letter-sheets, i.e. cards or sheets each of which is to be folded with the message inside and to serve as its own envelope for mailing **[3]**

15/10 . Identity, credit, cheque or like information-bearing cards (recognition of data, cards used as record carriers G06K; record carriers in general G11) **[5]**

Note

In this group, it is desirable to add the indexing codes of groups B42D 101/00 to B42D 121/00 **[5]**

17/00 Hanging or securing devices for books, newspapers, or the like (suspended filing appliances B42F 15/00) **[2]**

19/00 Movable-strip writing or reading apparatus (manifolding apparatus B41L; adapted for, or incorporated in, cash registers G07G)

Indexing scheme associated with group B42D 15/10, relating to structure or materials of identity, credit, cheque or like information-bearing cards [5,8]

101/00 Card or region thereof being transparent [5]

103/00 Card or region thereof being translucent [5]

105/00 with metallic material [5]

107/00 with magnetic or magnetisable material [5]

109/00 **incorporating electrical circuitry [5]**
109/02 . with liquid-crystal display **[5]**

111/00 **made of paper or cardboard [5]**

113/00 **of single layer structure [5]**

115/00 **having foldable or removable parts [5]**

117/00 **having mating or co-operating parts [5]**

119/00 **with pressure-sensitive material [5]**

121/00 **having projections or recesses, e.g. for co-operation with machine elements [5]**

B42F **SHEETS TEMPORARILY ATTACHED TOGETHER**; **FILING APPLIANCES**; **FILE CARDS**; **INDEXING** (reading desks A47B 19/00; book rests A47B 23/00)

Note

In this subclass, the following expression is used with the meaning indicated:
– "filing appliance" means holders for collections of papers, sheets, cards, or units thereof, each paper, sheet, card, or unit being individually insertable and extractable. This expression may thus include a calendar, an instruction manual, or a letter file.

Subclass index

Sheets temporarily attached together; **Means therefor**; **Albums**

1/00 **Sheets temporarily attached together without perforating**; **Means therefor**
1/02 . Paper-clips or like fasteners (B42F 1/12 takes precedence)
1/04 . . metallic
1/06 . . . of flat cross-section
1/08 . . . of round cross-section
1/10 . . non-metallic
1/12 . Means for attaching together sheet corners exclusively

3/00 **Sheets temporarily attached together involving perforations**; **Means therefor**; **Sheet details therefor** (staples, fasteners in general F16B)
3/02 . Attachment means of bifurcated form
3/04 . Attachment means of ring, finger, or claw form (ring files B42F 13/16; using such means for permanent attachment B42B 5/08) **[2]**
3/06 . Attachment means of coiled form

5/00 **Sheets and objects temporarily attached together**; **Means therefor**; **Albums** (bookbinding aspects of albums B42D 1/08; advertising or display aspects G09)
5/02 . Stamp or like filing arrangements in albums
5/04 . . with transparent pockets
5/06 . Corner-holding devices, e.g. for photographs

Filing appliances

7/00 **Filing appliances without fastening means** (B42F 17/00 takes precedence; suspension files B42F 15/00; wallets, notecases, briefcases A45C, e.g. A45C 1/00; furniture features A47B, A47F; envelopes B65D, e.g. B65D 27/00)
7/02 . Single gussetted pockets
7/04 . Covers with retention means
7/06 . Portfolios or cases with a plurality of compartments (indexing features B42F 21/00)
7/08 . . expansible
7/10 . Trays
7/12 . . Stacked trays
7/14 . Boxes (box features in general B65D)

9/00 **Filing appliances with devices clamping file edges**; **Covers with clamping backs** (B42F 13/00, B42F 17/00 take precedence)

11/00 **Filing appliances with separate intermediate holding means** (B42F 17/00 takes precedence; with adhesive strips for mounting papers or sheets B42D 1/10)
11/02 . engaging folds (B42F 11/04 takes precedence)
11/04 . magnetic

13/00 **Filing appliances with means for engaging perforations or slots** (B42F 17/00 takes precedence; indexing features B42F 21/00)
13/02 . with flexible or resilient means
13/04 . . with cords, coils, or chains
13/06 . . with strips or bands
13/08 . . . of metal
13/10 . . . of plastics
13/12 . with pillars, posts, rods, or tubes (B42F 13/30 takes precedence)

13/14 . . with clamping or locking means (pressure bars B42F 13/36)
13/16 . with claws or rings (B42F 13/30 takes precedence; for permanent binding B42B 5/08)
13/18 . . on two bars relatively movable longitudinally
13/20 . . pivotable about an axis or axes parallel to binding edges
13/22 . . . in two sections engaging each other when closed
13/24 . . . . wherein one section is in the form of fixed rods
13/26 . . . . and locked when so engaged, e.g. snap action
13/28 . . . in two staggered sections
13/30 . having a set of rods within a set of tubes for a substantial distance when closed
13/32 . . the nesting portions of the rods and tubes being straight
13/34 . . . with the rods locking in the tubes
13/36 . Locking followers; Pressure bars
13/38 . Expansible cover splines
13/40 . combined or formed with other articles, e.g. punches, stands
13/42 . Content-transfer devices; Converting into permanent binders

15/00 **Suspended filing appliances** (indexing features B42F 21/00; hanging of books, newspapers, or the like B42D 17/00)
15/02 . in concertina form
15/04 . Backs or the like therefor
15/06 . for hanging large drawings or the like

17/00 **Card-filing arrangements, e.g. card indexes or catalogues or filing cabinets** (indexing features B42F 21/00; furniture features A47B, A47F)
17/02 . in which the cards are stored substantially at right angles to the bottom of their containers
17/04 . . the cards being staggered sideways (with means for staggering cards already in the file B42F 17/32) **[2]**
17/06 . . with separable or loose card-separating means
17/08 . . Construction of the containers, e.g. trays or drawers
17/10 . . . Hinged walls
17/12 . . . Dividing means
17/14 . . . Locking followers
17/16 . . . with card-retaining means
17/18 . in which the cards are stored in a flat position
17/20 . . and are pivotable relative to the bottom of their containers
17/22 . . . Connections between the cards and their containers
17/24 . . . Special adaptations for use of index strips
17/26 . . . Stands for the containers
17/28 . in the form of endless bands or revolving drums
17/30 . modified for particular uses
17/32 . with means for staggering cards already in the file **[2]**
17/34 . with card-selection means, e.g. telephone-number list finders (selecting devices for data cards G06K 21/00)

19/00 **File cards** (B42F 21/00 takes precedence; punched cards for information retrieval, e.g. for manual use, G06K 21/00)
19/02 . folded
19/04 . with receptacles or other holding devices

21/00 **Indexing means**; **Indexing tabs or protectors therefor**
21/02 . Tabs integral with sheets, papers, cards, or suspension files
21/04 . Tabs permanently fastened to sheets, papers, cards, or suspension files
21/06 . Tabs detachably mounted on sheets, papers, cards, or suspension files
21/08 . . in one of a number of predetermined positions
21/10 . . . represented by slits
21/12 . Sheets, papers, or cards having edges cut away to facilitate indexing, e.g. thumb cuts on books

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23/00 **Filing appliances not provided for in other groups of this subclass [8]**

B43 WRITING OR DRAWING IMPLEMENTS; BUREAU ACCESSORIES

B43K **IMPLEMENTS FOR WRITING OR DRAWING** (containers, casings or accessories for cosmetic substances, e.g. shaving soap, lipstick, make-up, A45D 34/00, A45D 40/00)

Note

In this subclass, the following expression is used with the meaning indicated: **[6]**
– "writing implements" covers pens, pencils, crayons, chalks or like markers for writing or drawing. **[6]**

Subclass index

1/00 **Nibs** (continuously-adjustable nibs B43K 17/00); **Writing- points** (for indicating or recording apparatus G01D 15/16) **[2]**

1/01 . with ink reservoirs, e.g. funnel-shaped **[6]**
1/02 . Split nibs
1/04 . . with broadened tips
1/06 . Tubular writing-points
1/08 . with ball points; Balls or ball beds
1/10 . Wire nibs
1/12 . Writing-points comprising fibres; Felt pads

3/00 **Nib holders** (holders for continuously-adjustable nibs B43K 17/00)

3/02 . with ink guards
3/04 . with retractable nibs (mechanisms for retracting or locking nibs B43K 24/00)

5/00 **Pens with ink reservoirs in holders, e.g. fountain-pens** (nibs or writing-points with ink reservoirs B43K 1/01; ball-point pens B43K 7/00; pens with writing-points other than nibs or balls B43K 8/00; multiple-point writing implements B43K 27/00)

5/02 . Ink reservoirs
5/03 . . specially adapted for concentrated ink, e.g. solid ink **[6]**
5/04 . . flexible
5/06 . . with movable pistons
5/08 . . . with ink-supplying valves
5/10 . . with reserve ink chambers
5/12 . . with ink-level inspection means
5/14 . . Exchangeable ink cartridges
5/16 . with retractable nibs (mechanisms for retracting or locking nibs B43K 24/00)
5/17 . . with closing means **[6]**
5/18 . Arrangements for feeding the ink to the nibs

7/00 **Ball-point pens** (multiple-point writing implements B43K 27/00)

7/01 . for low viscosity liquid ink **[6]**
7/02 . Ink reservoirs; Ink cartridges (B43K 7/01 takes precedence) **[6]**
7/03 . . pressurised, e.g. by gas **[5]**
7/035 . . . the gas acting on a piston **[6]**
7/04 . . Arrangements for refilling the reservoirs, e.g. arrangements at the ball-point ends
7/06 . . Reservoirs with ink-level inspection means
7/08 . . Preventing leakage
7/10 . Arrangements for feeding the ink to the ball points (B43K 7/01 takes precedence) **[6]**
7/12 . with retractable ball points (mechanisms for retracting or locking ball points B43K 24/00)

8/00 **Pens with writing-points other than nibs or balls** (brushes with reservoir for supplying substances A46B 11/00)

8/02 . with writing-points comprising fibres, felt, or similar porous or capillary material (B43K 8/22 takes precedence) **[2,5]**
8/03 . . Ink reservoirs; Ink cartridges **[6]**
8/04 . . Arrangements for feeding ink to writing-points **[5]**
8/06 . . . Wick feed from within reservoir to writing-points **[5]**
8/08 . . . . Wick separate from writing-points **[5]**
8/10 . . . including compartment for soluble solid material **[5]**
8/12 . . . writing-points or writing-point units being separable from reservoir **[5]**
8/14 . with coreless tubular writing-points **[5]**
8/16 . with tubular writing-points comprising a movable cleaning element **[5]**
8/18 . . Arrangements for feeding the ink to the writing-points **[5]**
8/20 . with roller writing-points **[5]**
8/22 . with electrically or magnetically activated writing-points **[5]**
8/24 . characterised by the means for retracting writing-points **[5]**

11/00 **Filling devices** (ink receptacles B43L 25/00)

13/00 **Devices for removing nibs**; **Devices for cleaning nibs, e.g. by wiping** (ink receptacles with pen-wiping means B43L 25/12) **[3]**

13/02 . for cleaning nibs, e.g. ink reservoirs therein **[6]**

15/00 **Assembling, finishing, or repairing pens**

15/02 . Automatic machines

17/00 **Continuously-adjustable nibs, e.g. for drawing-pens**; **Holders therefor** (features common to fountain-pens B43K 5/00)

17/01 . Nibs with ink reservoirs **[6]**

17/02 . Nibs having more than two legs

17/04 . Holders with arrangements for drawing dotted lines

19/00 **Non-propelling pencils**; **Styles**; **Crayons**; **Chalks** (batik pencils, cord line chalkers B44D 3/00; writing-core compositions for pencils, crayon compositions, chalk compositions C09D 13/00) **[2]**

19/02 . Pencils with graphite; Coloured pencils

19/04 . Pencils with metallic writing-core

19/06 . . the writing-core being made from substance wearing off during use

19/08 . . the writing-core being made from wear-resistant substances

19/10 . . . equipped with ball point (using ink B43K 1/08, B43K 7/00)

19/12 . Slate pencils

19/14 . Sheathings

19/16 . Making non-propelling pencils (making slate-pencil writing-cores B28D)

19/18 . . Making pencil writing-cores

21/00 **Propelling pencils** (projecting mechanisms for writing units B43K 24/00; multiple-point writing implements B43K 27/00)

21/02 . Writing-core feeding mechanisms

21/027 . . with sliding tube-like writing-core guide **[5]**

21/033 . . . with automatic feed by pressure during use of pencil **[5]**

21/04 . . with the writing-cores brought into position by gravity

21/06 . . with the writing-cores fed by means sliding in longitudinally-slotted casings

21/08 . . with the writing-cores fed by screws

21/10 . . . with separate writing-core remnants ejecting-bar

21/12 . . . with means preventing overwinding

21/14 . . . with writing-cores automatically replaced from magazines

21/16 . . with stepwise feed of writing-cores

21/18 . . . having ratchet means

21/20 . . . with writing-cores automatically replaced from magazines

21/22 . . Writing-cores gripping means, e.g. chucks

21/24 . Assembling, finishing, or repairing propelling pencils (making pencil writing-cores B43K 19/18)

21/26 . . Automatic machines

23/00 **Holders or connectors for writing implements**; **Means for protecting the writing-points**

23/004 . Holders specially adapted for assisting handicapped or disabled persons to write (B43L 15/00 takes precedence) **[6]**

23/008 . Holders comprising finger grips (B43K 23/004, B43K 23/012 take precedence) **[6]**

23/012 . Holders for attachment to finger tips (B43K 23/004 takes precedence) **[6]**

23/016 . Holders for crayons or chalks (B43K 23/004 to B43K 23/012, B43K 23/02 take precedence) **[6]**

23/02 . with means for preventing rolling (B43K 23/004 to B43K 23/012 take precedence) **[6]**

23/04 . . enabling the writing implement to be set upright

23/06 . Means for connecting two or more writing implements **[6]**

23/08 . Protecting means, e.g. caps **[6]**

23/10 . . for pencils **[6]**

23/12 . . for pens **[6]**

24/00 **Mechanisms for selecting, projecting, retracting or locking writing units [6]**

24/02 . for locking a single writing unit in only fully projected or retracted positions

24/03 . . operated by flicking or tilting **[6]**

24/04 . . operated by means sliding in longitudinally-slotted casings

24/06 . . operated by turning means

24/08 . . operated by push-buttons

24/10 . for selecting, projecting and locking several writing units

24/12 . . operated by means sliding in longitudinally-slotted casings

24/14 . . operated by turning means

24/16 . . operated by push-buttons

24/18 . . and for feeding the writing cores

25/00 **Attaching writing implements to wearing apparel or objects involving constructional changes of the implements** (protecting means, e.g. caps, B43K 23/08; fastening articles to wearing apparel A45F 5/02)

25/02 . Clips **[6]**

27/00 **Multiple-point writing implements, e.g. multicolour**; **Combinations of writing implements** (B43K 29/00 takes precedence; mechanisms for selecting, projecting, retracting or locking writing units B43K 24/00; multiple writing devices with pantographic linkages B43L 13/12)

27/02 . Combinations of pens and pencils

27/04 . Combinations of pencils (writing-core feed mechanisms B43K 21/02)

27/08 . Combinations of pens

27/12 . . of ball-point pens **[3]**

29/00 **Combinations of writing implements with other articles**

29/007 . with advertising means **[6]**

29/013 . with stamping means **[6]**

29/02 . with rubbers

29/04 . with blotters

29/05 . with applicators for eradicating- or correcting-liquid **[6]**

29/06 . with sharpening devices (with erasing knives B43K 29/18; pocket knives with pencils B26B)

29/08 . with measuring, computing or indicating devices

29/087 . . for indicating time, e.g. with calendars or watches **[6]**

29/093 . . with calculators **[6]**

29/10 . with illuminating devices

29/12 . with memorandum appliances (with book covers B42D)

29/16 . with lighters

29/18 . with hand tools, e.g. erasing knives (with pocket knives B26B)

29/20 . with other articles having storage compartments (with lighters B43K 29/16; writing implements functioning as, or combined with, writing implement receptacles B43K 31/00)

31/00 Writing implement receptacles functioning as, or combined with, writing implements (other writing implement receptacles A45C 11/34, A45C 11/36)

B43L ARTICLES FOR WRITING OR DRAWING UPON; **ACCESSORIES FOR WRITING OR DRAWING** (workshop equipment for marking-out work B25H 7/00; teaching hand-writing or drawing G09B 11/00)

Note

This subclass does not cover devices used for both teaching and facilitating writing or drawing, which are covered by group G09B 11/00. **[3]**

Subclass index

Articles for writing or drawing upon

1/00 Repeatedly-usable boards or tablets for writing or drawing (drawing-boards B43L 5/00)

1/02 . Slates

1/04 . Blackboards (easels or stands for blackboards A47B 97/04)

1/06 . . rigid

1/08 . . flexible

1/10 . . Writing surfaces thereof

1/12 . having translucent writing surfaces producing visual impressions by co-operation with backing members

3/00 Writing or drawing-underlays, e.g. blotting pads (blotters B43L 17/00)

5/00 Drawing-boards (drawing-desks or tables A47B 27/00, A47B 85/02; stands for drawing-boards A47B 97/04)

5/02 . having means for clamping sheets of paper thereto (drawing-pins B43M 15/00)

Writing or drawing aids

7/00 Straightedges (guides for rulers other than for T-squares B43L 13/04; curve rulers or templets B43L 13/20; straightedges characterised by the provision of indicia or the like for measuring, e.g. rulers or tapes with measuring scales or marks for direct reading, G01B)

Note

In this group, the following term is used with the meaning indicated:
– "straightedge" means an instrument or its edge serving the purpose of acting as a guide for the drawing of a straight line. **[5]**

7/02 . T-squares

7/027 . Plural non-adjustable straightedges fixed at right angles (B43L 7/02 takes precedence) **[5]**

7/033 . Plural non-adjustable straightedges forming non-right angles **[5]**

7/04 . with rollers (with interconnected rollers B43L 13/02)

7/08 . with arrangements for attaching additional drawing equipment, e.g. for hatching, dotting

7/10 . Plural straightedges relatively movable **[5]**

7/12 . . Square and pivoting straightedges **[5]**

7/14 . . Square and sliding straightedges **[5]**

9/00 Circular curve-drawing or like instruments (curve rulers or templets B43L 13/20)

9/02 . Compasses (proportional compasses B43L 9/08; compasses for drawing spirals B43L 11/06)

9/04 . . Beam compasses

9/06 . . with legs formed by flat springs

9/08 . Proportional compasses or dividers

9/10 . . with arrangements for drawing polygons

9/12 . Dividers (proportional dividers B43L 9/08)
9/14 . with changeable leg-ends for conversion into compasses, dividers, or callipers (B43L 9/24 takes precedence)
9/16 . Features common to compasses, dividers, or callipers
9/18 . . Legs with toggle joints
9/20 . . Pivots
9/22 . . Leg-angle adjusting-means separate from pivots
9/24 . . Means for mounting points or writing appliances on legs

11/00 **Non-circular-curve-drawing instruments** (curve rulers or templets B43L 13/20)
11/02 . for drawing conic sections
11/04 . . for drawing ellipses
11/045 . . . with cords or like flexible elements **[5]**
11/05 . . . with gears **[5]**
11/055 . . . with guides **[5]**
11/06 . for drawing spirals
11/08 . for drawing involutes

12/00 **Means to prevent slippage [5]**
12/02 . magnetic **[5]**

13/00 **Drawing instruments, or writing or drawing appliances or accessories, not otherwise provided for** (stencils for surface decoration B44D)
13/02 . Drafting machines or drawing devices for keeping parallelism (T-squares B43L 7/02)
13/04 . . Guides for rulers
13/06 . . . with pivoted guide rods
13/08 . . Protractor heads
13/10 . Pantographic instruments for copying, enlarging, or diminishing (arrangements for copying in machine tools B23Q)
13/12 . . Multiple writing devices
13/14 . Devices for drawing in perspective
13/16 . . free-hand
13/18 . . . having optical or projecting equipment (optical systems or apparatus G02B; projectors G03B)
13/20 . Curve rulers or templets
13/22 . . Adjustable curve rulers
13/24 . Devices for generating stepwise movements of drawing equipment, e.g. for hatching

15/00 **Supports for attachment to hands or arms for facilitating writing or drawing**

17/00 **Blotters** (blotting pads B43L 3/00; combined with writing implements B43K 29/04; making blotting paper D21F 11/14) **[2]**
17/02 . for blotting-paper sheets
17/04 . . hand-held
17/06 . for reeled blotting-paper
17/08 . . Roller blotters
17/10 . using blotting material other than paper

19/00 **Erasers, rubbers, or erasing devices**; **Holders therefor** (rubbers or erasing knives combined with writing implements B43K 29/02, B43K 29/18)
19/02 . Erasing knives (knives in general B26B)
19/04 . Fibrous erasers

21/00 **Blackboard or slate-cleaning devices**
21/02 . with means for absorbing the chalk dust
21/04 . Wiper holders

23/00 **Sharpeners for pencils or leads** (grinding or cutting tools in general B24, B26; combined with writing implements B43K 29/06) **[2]**
23/02 . with gearing
23/04 . . with cranked handles
23/06 . in which the pencils or leads are sharpened by only axial movement against cutting blades
23/08 . in which the pencils or leads are sharpened mainly by rotational movement against cutting blades (B43L 23/02 takes precedence)

25/00 **Ink receptacles** (liquid receptacles in general B65D, e.g. B65D 1/00)
25/02 . with separate dipping-cups
25/04 . . supplied by pressure arrangements
25/06 . . supplied by tilting the receptacles
25/08 . with arrangements for dissolving ink powder
25/10 . with means for holding objects
25/12 . with pen-wiping means

27/00 **Ink stands**
27/02 . having means for securing objects thereon
27/04 . securable to other objects

B43M **BUREAU ACCESSORIES NOT OTHERWISE PROVIDED FOR** (stapling devices B25C, B27F; devices for temporarily attaching sheets together B42F; adhesive tape dispensers B65H 35/07)

Subclass index

1/00 **Fixing seals on documents** (embossing dies B44B; seals per se G09F 3/00)
1/02 . Sealing-wax holders

3/00 **Devices for inserting documents into envelopes** (combined devices for inserting documents into, and closing, envelopes B43M 5/00)
3/02 . equipped with document-folding means (B43M 3/04 takes precedence)
3/04 . automatic

5/00 **Devices for closing envelopes**

5/02 . Hand devices for both moistening gummed flaps of envelopes and for closing the envelopes

5/04 . automatic

7/00 **Devices for opening envelopes** (cutting tools in general B26)

7/02 . Devices for both opening envelopes and removing contents

9/00 **Paper-weights**

11/00 **Hand or desk devices of the office or personal type for applying liquid, other than ink, by contact to surfaces, e.g. for applying adhesive** (combined with envelope-closing devices B43M 5/02; reservoir brushes A46B 11/00; devices for applying liquids or other fluent materials to surfaces in general B05C; liquid receptacles B65D)

11/02 . with rollers

11/04 . with pads (B43M 11/06 takes precedence)

11/06 . Hand-held devices

11/08 . . of the fountain-pen type

13/00 **Dispensers without mechanisms for single stamps modified for the application of stamps to articles** (manually-controlled or manually-operable label or stamp dispensers B65C 11/00)

15/00 **Drawing-pins**; **Thumb-tacks** (extractors B25C 11/00)

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

B44 DECORATIVE ARTS

Note

Any machine, apparatus, tool or process is classified in this class in so far as it produces an effect or mark meant to be judged by the eye and in so far as such machine, apparatus, tool or process is not provided for elsewhere. **[4]**

B44B MACHINES, APPARATUS, OR TOOLS FOR ARTISTIC WORK, E.G. FOR SCULPTURING, GUILLOCHING, CARVING, BRANDING, INLAYING (processes for producing decorative effects B44C; embossing leather C14B)

Subclass index

1/00 **Artists' machines or apparatus equipped with tools or work holders moving, or able to be controlled, three-dimensionally for making single sculptures or models** (copying devices for machine-tool use B23Q 35/00)

1/02 . wherein three-dimensional copies are made

1/04 . . having devices for changing, e.g. proportionally enlarging or reducing, the shape from an original pattern

1/06 . Accessories

3/00 **Artists' machines or apparatus equipped with tools or work holders moving or able to be controlled substantially two-dimensionally for carving, engraving, or guilloching shallow ornamenting or markings** (marking or engraving metal by the action of a high concentration of electric current B23H 9/06; forme engraving B41C, B41D; engraving by photomechanical reproduction G03F)

3/02 . wherein plane surfaces are worked

3/04 . wherein non-plane surfaces are worked

3/06 . Accessories, e.g. tool or work holders

5/00 **Machines or apparatus for embossing decorations or marks, e.g. embossing coins** (corrugating sheet metal or metal tubes, embossing combined with sheet-metal-working operations B21D; embossing plastics or substances in a plastic state, in general B29C 59/00; embossing of paper or cardboard in general B31F 1/07; forme embossing B41C 1/08; embossing combined with application of ink, type marking presses, selective embossing mechanisms B41F, B41J, B41K, B41M; embossing leather C14B)

5/02 . Dies; Accessories

7/00 **Machines, apparatus, or hand tools for branding** (burning or charring wood stock B27M 1/06)

7/02 . Branding irons

9/00 **Machines or apparatus for inlaying with ornamental structures, e.g. tarsia or mosaic work** (uniting ornamental elements on a support B44C 1/28, to structures B44C 3/12; imitation of mosaic or tarsia-work patterns B44F 11/04)

11/00 **Artists' hand tools for sculpturing, kneading, carving, engraving, guilloching, or embossing; Accessories therefor**

11/02 . for substantially two-dimensional carving, engraving, or guilloching

11/04 . for embossing

B44C PRODUCING DECORATIVE EFFECTS (processes for applying liquids or other fluent materials to surfaces, in general B05D; shaping of plastics or substances in a plastic state B29C; printing processes to produce transfer pictures B41M 3/12; thermographic duplication or marking methods B41M 5/00); **MOSAICS**; **TARSIA WORK** (imitation of mosaic or tarsia-work patterns B44F 11/04); **PAPERHANGING [2]**

Note

In this subclass, the following expression is used with the meaning indicated:
– "decorative effects", when used in connection with the expressions "transfer picture" or "decalcomanias", covers also "information". **[4]**

1/00 **Processes, not specifically provided for elsewhere, for producing decorative surface effects** (decorating textiles D06Q)

1/02 . Pyrography

1/04 . Producing precipitations (producing precipitations by electrolysis C25D) **[2]**

1/10 . Applying flat material, e.g. leaflets, pieces of fabrics (paperhanging B44C 7/00)

1/14 . . Metallic leaves or foils, e.g. gold leaf
1/16 . for applying transfer pictures or the like **[4]**
1/165 . . for decalcomanias; Sheet materials therefor (apparatus or machines for applying decalcomanias B65C) **[4]**
1/17 . . . Dry transfer **[4]**
1/175 . . . Transfer using solvent **[4]**
1/18 . Applying ornamental structures, e.g. shaped bodies consisting of plastic material
1/20 . Applying plastic materials and superficially modelling the surface of these materials
1/22 . Removing surface-material, e.g. by engraving, by etching
1/24 . Pressing or stamping ornamental design on surfaces
1/26 . Inlaying with ornamental structures, e.g. niello work, tarsia work
1/28 . Uniting ornamental elements on a support, e.g. mosaics

3/00 Processes, not specifically provided for elsewhere, for producing ornamental structures
3/02 . Superimposing layers
3/04 . Modelling plastic materials, e.g. clay
3/06 . Sculpturing
3/08 . Stamping or bending
3/10 . Producing and filling perforations, e.g. tarsia plates
3/12 . Uniting ornamental elements to structures, e.g. mosaic plates

5/00 Processes for producing special ornamental bodies
5/02 . Mountings for pictures; Mountings of horns on plates
5/04 . Ornamental plaques, e.g. decorative panels, decorative veneers
5/06 . Natural ornaments; Imitations thereof (artificial flowers, fruit, leaves A41G 1/00; artificial feathers A41G 11/00)
5/08 . Leaded lights (imitations thereof B44F 1/06; joining glass surfaces to glass surfaces or to surfaces of other inorganic material to form a layered product C03C 27/00)

7/00 Paperhanging
7/02 . Machines, apparatus, tools, or accessories therefor (implements or apparatus for removing paint-covering adhering to surfaces B44D 3/16)
7/04 . . for applying adhesive **[2]**
7/06 . . for applying the paper to the surface to be covered **[2]**
7/08 . . for finishing operations **[2]**

B44D PAINTING OR ARTISTIC DRAWING, NOT OTHERWISE PROVIDED FOR; **PRESERVING PAINTINGS**; **SURFACE TREATMENT TO OBTAIN SPECIAL ARTISTIC SURFACE EFFECTS OR FINISHES** (surface treatment in general, see the relevant places, e.g. applying liquids or other fluent materials B05) **[2]**

2/00 Special techniques in artistic painting or drawing, e.g. oil painting, water painting, pastel painting, relief painting [2]

3/00 Accessories or implements for use in connection with painting or artistic drawing, not otherwise provided for (hand tools for applying liquids, e.g. paints, to surfaces B05C 17/00; implements for finishing work on buildings, other than painting, E04F 21/00); **Methods or devices for colour determination, selection, or synthesis, e.g. use of colour tables** (colorimetry G01J 3/00) **[2]**
3/02 . Palettes
3/04 . Paint boxes
3/06 . Implements for stirring or mixing paints (mixing in general B01F)
3/08 . . for liquid or semi-liquid paints
3/10 . . Sieves; Spatulas
3/12 . Paint cans; Brush holders; Containers for storing residual paint
3/14 . . Holders for paint cans
3/16 . Implements or apparatus for removing dry paint from surfaces, e.g. by scraping, by burning (chemical paint-removers C09D 9/00) **[2]**
3/18 . Boards or sheets with surfaces prepared for painting or drawing pictures; Stretching frames for canvases **[2]**
3/22 . Implements or apparatus for special techniques, e.g. for painting lines, for pouring varnish; Batik pencils
3/24 . Lamps for baking lacquers; Painters' belts; Apparatus for dissolving dried paints, for heating paints **[2]**
3/38 . Cord line chalkers

5/00 Surface treatment to obtain special artistic surface effects or finishes (pretreatment or after-treatment of surface coated by applying liquids B05D 3/00; obtaining special surface effects by applying liquids or other fluent materials to surfaces B05D 5/00; surface shaping of plastics, e.g. embossing, B29C 59/00) **[2]**
5/10 . Mechanical treatment

7/00 Preserving paintings, e.g. by varnishing

B44F SPECIAL DESIGNS OR PICTURES

1/00 Designs or pictures characterised by special or unusual light effects
1/02 . produced by reflected light, e.g. matt surfaces, lustrous surfaces
1/04 . . after passage through surface layers, e.g. pictures with mirrors on the back
1/06 . produced by transmitted light, e.g. transparencies, imitations of glass-paintings
1/08 . characterised by colour effects
1/10 . . Changing, amusing, or secret pictures
1/12 . . Securities or banknotes as far as the design or protection against forgery is of importance
1/14 . . Iridescent effects

3/00 Designs characterised by outlines

5/00 Designs characterised by irregular areas, e.g. mottled patterns (imitating natural patterns or artistic work B44F 9/00, B44F 11/00)

7/00 Designs imitating three-dimensional effects

9/00 Designs imitating natural patterns

9/02 . wood grain effects

9/04 . of stone surfaces, e.g. marble

9/06 . of horn, ivory, or meerschaum surfaces

9/08 . of crystalline structures, pearl effects, or mother-of-pearl effects

9/10 . of metallic or oxidised metallic surfaces

9/12 . of leather

11/00 Designs imitating artistic work

11/02 . Imitation of pictures, e.g. oil paintings

11/04 . Imitation of mosaic or tarsia-work patterns

11/06 . Imitation of ceramic patterns

TRANSPORTING

B60 VEHICLES IN GENERAL

Note

In this class, the following term is used with the meaning indicated:
– "vehicle" means all vehicles except those restricted to one of the following types of vehicles: rail vehicles, waterborne vessels, aircraft, space vehicles, hand carts, cycles, animal-drawn vehicles, and sledges, which are covered by the relevant subclasses of B61 to B64.
Thus the term "vehicle" includes:
– vehicular characteristics which are common to more than one of the above-listed types;
– certain characteristics restricted to automobiles, road or cross-country trailers.
– The following exceptions to the above should be noted:
(a) subclass B60B or B60C embrace all vehicle wheels and tyres, except wheels for roller skates A63C 17/22, wheels for model railway vehicles A63H 19/22, and special adaptations of wheels or tyres for aircraft B64C 25/36;
(b) subclass B60C embraces the connection of valves to inflatable elastic bodies in general, and in this respect it is not limited to vehicles;
(c) subclass B60L embraces certain electric equipment of all electrically-propelled vehicles;
(d) subclass B60M embraces certain power supply equipment for, but external to, any kind of electrically-propelled vehicle;
(e) subclass B60R embraces safety belts or body harnesses used in all types of land vehicles; **[4]**
(f) subclass B60S relates to all kinds of vehicles, except the servicing of rail locomotives B61K 11/00, ground equipment for aircraft B64F, or cleaning apparatus peculiar to waterborne vessels B63B 57/00, B63B 59/00;
(g) subclass B60T includes brake control systems of general applicability, and in this respect it is not limited to vehicles. It also includes rail-vehicle power-brake systems and some other features of rail-vehicle brake systems;
(h) subclass B60V embraces air-cushion vehicles per se and land vehicles, waterborne vessels or aircraft combined with features allowing them to alternatively operate as air-cushion vehicles or to be partially supported by an air cushion. **[2009.01]**

B60B **VEHICLE WHEELS** (making wheels or wheel parts by rolling B21H 1/00, by forging, hammering or pressing B21K 1/28); **CASTORS**; **AXLES**; **INCREASING WHEEL ADHESION**

Note

Attention is drawn to the Note following the title of class B60.

Subclass index

Wheels

1/00 **Spoked wheels**; **Spokes thereof** (non-metallic B60B 5/00) **[2]**
1/02 . Wheels with wire or other tension spokes
1/04 . . Attaching spokes to rim or hub
1/06 . Wheels with compression spokes (wheels of high resiliency B60B 9/00)
1/08 . . formed by casting
1/10 . . fabricated from sheet metal (B60B 1/12, B60B 3/08 take precedence)
1/12 . . with tubular spokes (B60B 1/08 takes precedence)
1/14 . . Attaching spokes to rim or hub

3/00 **Disc wheels, i.e. wheels with load-supporting disc body** (non-metallic B60B 5/00; wheel cover discs B60B 7/00)
3/02 . with a single disc body integral with rim
3/04 . with a single disc body not integral with rim
3/06 . formed by casting
3/08 . with disc body formed by two or more axially-spaced discs
3/10 . apertured to simulate spoked wheels

3/12 . Means of reinforcing disc bodies
3/14 . Attaching disc body to hub (resiliently B60B 9/00; attaching rim to wheel body B60B 23/00)
3/16 . . by bolts or the like
3/18 . . by circlips or the like

5/00 Wheels, spokes, disc bodies, rims, hubs, wholly or predominantly made of non-metallic material (wheel cover discs B60B 7/00; wheels of high resiliency B60B 9/00)
5/02 . made of synthetic material
5/04 . made of wood

7/00 Wheel cover discs, rings, or the like, for ornamenting, protecting, or obscuring, wholly or in part, the wheel body, rim, hub, or tyre sidewall [2,5]
7/01 . Rings specially adapted for covering only the wheel rim or the tyre sidewall, e.g. removable tyre sidewall trim rings **[5]**
7/02 . made essentially in one part (B60B 7/01 takes precedence) **[5]**
7/04 . built-up of several main parts (B60B 7/01, B60B 7/20 take precedence) **[5]**
7/06 . Fastening arrangements therefor (B60B 7/01, B60B 7/16 take precedence) **[5]**
7/08 . . having gripping elements consisting of formations integral with the cover **[5]**
7/10 . . comprising a plurality of spaced spring clips individually mounted on the cover, e.g. riveted, welded or readily releasable **[5]**
7/12 . . comprising an annular spring or gripping element mounted on the cover (B60B 7/08 takes precedence) **[5]**
7/14 . . comprising screw-threaded means **[5]**
7/16 . Anti-theft devices **[5]**
7/18 . simulating spoked or wire wheel **[5]**
7/20 . having an element mounted for rotation independently of wheel rotation **[5]**

9/00 Wheels of high resiliency
9/02 . using springs (wheels comprising resilient spokes B60B 9/26)
9/04 . . in leaf form
9/06 . . in helical form
9/08 . . in flat coiled form
9/10 . . of rubber or the like
9/12 . . . in the form of sleeves or rings concentric with wheel axis
9/14 . . . with means limiting relative lateral movements between hub and remainder of wheel
9/16 . . . modified to ensure electric conductivity
9/18 . using fluid (within spokes B60B 9/26)
9/20 . . in rings concentric with wheel axis
9/22 . . . inflatable
9/24 . . with pistons and cylinders
9/26 . comprising resilient spokes
9/28 . . with telescopic action

11/00 Units comprising multiple wheels arranged side by side; **Wheels having more than one rim or capable of carrying more than one tyre**
11/02 . Units of separate wheels mounted for independent or coupled rotation
11/04 . Wheels with a rim capable of carrying more than one tyre
11/06 . Wheels with more than one rim mounted on a single wheel body
11/08 . Arrangements of balancing mechanisms enabling a uniform distribution of load to the tyres
11/10 . Emergency wheels (tyres collapsible into storage or non-use condition B60C 3/08; tyres characterised by means enabling restricted operation in damaged or deflated condition B60C 17/00) **[5]**

15/00 Wheels or wheel attachments designed for increasing traction (vehicle tyres B60C; non-skid devices temporarily attachable to resilient tyres or resiliently-tyred wheels B60C 27/00)
15/02 . Wheels with spade lugs
15/04 . . with resiliently-mounted spade lugs
15/06 . . with pivotally-mounted spade lugs
15/08 . . with spade lugs axially displaced relatively to the tread surface of the tyre
15/10 . . with radially-adjustable spade lugs; Control mechanisms therefor
15/12 . . . involving cams or eccentric hoops
15/14 . . . involving an axially-displaceable cone
15/16 . . . involving gearing, e.g. gear pinions acting upon threaded shafts on the spade lugs
15/18 . Wheels with ground-engaging plate-like shoes
15/20 . . with resiliently-mounted shoes, e.g. on a spider
15/22 . . connected by links to the hub
15/24 . Tread bands or rings for fairing lugs when travelling on the road
15/26 . Auxiliary wheels or rings with traction-increasing surface attachable to the main wheel body
15/28 . Wheel-ballasting weights; Their attachment

17/00 Wheels characterised by rail-engaging elements (of model railways A63H 19/22) **[2]**
17/02 . with elastic tyres

19/00 Wheels not otherwise provided for or having characteristics specified in one of the subgroups of this group
19/02 . convertible, e.g. from road wheel to rail wheel; Wheels specially designed for alternative use on road and rail
19/04 . expansible
19/06 . with compartments for fluid, packing, or loading material; Buoyant wheels
19/08 . with lubricating passages, channels, or reservoirs
19/10 . with cooling fins
19/12 . Roller-type wheels (B60B 19/06 takes precedence)
19/14 . Ball-type wheels (B60B 19/06 takes precedence)

Rims; **Hubs**

21/00 Rims (non-metallic B60B 5/00; of high resiliency B60B 9/00; capable of carrying more than one tyre B60B 11/04; multiple rims on single wheel body B60B 11/06; of multi-part type B60B 25/00; metal tyres B60C)
21/02 . characterised by transverse section
21/04 . . with substantially-radial flanges (with rail-engaging flanges B60B 17/00)
21/06 . characterised by means for attaching spokes
21/08 . characterised by having braking surfaces
21/10 . characterised by the form of tyre-seat or flange, e.g. corrugated (B60B 21/02 takes precedence)
21/12 . Accessories, e.g. lining bands

23/00 Attaching rim to wheel body (attaching spokes to rim B60B 1/04, B60B 1/14; attaching rims resiliently to wheel body B60B 9/00)

Note

Group B60B 23/12 takes precedence over groups B60B 23/02 to B60B 23/06.

23/02 . by split or other expansible ring devices
23/04 . by bayonet-joint, screw-thread, or like attachments
23/06 . by screws, bolts, pins, or clips
23/08 . . arranged radially
23/10 . . arranged axially
23/12 . by devices arranged to permit variation of axial position of rim relative to wheel body for track-width adjustment

25/00 **Rims built-up of several main parts** (tools for assembling divided rims B60B 31/04)
25/02 . Segmented rims, e.g. with segments arranged in sections; Connecting equipment, e.g. hinges; Insertable flange rings therefor
25/04 . Rims with dismountable flange rings, seat rings, or lock rings
25/06 . . Split flange rings, e.g. transversely split; Connecting equipment for overlapping the slot
25/08 . . Continuous flange rings; Arrangement of recesses enabling the flange ring to be slipped over the rim body
25/10 . . Seat rings for the tyre bead part, e.g. split
25/12 . . . with integral flange part
25/14 . . Locking means for flange rings or seat rings
25/16 . . . Arrangement of bayonet catches
25/18 . . . Arrangement of split rings
25/20 . . . Arrangement of screw, bolts, or shouldered pins
25/22 . Other accessories, e.g. for sealing the component parts enabling the use of tubeless tyres

27/00 **Hubs** (non-metallic B60B 5/00; of high resiliency B60B 9/00)
27/02 . adapted to be rotatably arranged on axle
27/04 . . housing driving means, e.g. sprockets
27/06 . adapted to be fixed on axle

Apparatus or tools for mounting, holding or assembling wheels

29/00 **Apparatus or tools for mounting or dismounting wheels** (characterised by the means for holding the wheels B60B 30/00) **[5]**

30/00 **Means for holding wheels or parts thereof** (spare wheel stowing, holding or mounting arrangements on vehicles B62D 43/00) **[5]**
30/02 . engaging the tyre, e.g. the tyre being mounted on the wheel rim **[5]**
30/04 . . the tyre not being mounted on a rim, i.e. holders or supports for tyres alone **[5]**
30/06 . engaging the wheel body, e.g. the rim **[5]**
30/08 . . the central part of the wheel body **[5]**
30/10 . characterised by being provided on a dolly **[5]**

31/00 **Apparatus or tools for assembling or disassembling wheels**
31/02 . for tightening or straightening wire spokes in situ; for extracting spokes from wheels
31/04 . for assembling divided rims
31/06 . for removing or attaching cover discs, hub caps, or the like **[2]**

33/00 **Castors in general** (castors for large containers B65D 90/18)
33/02 . with disengageable swivel action
33/04 . adjustable
33/06 . . mounted retractably
33/08 . Ball castors

35/00 **Axle units**; **Parts thereof** (resilient suspension of a rigid axle or axle housing B60G 9/00; steerable vehicle stub-axles B62D)
35/02 . Dead axles, i.e. not transmitting torque (axle housings for torque transmitting elements B60B 35/16)
35/04 . . straight
35/06 . . cranked
35/08 . . of closed hollow section
35/10 . . adjustable for varying track
35/12 . Torque-transmitting axles
35/14 . . composite or split, e.g. half-axles; Couplings between axle parts or sections (B60G 3/24 takes precedence)
35/16 . . characterised by the axle housings for the torque transmitting elements, e.g. for shafts
35/18 . . characterised by the arrangement of the bearings for the torque transmitting elements in the axle housings

37/00 **Wheel-axle combinations, e.g. wheel sets** (units comprising multiple wheels arranged side by side B60B 11/00; rail-vehicle axle-boxes B61F)
37/02 . the wheels being integral with solid axles
37/04 . the wheels being rigidly attached to solid axles
37/06 . the wheels being integral with, or rigidly attached to, hollow axles
37/08 . . the hollow axles being rotatable around fixed axles
37/10 . the wheels being individually rotatable around the axles
37/12 . Axles with a fixed wheel and a loose wheel

39/00 **Increasing wheel adhesion** (wheels or wheel attachments designed for increasing traction B60B 15/00; vehicle tyres B60C; non-skid devices temporarily attachable to resilient tyres or resiliently-tyred wheels B60C 27/00; road surface conditioning to prevent slipperiness E01C)
39/02 . Vehicle fittings for scattering or dispensing material in front of its wheels
39/04 . . the material being granular, e.g. sand (combined control of sanding apparatus and brakes of rail vehicles B61H)
39/06 . . . the dispensing being effected by mechanical means
39/08 . . . the dispensing being effected by fluid means
39/10 . . . the dispensing being controlled electrically or electromagnetically
39/12 . . the material being sheet-like or web-like

B60C **VEHICLE TYRES** (manufacture, repairing B29); **TYRE INFLATION**; **TYRE CHANGING**; **CONNECTING VALVES TO INFLATABLE ELASTIC BODIES IN GENERAL**; **DEVICES OR ARRANGEMENTS RELATED TO TYRES** (testing of tyres G01M 17/02) **[5]**

(1) In this subclass, the following term is used with the meaning indicated:
– "tyre" means a separate ground-engaging, continuous element outside the periphery of the wheel rim and includes the tyre casing, cover, or jacket and any insert, e.g. inner tube. In group B60C 29/00, relating to connection of valves, the term "tyre" also includes inflatable elastic bodies other than tyres or inner tubes.

(2) Attention is drawn to the Note following the title of class B60.

Subclass index

1/00 **Tyres characterised by the chemical composition or the physical arrangement or mixture of the composition [4]**

Note

Tyres characterised by the compositions only, i.e. having no significant tyre structure, are classified only with the compositions, e.g. in C08K, C08L. **[4]**

3/00 **Tyres characterised by transverse section** (characterised by rail-engaging elements B60B 17/00) **[4]**

3/02 . Closed, e.g. toroidal, tyres **[4]**

3/04 . characterised by the relative dimensions of the section, e.g. low profile (B60C 3/06 takes precedence) **[4]**

3/06 . asymmetric **[4]**

3/08 . collapsible into storage or non-use condition, e.g. space-saving spare tyres (run-flat tyres B60C 17/08) **[4]**

5/00 **Inflatable pneumatic tyres or inner tubes** (B60C 1/00, B60C 9/00 to B60C 17/00 take precedence) **[4]**

5/01 . without substantial cord reinforcement, e.g. cordless tyres, cast tyres **[4]**

5/02 . having separate inflatable inserts, e.g. with inner tubes; Means for lubricating, venting, preventing relative movement between tyre and inner tube (B60C 5/20 takes precedence) **[4]**

5/04 . . Shape or construction of inflatable inserts (B60C 5/10 takes precedence) **[4]**

5/08 . . . having reinforcing means

5/10 . formed as a single discontinuous ring with contiguous ends which may be connected together **[4]**

5/12 . without separate inflatable inserts, e.g. tubeless tyres with transverse section open to the rim (B60C 5/20 takes precedence) **[4]**

5/14 . . with impervious liner or coating on the inner wall of the tyre **[4]**

5/16 . . Sealing means between beads and rims, e.g. bands

5/18 . Sectional casings, e.g. comprising replaceable arcuate parts

5/20 . having multiple separate inflatable chambers (with additional tubes which become load supporting in emergence B60C 17/02) **[4]**

5/22 . . the chambers being annular **[4]**

5/24 . . the walls of the chambers extending transversely of the tyre **[4]**

7/00 **Non-inflatable or solid tyres** (B60C 1/00 takes precedence; tyres or rims characterised by rail-engaging elements B60B 17/00) **[2]**

7/02 . made from ropes or bristles

7/04 . made of wood or leather

7/06 . made of metal

7/08 . built-up from a plurality of arcuate parts

7/10 . characterised by means for increasing resiliency (highly resilient wheels B60B 9/00)

7/12 . . using enclosed chambers, e.g. gas-filled (inflatable tyres B60C 5/00) **[4]**

7/14 . . using springs

7/16 . . . of helical or flat coil form

7/18 . . . . disposed radially relative to wheel axis

7/20 . . . . disposed circumferentially relative to wheel axis

7/22 . having inlays other than for increasing resiliency, e.g. for armouring

7/24 . characterised by means for securing tyres on rim or wheel body

7/26 . . using bolts

7/28 . . using straps or the like, e.g. vulcanised into the tyre

9/00 **Reinforcements or ply arrangement of pneumatic tyres** (inserts having reinforcing means B60C 5/08; bead structure, e.g. turnup or overlap construction, B60C 15/00; tyre cords per se D02G 3/48; fabrics per se D03D, D04H; metal ropes or cables, per se D07B 1/06) **[4]**

Note

When classifying in this group, classification is also made in subclass B32B insofar as any layered product is concerned. **[4]**

9/02 . Carcasses
9/04 . . the reinforcing cords of each carcass ply arranged in a substantially parallel relationship
9/06 . . . the cords extend diagonally from bead to bead and run in opposite directions in each successive carcass ply, i.e. bias angle ply (B60C 9/07, B60C 9/09 take precedence) **[4]**
9/07 . . . the cords curve from bead to bead in plural planes, e.g. S-shaped cords **[4]**
9/08 . . . the cords extend transversely from bead to bead, i.e. radial ply (B60C 9/07 takes precedence) **[4]**
9/09 . . . . combined with other carcass plies having cords extending diagonally from bead to bead, i.e. combined radial ply and bias angle ply **[4]**
9/10 . . the reinforcing cords within each carcass ply arranged in a crossing relationship
9/11 . . . Woven, braided, or knitted plies **[4]**
9/12 . . built-up with rubberised layers of discrete fibres or filaments
9/13 . . . with two or more differing cord materials **[4]**
9/14 . . built-up with sheets, webs, or films of homogeneous material, e.g. synthetics, sheet metal, rubber
9/16 . . built-up with metallic reinforcing inlays
9/17 . . asymmetric to the midcircumferential plane of the tyre **[4]**
9/18 . Structure or arrangement of belts or breakers, crown-reinforcing or cushioning layers
9/20 . . built-up from rubberised plies each having all cords arranged substantially parallel
9/22 . . . the plies being arranged with all cords disposed along the circumference of the tyre
9/24 . . built-up of arcuate parts
9/26 . . Folded plies **[4]**
9/28 . . characterised by the belt or breaker dimensions or curvature relative to carcass (B60C 9/30 takes precedence) **[4]**
9/30 . . asymmetric to the midcircumferential plane of the tyre **[4]**

11/00 Tyre tread bands; **Tread patterns**; **Anti-skid inserts**
11/01 . Shape of the shoulders between tread and sidewall, e.g. rounded, stepped, cantilevered (arrangements of grooves or ribs on the sidewalls B60C 13/02) **[4]**
11/02 . Replaceable treads
11/03 . Tread patterns **[4]**
11/04 . . in which the raised area of the pattern consists only of continuous circumferential ribs, e.g. zig-zag (B60C 11/12, B60C 11/13 take precedence) **[4,6]**
11/11 . . in which the raised area of the pattern consists only of isolated elements, e.g. blocks (B60C 11/12, B60C 11/13 take precedence) **[4]**
11/113 . . in which the raised area of the pattern consists only of projections extending continuously across the tread from one edge to the other **[6]**
11/117 . . formed only by isolated recesses, e.g. grooves, slots or holes (B60C 11/12, B60C 11/13 take precedence) **[6]**
11/12 . . characterised by the use of narrow slits or incisions, e.g. sipes **[4]**
11/13 . . characterised by the groove cross-section, e.g. for buttressing or preventing stone-trapping **[6]**
11/14 . Anti-skid inserts, e.g. vulcanised into the tread band
11/16 . . of plug form, e.g. made from metal, textile
11/18 . . or strip form, e.g. metallic combs, rubber strips of different wear resistence (B60C 11/20 takes precedence)
11/20 . . in coiled form
11/22 . Tread rings between dual tyres **[4]**
11/24 . Wear-indicating arrangements **[4]**

13/00 Tyre sidewalls; **Protecting, decorating, marking, or the like, thereof** (B60C 17/08 takes precedence; tyre shoulders B60C 11/01; removable tyre sidewall trim rings B60B 7/01) **[4,5]**
13/02 . Arrangement of grooves or ribs **[4]**
13/04 . having annular inlays or covers, e.g. white sidewalls **[4]**

15/00 Tyre beads, e.g. ply turn-up or overlap
15/02 . Seating or securing beads on rims (sealing means between beads and rims of tubeless tyres B60C 5/16; means for securing solid tyres on rims B60C 7/24; rims B60B 21/00) **[4]**
15/024 . . Bead contour, e.g. lips, grooves, or ribs **[4]**
15/028 . . Spacers between beads (emergency load-supporting means B60C 17/00) **[4]**
15/032 . . . inflatable **[4]**
15/036 . . Tyres permanently fixed to the rim, e.g. by adhesive, by vulcanisation **[4]**
15/04 . Bead cores (producing bead-rings or bead-cores for tyres B29D 30/48) **[4]**
15/05 . . multiple, i.e. with two or more cores in each bead **[4]**
15/06 . Flipper strips, fillers, or chafing strips

17/00 Tyres characterised by means enabling restricted operation in damaged or deflated condition; **Accessories therefor** (having multiple separate inflatable chambers B60C 5/20)
17/01 . utilising additional inflatable supports which become load-supporting in emergency **[4]**
17/02 . . inflated or expanded in emergency only **[4]**
17/04 . utilising additional non-inflatable supports which become load-supporting in emergency
17/06 . . resilient **[4]**
17/08 . Means facilitating folding of sidewalls, e.g. run-flat sidewalls (for storage purposes B60C 3/08) **[4]**
17/10 . Internal lubrication **[4]**

19/00 Tyre parts or constructions not otherwise provided for
19/04 . Tyre with openings closeable by means other than the rim; Closing means therefor
19/08 . Electric-charge-dissipating arrangements
19/12 . Puncture preventing arrangements (B60C 9/00 takes precedence; inflatable inserts having reinforcing means B60C 5/08) **[4]**

23/00 **Devices for measuring, signalling, controlling, or distributing tyre pressure or temperature, specially adapted for mounting on vehicles** (measuring in general G01, e.g. G01L 17/00; remote signalling in general G08); **Arrangement of tyre inflating devices on vehicles, e.g. of pumps, of tanks** (air pumps per se F04; tanks per se F17C); **Tyre cooling arrangements [3]**

23/02 . Signalling devices actuated by tyre pressure
23/04 . . mounted on the wheel or tyre
23/06 . Signalling devices actuated by deformation of the tyre (wear-indicating arrangements B60C 11/24)
23/08 . . by touching the ground
23/10 . Arrangement of tyre-inflating pumps mounted on vehicles
23/12 . . operated by a running wheel
23/14 . . operated by the prime mover of the vehicle
23/16 . Arrangement of air tanks mounted on vehicles
23/18 . Tyre cooling arrangements **[3,4]**
23/19 . . for dissipating heat **[4]**
23/20 . Devices for measuring or signalling tyre temperature **[3]**

25/00 **Apparatus or tools adapted for mounting, removing or inspecting tyres** (apparatus or tools characterised by the means for holding wheels or parts thereof B60B 30/00) **[5]**

25/01 . for removing tyres from, or mounting tyres on, wheels **[5]**
25/02 . . Tyre levers or the like, e.g. hand-held (machine operated B60C 25/05) **[5]**
25/04 . . . pivotal about the wheel axis, or movable along the rim edge, e.g. rollable **[5]**
25/05 . . Machines **[5]**
25/12 . . . for only seating the beads **[5]**
25/122 . . . . acting on the tyre tread **[5]**
25/125 . . . for only breaking the beads **[5]**
25/128 . . . . acting axially on the whole circumference of the bead or side wall **[5]**
25/13 . . . . acting axially at localised regions of the bead or side wall **[5]**
25/132 . . . for removing and mounting tyres (for only seating the beads B60C 25/12; for only breaking the beads B60C 25/125) **[5]**
25/135 . . . . having a tyre support or a tool, movable along wheel axis **[5]**
25/138 . . . . . with rotary motion of tool or tyre support **[5]**
25/14 . Apparatus or tools for spreading tyre beads (B60C 25/12 takes precedence) **[5]**
25/15 . . with means for inverting the tyre **[5]**
25/18 . Tools for mounting or demounting air valves
25/20 . Tools for attaching metallic tyres, e.g. iron tyres upon wooden rims

27/00 **Non-skid devices temporarily attachable to resilient tyres or resiliently-tyred wheels**

27/02 . extending over restricted arcuate part of tread (B60C 27/20 takes precedence)
27/04 . . the ground-engaging part being rigid
27/06 . extending over the complete circumference of tread, e.g. made of chains (B60C 27/20 takes precedence)
27/08 . . involving lugs or rings taking up wear
27/10 . . having tensioning means
27/12 . . . resilient
27/14 . . automatically attachable
27/16 . . formed of close material, e.g. leather
27/18 . . . the material being fabric, e.g. woven wire
27/20 . having ground-engaging plate-like elements
27/22 . for tandem tyres (endless-track features B62D)

29/00 **Arrangements of tyre-inflating valves to tyres or rims**; **Accessories for tyre-inflating valves, not otherwise provided for** (tools for mounting or demounting valves B60C 25/18; valves per se, valve dust caps F16K) **[4,5]**

29/02 . Connection to rims **[4]**
29/04 . Connection to tyres **[4]**
29/06 . Accessories for tyre-inflating valves, e.g. housings, guards, covers for valve caps, locks, not otherwise provided for **[5]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

B60D **VEHICLE CONNECTIONS** (components of brake systems B60T 17/04)

Note

Attention is drawn to the Note following the title of class B60.

1/00 **Traction couplings**; **Hitches**; **Draw-gear**; **Towing devices** (devices specially adapted for connection between tractors and agricultural machines or implements A01B 59/00; fifth-wheel couplings B62D) **[2]**

1/01 . Traction couplings or hitches characterised by their type **[5]**
1/02 . . Bolt or shackle-type couplings **[5]**
1/04 . . Hook or hook-and-hasp couplings **[5]**
1/06 . . Ball-and-socket hitches **[5]**
1/07 . . Multi-hitch devices, i.e. comprising several hitches of the same or of a different type; Hitch-adaptors, i.e. for converting hitches from one type to another **[5]**
1/14 . Draw-gear or towing devices characterised by their type **[4]**
1/145 . . consisting of an elongated single bar or tube **[5]**
1/155 . . . comprising telescopic or foldable parts **[5]**
1/167 . . consisting of articulated or rigidly assembled bars or tubes forming a V-, Y- or U-shaped draw gear (B60D 1/173 takes precedence) **[5]**
1/173 . . consisting of at least two bars which are not connected or articulated to each other **[5]**
1/18 . . Tow ropes, chains, or the like
1/24 . characterised by arrangements for particular functions **[5]**
1/26 . . for remote control, e.g. for releasing **[5]**

1/28 . . for preventing unwanted disengagement, e.g. safety appliances **[5]**
1/30 . . for sway control **[5]**
1/32 . . . involving damping devices **[5]**
1/34 . . . involving springs **[5]**
1/36 . . for facilitating connection, e.g. hitch catchers **[5]**
1/38 . . . involving auxiliary cables for drawing the trailer to the tractor before coupling **[5]**
1/40 . . . involving a temporarily extensible or alignable member (B60D 1/38 takes precedence) **[5]**
1/42 . . for being adjustable **[5]**
1/44 . . . horizontally **[5]**
1/46 . . . vertically **[5]**
1/48 . characterised by the mounting **[5]**
1/50 . . resiliently mounted (B60D 1/30 takes precedence) **[5]**
1/52 . . removably mounted (B60D 1/56 takes precedence) **[5]**
1/54 . . collapsible or retractable when not in use, e.g. hide-away hitches (B60D 1/52 takes precedence) **[5]**
1/56 . . securing to the vehicle bumper **[5]**
1/58 . Auxiliary devices **[5]**
1/60 . . Covers, caps or guards **[5]**
1/62 . . involving supply lines, electric circuits, or the like **[5]**
1/64 . . . Couplings or joints therefor **[5]**
1/66 . . Props **[5]**

3/00 **Fittings to facilitate pushing** (B60D 1/00 takes precedence; vehicle bumpers B60R 19/02; steering arrangements for backing a normally-drawn trailer B62D 13/06)

5/00 **Gangways for coupled vehicles, e.g. of concertina type**

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B60F **VEHICLES FOR USE BOTH ON RAIL AND ON ROAD**; **VEHICLES CAPABLE OF TRAVELLING IN OR ON DIFFERENT MEDIA, E.G. AMPHIBIOUS VEHICLES** (air-cushion vehicles B60V)

1/00 **Vehicles for use both on rail and on road**; **Conversions therefor**
1/02 . with rail and road wheels on the same axle
1/04 . with rail and road wheels on different axles

3/00 **Amphibious vehicles, i.e. vehicles capable of travelling both on land and on water**; **Land vehicles capable of travelling under water** (buoyant wheels B60B)

5/00 **Other vehicles capable of travelling in or on different media** (vehicles having alternatively-usable runners and wheels B62B 13/18; flying-boats or seaplanes B64C 35/00)
5/02 . convertible into aircraft

B60G **VEHICLE SUSPENSION ARRANGEMENTS** (air-cushion vehicles B60V; connections between vehicle bodies and vehicle frames B62D 24/00) **[5]**

Note

Attention is drawn to the Note following the title of class B60.

Subclass index

1/00 **Suspensions with rigid connection between axle and frame**
1/02 . with continuous axle
1/04 . with divided axle

3/00 **Resilient suspensions for a single wheel** (pivoted suspension arms per se, attachment thereof to sprung part of the vehicle, buffer means for limiting movement of arms B60G 7/00; characterised by arrangement, location, or type of springs B60G 11/00)

3/01 . the wheel being mounted for sliding movement, e.g. in or on a vertical guide (camber maintaining means B60G 3/26) **[5]**
3/02 . with a single pivoted arm
3/04 . . the arm being essentially transverse to the longitudinal axis of the vehicle
3/06 . . . the arm being rigid
3/08 . . . . the arm forming the axle housing
3/10 . . . the arm itself being resilient, e.g. leaf spring
3/12 . . the arm being essentially parallel to the longitudinal axis of the vehicle
3/14 . . . the arm being rigid
3/16 . . . the arm itself being resilient, e.g. leaf spring
3/18 . with two or more pivoted arms, e.g. parallelogram
3/20 . . all arms being rigid
3/22 . . . a rigid arm forming the axle housing
3/24 . . . a rigid arm being formed by the live axle
3/26 . . . Means for maintaining substantially-constant wheel camber during suspension movement
3/28 . . at least one of the arms itself being resilient, e.g. leaf spring

5/00 **Resilient suspensions for a set of tandem wheels or axles having interrelated movements**

5/01 . the set being characterised by having more than two successive axles **[5]**
5/02 . mounted on a single pivoted arm
5/03 . . the arm itself being resilient, e.g. a leafspring (B60G 5/053 takes precedence) **[5]**
5/04 . with two or more pivoted arms, the movements of which are resiliently interrelated
5/047 . . at least one arm being resilient, e.g. a leafspring (B60G 5/053 takes precedence) **[5]**
5/053 . . a leafspring being used as equilibration unit between two axle-supporting units **[5]**
5/06 . . the arms turning on a common pivot

7/00 **Pivoted suspension arms**; **Accessories thereof** (means for maintaining substantially-constant wheel camber during suspension movement B60G 3/26)

7/02 . Attaching arms to sprung part of vehicle
7/04 . Buffer means for limiting movement of arms

9/00 **Resilient suspensions for a rigid axle or axle housing for two or more wheels**

9/02 . the axle or housing being pivotally mounted on the vehicle
9/04 . the axle or housing not being pivotally mounted on the vehicle

11/00 **Resilient suspensions characterised by arrangement, location, or kind of springs** (single-wheel suspension by pivoted arm resilient in itself B60G 3/00; adjusting spring characteristic B60G 17/00; springs per se F16F)

Note

In this group, the following terms or expressions are used with the meanings indicated:
– "torsion bar" includes torsion tube or the like;
– "rubber" includes synthetic substitutes of a similar nature.

11/02 . having leaf springs only
11/04 . . arranged substantially parallel to the longitudinal axis of the vehicle
11/06 . . arranged obliquely to the longitudinal axis of the vehicle
11/08 . . arranged substantially transverse to the longitudinal axis of the vehicle
11/10 . . characterised by means specially adapted for attaching the spring to axle or sprung part of the vehicle
11/107 . . . Sliding or rolling mountings **[5]**
11/113 . . . Mountings on the axle (B60G 11/107 takes precedence) **[5]**
11/12 . . . Links, pins, or bushes
11/14 . having helical, spiral, or coil springs only
11/15 . . Coil springs resisting deflection by winding up **[5]**
11/16 . . characterised by means specially adapted for attaching the spring to axle or sprung part of the vehicle
11/18 . having torsion-bar springs only
11/20 . . characterised by means specially adapted for attaching the spring to axle or sprung part of the vehicle
11/22 . having rubber springs only
11/23 . . of the torsional-energy-absorption type **[5]**
11/24 . . characterised by means specially adapted for attaching the spring to axle or sprung part of the vehicle
11/26 . having fluid springs only, e.g. hydropneumatic springs (B60G 15/12 takes precedence)
11/27 . . wherein the fluid is a gas **[5]**
11/28 . . characterised by means specially adapted for attaching the spring to axle or sprung part of the vehicle
11/30 . . having pressure fluid accumulator therefor, e.g. accumulator arranged in vehicle frame
11/32 . having springs of different kinds
11/34 . . including leaf springs
11/36 . . . and also helical, spiral, or coil springs
11/38 . . . and also rubber springs
11/40 . . . . the rubber springs being attached to the axle
11/42 . . . . the rubber springs being attached to sprung part of the vehicle
11/44 . . . and also torsion-bar springs
11/46 . . . and also fluid springs
11/48 . . not including leaf springs
11/50 . . . having helical, spiral, or coil springs, and also torsion-bar springs
11/52 . . . having helical, spiral, or coil springs, and also rubber springs
11/54 . . . . with rubber springs arranged within helical, spiral or coil springs
11/56 . . . having helical, spiral or coil springs, and also fluid springs

11/58 . . . . arranged coaxially
11/60 . . . having both rubber springs and torsion-bar springs
11/62 . . . having both rubber springs and fluid springs
11/64 . . . having both torsion-bar springs and fluid springs

13/00 Resilient suspensions characterised by arrangement, location, or type of vibration-dampers (adjusting damping effect B60G 17/06; vibration-dampers per se F16F)
13/02 . having dampers dissipating energy, e.g. frictionally
13/04 . . mechanically, e.g. having frictionally-engaging springs as damping elements
13/06 . . of fluid type
13/08 . . . hydraulic
13/10 . . . pneumatic
13/12 . . . quasi-fluid, i.e. having powdered medium
13/14 . having dampers accumulating utilisable energy, e.g. compressing air
13/16 . having dynamic absorbers as main damping means, i.e. spring-mass system vibrating out of phase
13/18 . . combined with energy-absorbing means

15/00 Resilient suspensions characterised by arrangement, location, or type of combined spring and vibration-damper, e.g. telescopic type (combined spring and vibration-dampers per se F16F) **[5]**
15/02 . having mechanical spring
15/04 . . and mechanical damper
15/06 . . and fluid damper
15/07 . . . the damper being connected to the stub axle and the spring being arranged around the damper **[5]**
15/08 . having fluid spring
15/10 . . and mechanical damper
15/12 . . and fluid damper
15/14 . . . the damper being connected to the stub axle and the spring being arranged around the damper **[5]**

17/00 Resilient suspensions having means for adjusting the spring or vibration-damper characteristics, for regulating the distance between a supporting surface and a sprung part of vehicle or for locking suspension during use to meet varying vehicular or surface conditions, e.g. due to speed or load [5]
17/005 . Suspension locking arrangements **[5]**
17/015 . the regulating means comprising electric or electronic elements (B60G 17/005 takes precedence) **[5,8]**
17/016 . . characterised by their responsiveness, when the vehicle is travelling, to specific motion, a specific condition, or driver input **[8]**
17/0165 . . . to an external condition, e.g. rough road surface, side wind **[8]**
17/017 . . characterised by their use when the vehicle is stationary, e.g. during loading, engine start-up or switch-off **[8]**
17/018 . . characterised by the use of a specific signal treatment or control method **[8]**
17/0185 . . . for failure detection **[8]**
17/019 . . characterised by the type of sensor or the arrangement thereof **[8]**
17/0195 . . characterised by the regulation being combined with other vehicle control systems **[8]**
17/02 . Spring characteristics (B60G 17/005 to B60G 17/015 take precedence) **[5]**
17/027 . . Mechanical springs regulated by fluid means (B60G 17/033 takes precedence) **[5]**
17/033 . . characterised by regulating means acting on more than one spring **[5]**
17/04 . . Fluid-spring characteristics
17/044 . . . Self-pumping fluid springs (pumps for liquids F04) **[5]**
17/048 . . . with the regulating means inside the fluid springs (B60G 17/044 takes precedence) **[5]**
17/052 . . . Pneumatic spring characteristics (B60G 17/048 takes precedence) **[5]**
17/056 . . . Regulating distributors or valves (B60G 17/044 to B60G 17/048 take precedence) **[5]**
17/06 . Characteristics of dampers (B60G 17/015 takes precedence) **[5]**
17/08 . . Characteristics of fluid dampers (adjusting fluid dampers in general F16F 9/44 to F16F 9/53)

21/00 Interconnection systems for two or more resiliently-suspended wheels, e.g. for stabilising a vehicle body with respect to acceleration, deceleration or centrifugal forces (B60G 17/033 takes precedence; steering deflectable wheels combined with means for inwardly inclining the vehicle body on bends B62D 9/02) **[5]**
21/02 . permanently interconnected
21/04 . . mechanically
21/045 . . . between wheels on different axles on the same side of the vehicle, i.e. the left or the right side **[5]**
21/05 . . . between wheels on the same axle but on different sides of the vehicle, i.e. the left and right wheel suspensions being interconnected **[5]**
21/055 . . . . Stabiliser bars **[5]**
21/06 . . fluid
21/067 . . . between wheels on different axles on the same side of the vehicle, i.e. the left or the right side **[5]**
21/073 . . . between wheels on the same axle but on different sides of the vehicle, i.e. the left and right wheel suspensions being interconnected **[5]**
21/08 . characterised by use of gyroscopes (gyroscopes for stabilising vehicle bodies without controlling suspension arrangements B62D 37/06) **[4,5]**
21/10 . not permanently interconnected, e.g. operative only on acceleration, only on deceleration, or only at off-straight position of steering

23/00 Wheel suspensions with automatic means for sensing unevenness ahead of wheels or for moving wheels up or down in accordance therewith

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

B60H ARRANGEMENTS OF HEATING, COOLING, VENTILATING, OR OTHER AIR-TREATING DEVICES SPECIALLY FOR PASSENGER OR GOODS SPACES OF VEHICLES

Note

Attention is drawn to the Note following the title of class B60.

1/00 **Heating, cooling or ventilating devices** (heating, cooling or ventilating devices providing other air treatment, the other treatment being relevant, B60H 3/00; ventilating solely by opening windows, doors, roof parts, or the like B60J; heating or ventilating devices for vehicle seats B60N 2/56; vehicle window or windscreen cleaners using air, e.g. defrosters, B60S 1/54) **[4]**

1/02 . the heat being derived from the propulsion plant

1/03 . . and from a source other than the propulsion plant **[4]**

1/04 . . from cooling liquid of the plant

1/06 . . . directly from main radiator

1/08 . . . from other radiator than main radiator

1/10 . . . . the other radiator being situated in a duct capable of being connected to atmosphere outside vehicle

1/12 . . . . . using an air blower

1/14 . . otherwise than from cooling liquid of the plant

1/16 . . . the air being heated by direct contact with the plant, e.g. air-cooled motor

1/18 . . . the air being heated from the plant exhaust gases

1/20 . . . . using an intermediate heat-transferring medium

1/22 . the heat being derived otherwise than from the propulsion plant

1/24 . Devices purely for ventilating or where the heating or cooling is irrelevant (nozzles, air-diffusers B60H 1/34) **[4]**

1/26 . . Ventilating openings in vehicle exterior; Ducts for conveying ventilating air

1/28 . . . the openings being situated directly in front of vehicle front window

1/30 . . . Air scoops

1/32 . Cooling devices (vehicles adapted to transport refrigerated goods B60P 3/20) **[4]**

1/34 . Nozzles; Air-diffusers **[4]**

3/00 **Other air-treating devices [4]**

3/02 . Moistening

3/06 . Filtering

B60J WINDOWS, WINDSCREENS, NON-FIXED ROOFS, DOORS, OR SIMILAR DEVICES FOR VEHICLES; REMOVABLE EXTERNAL PROTECTIVE COVERINGS SPECIALLY ADAPTED FOR VEHICLES (fastening, suspending, closing, or opening of such devices E05)

(1) Windows, windscreens, non-fixed roofs, doors, or similar devices which are of general applicability, irrespective of whether described or claimed only for vehicles, are also classified in subclass E06B.

(2) Attention is drawn to the Note following the title of class B60.

1/00 **Windows**; **Windscreens**; **Accessories therefor** (B60J 10/00 takes precedence; air curtains instead of windows B60J 9/04) **[4,5]**

1/02 . arranged at the vehicle front

1/04 . . adjustable

1/06 . . . comprising more than one pane

1/08 . arranged at vehicle sides

1/10 . . fixedly mounted

1/12 . . adjustable

1/14 . . . with pivotal or rotary movement

1/16 . . . slidable

1/17 . . . . vertically **[2]**

1/18 . arranged at the vehicle rear

1/20 . Accessories, e.g. wind deflectors, blinds (antiglare provisions B60J 3/00; wind deflectors associated with roof openings B60J 7/22; removable external protective coverings for windows or windscreens B60J 11/08; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84) **[1,8]**

3/00 **Antiglare equipment associated with windows or windscreens** (optical viewing arrangements for vehicles B60R 1/00); **Sun visors for vehicles** (sun visors having appliances for stowing or holding personal property B60R 7/05) **[2,5]**

3/02 . adjustable in position

3/04 . adjustable in transparency

3/06 . using polarising effect

5/00 **Doors** (B60J 10/00 takes precedence; window aspects B60J 1/00) **[5]**

5/02 . arranged at the vehicle front

5/04 . arranged at the vehicle sides

5/06 . . slidable; foldable

5/08 . . . of roller-blind type

5/10 . arranged at the vehicle rear (B60J 5/04 takes precedence)

5/12 . . slidable; foldable

5/14 . . . of roller-blind type

7/00 **Non-fixed roofs**; **Roofs with movable panels** (B60J 10/00 takes precedence; window aspects B60J 1/00; fixed roofs B62D 25/06; mechanisms for operating wings E05F 11/00, E05F 15/00) **[4,5]**

7/02 . of sliding type

7/04 . . with rigid plate-like element or elements

7/043 . . . Sunroofs (B60J 7/047 to B60J 7/053 take precedence) **[4]**

7/047 . . . movable to overlapping or nested relationship **[4]**

7/05 . . . pivoting upwardly to vent mode and moving downward before sliding to fully open mode **[4]**

7/053 . . . sliding with final closing motion having vertical component to attain closed and sealed condition **[4]**

7/057 . . . Driving or actuating arrangements (B60J 7/047 to B60J 7/053 take precedence) **[4]**

7/06 . . with non-rigid element or elements

7/08 . of non-sliding type, i.e. movable or removable roofs or panels, e.g. let-down tops or roofs capable of being easily detached or of assuming a collapsed or inoperative position

7/10 . . readily detachable, e.g. tarpaulins with frames, or fastenings for tarpaulins (covering of loads on vehicles by tarpaulins B60P 7/04)

7/11 . . . Removable panels, e.g. sunroofs **[4]**

7/12 . . foldable; Tensioning mechanisms therefor, e.g. struts (B60J 7/10 takes precedence)

7/14 . . . with a plurality of plate-like elements

7/16 . . non-foldable (B60J 7/10 takes precedence)

7/185 . Locking arrangements (locks in general E05B) **[4]**

7/19 . . for rigid panels **[4]**

7/20 . Vehicle storage compartments for roof parts

7/22 . Wind deflectors for open roofs

9/00 **Devices not provided for in one of main groups B60J 1/00 to B60J 7/00** (B60J 10/00 takes precedence) **[3,5]**

9/02 . Entrance or exit closures other than windows, doors, or in roofs, e.g. emergency escape closures in vehicle bottom

9/04 . Air curtains (in general F24F)

10/00 **Sealing arrangements** (sealings in general F16J 15/00) **[5]**

10/02 . for windows or windscreens **[5]**

10/04 . . for sliding window panes, e.g. sash guides **[5]**

10/06 . . . for flush-glass windows **[5]**

10/08 . for doors **[5]**

10/10 . for non-fixed roofs **[5]**

10/12 . for movable panels in roofs **[5]**

11/00 **Removable external protective coverings specially adapted for vehicles or parts of vehicles, e.g. parking covers** (covering of load on vehicles B60P 7/00; guard strips for body finishing, identifying or decorating B60R 13/04; tents for use as garages E04H 15/00) **[1,8]**

Note

In groups B60J 11/02 to B60J 11/06, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[8]**

11/02 . Covers wound on rollers **[8]**

11/04 . for covering at least the roof of the vehicle, e.g. for covering the whole vehicle **[8]**

11/06 . for covering only specific parts of the vehicle, e.g. for doors (covers or guards for traction couplings, hitches, draw-gear or towing devices B60D 1/60; guards for wheels, radiators or bumpers B60R 19/00) **[8]**

11/08 . . for windows or windscreens (antiglare equipment B60J 3/00) **[8]**

11/10 . . for wheels (hub caps or the like B60B 7/00; external spare wheel stowing, holding or mounting arrangements B62D 43/02) **[8]**

B60K ARRANGEMENT OR MOUNTING OF PROPULSION UNITS OR OF TRANSMISSIONS IN VEHICLES; ARRANGEMENT OR MOUNTING OF PLURAL DIVERSE PRIME-MOVERS; AUXILIARY DRIVES; INSTRUMENTATION OR DASHBOARDS FOR VEHICLES; ARRANGEMENTS IN CONNECTION WITH COOLING, AIR INTAKE, GAS EXHAUST, OR FUEL SUPPLY, OF PROPULSION UNITS, IN VEHICLES [1,8]

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
- "auxiliary drives" means drives of auxiliary or external machines or devices from the propulsion unit, transmission, or other parts of the vehicle, and includes the control of such drives;
- "transmission" means all propulsion parts linking propulsion units, e.g. engines, to ultimate propulsive elements, e.g. wheels.

(2) Attention is drawn to the Note following the title of class B60.

Subclass index

Arrangement or mounting of propulsion units in vehicles [2]

1/00 **Arrangement or mounting of electrical propulsion units** (B60K 7/00 takes precedence; arrangement or mounting of plural diverse prime-movers for mutual or common propulsion B60K 6/00; electric transmission arrangements B60K 17/12; electric equipment or propulsion of electrically-propelled vehicles per se B60L; current-collectors for power supply lines of electrically-propelled vehicles B60L 5/00) **[5]**

1/02 . comprising more than one electric motor

1/04 . of the electric storage means for propulsion (for auxiliary purposes only B60R 16/04; supplying batteries to, or removing batteries from, vehicles B60S 5/06) **[6]**

3/00 **Arrangement or mounting of steam or gaseous-pressure propulsion units** (B60K 7/00 takes precedence; arrangement or mounting of plural diverse prime-movers for mutual or common propulsion B60K 6/00; gaseous-pressure transmission arrangements B60K 17/10) **[5]**

3/02 . of piston type

3/04 . of turbine type

5/00 **Arrangement or mounting of internal-combustion or jet-propulsion units** (B60K 7/00 takes precedence; arrangement or mounting of plural diverse prime-movers for mutual or common propulsion B60K 6/00) **[5]**

5/02 . with the engine main axis, e.g. crankshaft axis, substantially in, or parallel to, the longitudinal centre line of the vehicle

5/04 . with the engine main axis, e.g. crankshaft axis, transversely to the longitudinal centre line of the vehicle

5/06 . . with the engine main axis substantially vertical

5/08 . comprising more than one engine

5/10 . providing for ready detachment of engine

5/12 . Arrangement of engine supports

6/00 **Arrangement or mounting of plural diverse prime-movers for mutual or common propulsion, e.g. hybrid propulsion systems comprising electric motors and internal combustion engines [5,2007.10]**

Note

In this group, the following expressions are used, with the meaning indicated:

– "prime-mover" means a propulsion unit or source of motive power providing a mechanical output, e.g. via a rotating shaft; **[2007.10]**
– "hybrid electric vehicle" [HEV] means a vehicle having an electric prime-mover and a combustion engine, in which the electrical prime-mover and the combustion engine either singly or in combination, drive the ultimate propulsive elements, e.g. wheels; **[2007.10]**
– "energy storing means" means apparatus for storing propulsive energy and providing stored energy to drive the prime-mover or the ultimate propulsive elements, e.g. wheels; **[2007.10]**
– "motor-generator" means an electric machine, such as a motor or a generator, or a mechanical combination thereof, which can provide positive mechanical output force or torque and which can function at other times as an electric generator. **[2007.10]**

6/08 . Prime-movers comprising combustion engines and mechanical or fluid energy storing means **[5]**

6/10 . . by means of a chargeable mechanical accumulator, e.g. flywheel **[5]**

6/12 . . by means of a chargeable fluidic accumulator **[5]**

6/20 . the prime-movers consisting of electric motors and internal combustion engines, e.g. HEVs **[2007.10]**

Note

When classifying in one of groups B60K 6/22, B60K 6/42 or B60K 6/50, further technical information, which is considered to represent information of interest for search, should also be classified in the other subgroups of main group B60K 6/00 to enable searching using a combination of classification symbols. **[2007.10]**

6/22 . . characterised by apparatus, components or means specially adapted for HEVs **[2007.10]**

6/24 . . . characterised by the combustion engines **[2007.10]**

6/26 . . . characterised by the motors or the generators **[2007.10]**

6/28 . . . characterised by the electric energy storing means, e.g. batteries or capacitors **[2007.10]**

6/30 . . . characterised by chargeable mechanical accumulators, e.g. flywheels **[2007.10]**

6/32 . . . characterised by the fuel cells **[2007.10]**

6/34 . . . characterised by the absence of energy storing means **[2007.10]**

6/36 . . . characterised by the transmission gearings **[2007.10]**

6/365 . . . . with the gears having orbital motion **[2007.10]**

6/38 . . . characterised by the driveline clutches (shift clutches within the gearing or transmission B60K 6/36) **[2007.10]**

6/383 . . . . One-way clutches or freewheel devices **[2007.10]**

6/387 . . . . Actuated clutches, i.e. clutches engaged or disengaged by electric, hydraulic or mechanical actuating means **[2007.10]**

6/40 . . . characterised by the assembly or relative disposition of components **[2007.10]**

6/405 . . . . Housings **[2007.10]**

6/42 . . characterised by the architecture of the hybrid electric vehicle **[2007.10]**
6/44 . . . Series-parallel type **[2007.10]**
6/442 . . . . Series-parallel switching type **[2007.10]**
6/445 . . . . Differential gearing distribution type **[2007.10]**
6/448 . . . . Electrical distribution type **[2007.10]**
6/46 . . . Series type **[2007.10]**
6/48 . . . Parallel type **[2007.10]**
6/485 . . . . Motor-assist type **[2007.10]**
6/50 . . Architecture of the driveline characterised by arrangement or kind of transmission units **[2007.10]**
6/52 . . . Driving a plurality of drive axles, e.g. four-wheel drive **[2007.10]**
6/54 . . . Transmission for changing ratio **[2007.10]**
6/543 . . . . the transmission being a continuously variable transmission **[2007.10]**
6/547 . . . . the transmission being a stepped gearing **[2007.10]**

7/00 Disposition of motor in, or adjacent to, traction wheel (roller-skate driving mechanisms A63C 17/12)

8/00 Arrangement or mounting of propulsion units not provided for in one of main groups B60K 1/00 to B60K 7/00 [5]

Arrangements in connection with cooling, air intake, gas exhaust, fuel supply, or power supply of propulsion units in vehicles

11/00 Arrangement in connection with cooling of propulsion units (heating the interior space B60H; cooling internal combustion engines per se F01P)
11/02 . with liquid cooling
11/04 . . Arrangement or mounting of radiators, radiator shutters, or radiator blinds
11/06 . with air cooling
11/08 . Air inlets for cooling; Shutters or blinds therefor

13/00 Arrangement in connection with combustion air intake or gas exhaust of propulsion units (extensions for melting snow or ice on roads or like surfaces E01H 5/00, E01H 6/00; forming part of the engine F01N; supplying combustion engines with combustible mixtures or constituents F02M)
13/02 . concerning intake
13/04 . concerning exhaust (exhaust silencers for internal-combustion engines per se F01N)
13/06 . using structural parts of the vehicle as ducts, e.g. frame parts

15/00 Arrangement in connection with fuel supply of combustion engines; **Mounting or construction of fuel tanks** (tanks in general B65D, F17C; supplying combustion engines with combustible mixtures or constituents F02M) **[5]**
15/01 . Arrangement of fuel conduits (chassis frame forming fluid conduit means B62D 21/17) **[5]**
15/03 . Fuel tanks (chassis frame comprising fluid storage compartment B62D 21/16) **[5]**
15/035 . . characterised by venting means **[5]**
15/04 . . Tank inlets (B60K 15/077 takes precedence) **[5]**
15/05 . . . Inlet covers **[5]**
15/06 . . characterised by fuel reserve systems **[5]**
15/063 . . Arrangement of tanks **[5]**
15/067 . . . Mounting of tanks **[5]**
15/07 . . . . of gas tanks **[5]**
15/073 . . Tank construction specially adapted to the vehicle (B60K 15/077 takes precedence) **[5]**
15/077 . . with means modifying or controlling distribution or motion of fuel, e.g. to prevent noise, surge, splash or fuel starvation **[5]**
15/10 . concerning gas-producing plants (gas-producing plants per se C10J)

16/00 Arrangements in connection with power supply from force of nature, e.g. sun, wind (electric propulsion with power supply from force of nature, e.g. sun, wind, B60L 8/00; effecting propulsion by wind motors driving water-engaging propulsive elements B63H 13/00) **[5]**

Arrangement or mounting of transmissions or their control in vehicles

17/00 Arrangement or mounting of transmissions in vehicles (torque-transmitting axles B60B 35/12; combined transmission and steering gear for steering non-deflectable wheels B62D 11/00; clutches per se, e.g. construction thereof, F16D; gearing per se, e.g. construction thereof, F16H) **[2]**
17/02 . characterised by arrangement, location, or kind of clutch
17/04 . characterised by arrangement, location, or kind of gearing (electric equipment or propulsion of electrically-propelled vehicles B60L)
17/06 . . of change-speed gearing (B60K 17/10 to B60K 17/16 take precedence) **[2]**
17/08 . . . of mechanical type
17/10 . . of fluid gearing (of fluid clutches B60K 17/02)
17/12 . . of electric gearing (of electrically-actuated clutches B60K 17/02)
17/14 . . the motor of fluid or electric gearing being disposed in, or adjacent to, traction wheel (B60K 7/00, B60K 17/356 take precedence) **[4]**
17/16 . . of differential gearing
17/22 . characterised by arrangement, location, or type of main drive shafting, e.g. cardan shaft
17/24 . . Arrangement of mountings for shafting
17/26 . characterised by arrangement, location, or type of freewheel device
17/28 . characterised by arrangement, location, or type of power take-off
17/30 . the ultimate propulsive elements, e.g. ground wheels, being steerable **[4]**
17/32 . the ultimate propulsive elements, e.g. ground wheels, being rockable about a horizontal pivot
17/34 . for driving both front and rear wheels, e.g. four wheel drive vehicles (arrangement or mounting of control devices for changing number of driven wheels B60K 23/08)
17/342 . . having a longitudinal, endless element, e.g. belt or chain, for transmitting drive to wheels **[4]**
17/344 . . having a transfer gear **[4]**
17/346 . . . the transfer gear being a differential gear **[4]**
17/348 . . having differential means for driving one set of wheels, e.g. the front, at one speed and the other set, e.g. the rear, at a different speeds (B60K 17/346 takes precedence) **[4]**
17/35 . . . including arrangements for suppressing or influencing the power transfer, e.g. viscous clutches (differential gearing with locking devices F16H 48/20) **[4,6]**

17/354 . . having separate mechanical assemblies for transmitting drive to the front or to the rear wheels or set of wheels **[4]**

17/356 . . having fluid or electric motor, for driving one or more wheels (disposition of motor in, or adjacent to, traction wheel B60K 7/00) **[4]**

17/36 . for driving tandem wheels

20/00 **Arrangement or mounting of change-speed gearing control devices in vehicles** (movable cabs having special adaptations of vehicle control devices B62D 33/073; such control devices per se F16H) **[2,5]**

20/02 . of initiating means (control mechanisms in general G05G) **[2]**

20/04 . . floor-mounted **[2]**

20/06 . . mounted on steering column or the like **[2]**

20/08 . . dashboard-mounted **[2]**

23/00 **Arrangement or mounting of control devices for vehicle transmissions, or parts thereof, not otherwise provided for** (combined transmission and steering gear for steering non-deflectable wheels B62D 11/00; movable cabs having special adaptations of vehicle control devices B62D 33/073; such control devices per se F16D, F16H) **[2,5]**

23/02 . for main transmission clutches

23/04 . for differential gearing

23/06 . for freewheel devices

23/08 . for changing number of driven wheels

25/00 **Auxiliary drives** (B60K 16/00 takes precedence; arrangement of tyre-inflating pumps mounted on vehicles B60C 23/10; driving engine auxiliaries F02B) **[5]**

25/02 . directly from an engine shaft

25/04 . from static or dynamic pressure or vacuum, developed by the engine

25/06 . from the transmission power take-off (transmissions having power take-off B60K 17/28)

25/08 . from a ground wheel, e.g. engaging the wheel tread or rim

25/10 . directly from oscillating movements due to vehicle running motion, e.g. suspension movement (resilient suspensions having dampers accumulating utilisable energy, e.g. compressing air, B60G 13/14) **[5]**

26/00 **Arrangement or mounting of propulsion-unit control devices in vehicles** (movable cabs having special adaptations of vehicle control devices B62D 33/073) **[2,5]**

26/02 . of initiating means or elements **[2]**

26/04 . of means connecting initiating means or elements to propulsion unit **[2]**

28/00 **Safety devices for propulsion-unit control, specially adapted for, or arranged in, vehicles, e.g. preventing fuel supply or ignition in the event of potentially dangerous conditions** (for electrically-propelled vehicles B60L 3/00; road vehicle drive control systems for purposes not related to the control of a particular sub-unit B60W 30/00) **[2,8]**

28/02 . responsive to conditions relating to the driver **[4]**

28/04 . . responsive to presence or absence of the driver, e.g. to weight or lack thereof **[4]**

28/06 . . responsive to incapacity of driver **[4]**

28/08 . responsive to conditions relating to the cargo, e.g. overload **[4]**

28/10 . responsive to conditions relating to the vehicle **[4]**

28/12 . . responsive to conditions relating to doors or doors locks, e.g. open door **[4]**

28/14 . . responsive to accident or emergency, e.g. deceleration, tilt of vehicle **[4]**

28/16 . . responsive to, or preventing, spinning or skidding of wheels (brake control systems for vehicle drive stability B60T 8/1755; arrangements responsive to a speed condition for adjusting wheel braking force B60T 8/32; control of vehicle driving stability otherwise than by controlling the propulsion unit only B60W 30/02; preventing wheel slippage by reducing power in rail vehicles B61C 15/12) **[4,8]**

31/00 **Vehicle fittings, acting on a single sub-unit only, for automatically controlling vehicle speed, i.e. preventing speed from exceeding an arbitrarily established velocity or maintaining speed at a particular velocity, as selected by the vehicle operator** (fittings acting on two or more sub-units B60W 30/14; propulsion-unit control in general, see the relevant classes or subclasses, e.g. F02D; speedometers G01P; systems or devices for controlling speed in general G05D 13/00) **[2,8]**

Note

In this group:
- the means ordinarily includes a device, e.g. a servomechanism, for operating a velocity-affecting element of the vehicle, e.g. the throttle;
- a means for preventing a vehicle from exceeding a particular speed is often referred to as a "governor", whereas a means for maintaining the vehicle within a relatively narrow speed range is generally designated as "speed control". Since these two functions are frequently interrelated, no attempt has been made to identify such means as being particularly adapted to perform only one, or the other of the functions. **[4]**

31/02 . including electrically actuated servomechanism **[4]**

31/04 . . and means for comparing one electrical quantity, e.g. voltage, pulse, waveform, flux, or the like, with another quantity of a like kind, which comparison means is involved in the development of an electrical signal which is fed into the controlling means **[4]**

31/06 . including fluid pressure actuated servomechanism **[4]**

31/08 . . and one or more electrical components for establishing or regulating input pressure **[4]**

31/10 . . and means for comparing one electrical quantity, e.g. voltage, pulse, waveform, flux, or the like, with another quantity of a like kind, which comparison means is involved in the development of a pressure which is fed into the controlling means **[4]**

31/12 . including a device responsive to centrifugal force **[4]**

(1) This subgroup covers also, for example, the pendulum of a curve compensator, i.e. a refinement to the regulating means for automatically adjusting the "set" speed of the means to changes in the course of the roadway along which the vehicle is travelling. **[4]**

(2) In this subgroup, rotating weights driven at a speed proportional to that of the vehicle's motor presently predominate. **[4]**

31/14 . . having an electrical switch which is caused to function by the centrifugal force **[4]**

31/16 . having means to prevent or discourage unauthorised use or adjusting of the controlling means **[4]**

31/18 . including a device to audibly, visibly, or otherwise signal the existence of unusual or unintended speed **[4]**

Arrangement or adaptations of instruments specially for vehicles; **Dashboards**

35/00 **Arrangement or adaptations of instruments** (arrangements on dashboard B60K 37/02)

37/00 **Dashboards** (as road-vehicle superstructure sub-unit B62D)

37/02 . Arrangement of instruments (arrangement of lighting devices for dashboards B60Q 3/04)

37/04 . Arrangement of fittings on dashboard (of instruments B60K 37/02)

37/06 . . of controls, e.g. control knobs

B60L **PROPULSION OF ELECTRICALLY-PROPELLED VEHICLES** (arrangements or mounting of electrical propulsion units or of plural diverse prime-movers for mutual or common propulsion in vehicles B60K 1/00, B60K 6/20; arrangements or mounting of electrical gearing in vehicles B60K 17/12, B60K 17/14; preventing wheel slip by reducing power in rail vehicles B61C 15/08; dynamo-electric machines H02K; control or regulation of electric motors H02P); **SUPPLYING ELECTRIC POWER FOR AUXILIARY EQUIPMENT OF ELECTRICALLY-PROPELLED VEHICLES** (electric coupling devices combined with mechanical couplings of vehicles B60D 1/64; electric heating for vehicles B60H 1/00); **ELECTRODYNAMIC BRAKE SYSTEMS FOR VEHICLES IN GENERAL** (control or regulation of electric motors H02P); **MAGNETIC SUSPENSION OR LEVITATION FOR VEHICLES**; **MONITORING OPERATING VARIABLES OF ELECTRICALLY-PROPELLED VEHICLES**; **ELECTRIC SAFETY DEVICES FOR ELECTRICALLY-PROPELLED VEHICLES [4]**

Subclass index

1/00 **Supplying electric power to auxiliary equipment of electrically-propelled vehicles** (arrangement of signalling or lighting devices, the mounting or supporting thereof or circuits therefor, for vehicles in general B60Q) **[6]**

1/02 . to electric heating circuits

1/04 . . fed by the power supply line

1/06 . . . using only one supply

1/08 . . . . Methods or devices for control or regulation

1/10 . . . with provision for using different supplies

1/12 . . . . Methods or devices for control or regulation

1/14 . to electric lighting circuits

1/16 . . fed by the power supply line

3/00 **Electric devices on electrically-propelled vehicles for safety purposes**; **Monitoring operating variables, e.g. speed, deceleration, power consumption**

3/02 . Dead-man's devices

3/04 . Cutting-off the power supply under fault conditions

3/06 . Limiting the traction current under mechanical-overload conditions

3/08 . Means for preventing excessive speed of the vehicle

3/10 . Indicating wheel slip

3/12 . Recording operating variables

5/00 **Current-collectors for power supply lines of electrically-propelled vehicles**

5/02 . with ice-removing device

5/04 . using rollers or sliding shoes in contact with trolley wire (B60L 5/40 takes precedence)

5/06 . . Structure of the rollers or their carrying means

5/08 . . Structure of the sliding shoes or their carrying means

5/10 . . Devices preventing the collector from jumping off

5/12 . . Structural features of poles or their bases

5/14 . . . Devices for automatic lowering of a jumped-off collector

5/16 . . . Devices for lifting and resetting the collector (B60L 5/34 takes precedence)

5/18 . using bow-type collectors in contact with trolley wire

5/19 . . using arrangements for effecting collector movement transverse to the direction of vehicle motion **[3]**

5/20 . . Details of contact bow

5/22 . . Supporting means for the contact bow

5/24 . . . Pantographs

5/26 . . . Half-pantographs, e.g. using counter-rocking beams

5/28 . . . Devices for lifting and resetting the collector

5/30 . . . . using springs

5/32 . . . . using fluid pressure

5/34 . with devices to enable one vehicle to pass another one using the same power supply line

5/36 . with means for collecting current simultaneously from more than one conductor, e.g. from more than one phase

5/38 . for collecting current from conductor rails (B60L 5/40 takes precedence)

5/39 . . from third rail **[3]**

5/40 . for collecting current from lines in slotted conduits

5/42 . for collecting current from individual contact pieces connected to the power supply line

7/00 Electrodynamic brake systems for vehicles in general [4]

7/02 . Dynamic electric resistor braking (B60L 7/22 takes precedence)
7/04 . . for vehicles propelled by dc motors
7/06 . . for vehicles propelled by ac motors
7/08 . . Controlling the braking effect (B60L 7/04, B60L 7/06 take precedence)
7/10 . Dynamic electric regenerative braking (B60L 7/22 takes precedence)
7/12 . . for vehicles propelled by dc motors
7/14 . . for vehicles propelled by ac motors
7/16 . . for vehicles comprising converters between the power source and the motor
7/18 . . Controlling the braking effect (B60L 7/12, B60L 7/14, B60L 7/16 take precedence)
7/20 . Braking by supplying regenerated power to the prime mover of vehicles comprising engine-driven generators
7/22 . Dynamic electric resistor braking, combined with dynamic electric regenerative braking
7/24 . with additional mechanical or electromagnetic braking
7/26 . . Controlling the braking effect
7/28 . Eddy-current braking

8/00 Electric propulsion with power supply from force of nature, e.g. sun, wind [5]

9/00 Electric propulsion with power supply external to vehicle (B60L 8/00, B60L 13/00 take precedence) **[5,6]**

9/02 . using dc motors
9/04 . . fed from dc supply lines
9/06 . . . with conversion by metadyne
9/08 . . fed from ac supply lines
9/10 . . . with rotary converters
9/12 . . . with static converters
9/14 . . fed from different kinds of power supply lines
9/16 . using ac induction motors
9/18 . . fed from dc supply lines
9/20 . . . single-phase motors
9/22 . . . polyphase motors
9/24 . . fed from ac supply lines
9/26 . . . single-phase motors
9/28 . . . polyphase motors
9/30 . . fed from different kinds of power supply lines
9/32 . using ac brush-displacement motors

11/00 Electric propulsion with power supplied within the vehicle (B60L 8/00, B60L 13/00 take precedence; arrangements or mounting of prime-movers consisting of electric motors and internal combustion engines for mutual or common propulsion B60K 6/20) **[5,6,8]**

11/02 . using engine-driven generators
11/04 . . using dc generators and motors
11/06 . . using ac generators and dc motors
11/08 . . using ac generators and motors
11/10 . . using dc generators and ac motors
11/12 . . with additional electric power supply, e.g. accumulator
11/14 . . with provision for direct mechanical propulsion
11/16 . using power stored mechanically, e.g. in flywheel
11/18 . using power supplied from primary cells, secondary cells, or fuel cells

13/00 Electric propulsion for monorail vehicles, suspension vehicles or rack railways; **Magnetic suspension or levitation for vehicles [4,6]**

13/03 . Electric propulsion by linear motors **[6]**
13/04 . Magnetic suspension or levitation for vehicles **[4]**
13/06 . . Means to sense or control vehicle position or attitude with respect to railway **[4]**
13/08 . . . for the lateral position **[4]**
13/10 . Combination of electric propulsion and magnetic suspension or levitation **[4]**

15/00 Methods, circuits or devices for controlling the propulsion of electrically-propelled vehicles, e.g. their traction-motor speed, to achieve a desired performance; **Adaptation of control equipment on electrically-propelled vehicles for remote actuation from a stationary place, from alternative parts of the vehicle or from alternative vehicles of the same vehicle train**

15/02 . characterised by the form of the current used in the control circuit
15/04 . . using dc
15/06 . . using substantially-sinusoidal ac
15/08 . . using pulses
15/10 . for automatic control superimposed on human control to limit the acceleration of the vehicle, e.g. to prevent excessive motor current (electric devices for safety purposes B60L 3/00)
15/12 . . with circuits controlled by relays or contactors
15/14 . . with main controller driven by a servomotor (B60L 15/18 takes precedence)
15/16 . . with main controller driven through a ratchet mechanism (B60L 15/18 takes precedence)
15/18 . . without contact-making and breaking, e.g. using a transductor
15/20 . for control of the vehicle or its driving motor to achieve a desired performance, e.g. speed, torque, programmed variation of speed
15/22 . . with sequential operation of interdependent switches, e.g. relays, contactors, programme drum
15/24 . . with main controller driven by a servomotor (B60L 15/28 takes precedence)
15/26 . . with main controller driven through a ratchet mechanism (B60L 15/28 takes precedence)
15/28 . . without contact-making and breaking, e.g. using a transductor
15/30 . . with means to change-over to human control
15/32 . Control or regulation of multiple-unit electrically-propelled vehicles
15/34 . . with human control of a setting device
15/36 . . . with automatic control superimposed, e.g. to prevent excessive motor current
15/38 . . with automatic control
15/40 . Adaptation of control equipment on vehicle for remote actuation from a stationary place (devices along the route for controlling devices on rail vehicles B61L 3/00; central rail-traffic control systems B61L 27/00)
15/42 . Adaptation of control equipment on vehicle for actuation from alternative parts of the vehicle or from alternative vehicles of the same vehicle train (B60L 15/32 takes precedence)

B60M **POWER SUPPLY LINES, OR DEVICES ALONG RAILS, FOR ELECTRICALLY-PROPELLED VEHICLES** (control of points or safety arrangements along railway lines B61L; construction of rails or points in general E01B)

Note

This subclass covers:
– overhead, overground, or underground power-supply lines; their crossings and points, erection and supervision;
– devices along rails and rail joints, for current-conduction and for insulation;
– safety devices along the route against earth currents and inductive interference with nearby communication lines.

1/00 **Power supply lines for contact with collector on vehicle** (collectors therefor B60L 5/00)
1/02 . Details
1/04 . . Mechanical protection of line; Protection against contact by living beings
1/06 . . Arrangements along the power lines for reducing interference in nearby communication lines (in general H04B 15/02)
1/08 . . Arrangements for energising and de-energising power line sections using mechanical actuation by the passing vehicle
1/10 . . Arrangements for energising and de-energising power line sections using magnetic actuation by the passing vehicle
1/12 . Trolley lines; Accessories therefor
1/13 . . Trolley wires
1/14 . . Crossings; Points
1/16 . . Suspension insulators (in general H01B)
1/18 . . Section insulators; Section switches
1/20 . . Arrangements for supporting or suspending trolley wires, e.g. from buildings
1/22 . . . Separate lines from which power lines are suspended, e.g. catenary lines, supporting-lines under tension
1/225 . . . Arrangements for fixing trolley wires to supporting-lines which are under tension
1/23 . . . Arrangements for suspending trolley wires from catenary line
1/234 . . . incorporating yielding means or damping means (supporting wires B60M 1/22)
1/24 . . . Clamps; Splicers; Anchor tips
1/26 . . Compensation means for variation in length
1/28 . . Manufacturing or repairing trolley lines (scaffold cars B60P, B61D 15/00; platforms therefor B66F 11/04; manufacturing conductors in general H01B 13/00; overhead lines in general H02G 1/00)
1/30 . Power rails
1/32 . . Crossings; Points (B60M 1/34 takes precedence)
1/34 . . in slotted conduits
1/36 . Single contact pieces along the line for power supply

3/00 **Feeding power to the supply lines in contact with collector on vehicles**; **Arrangements for consuming regenerative power** (controlling rail vehicles by varying voltage of power fed to vehicle B60L; power distribution in general H02J)
3/02 . with means for maintaining voltage within a predetermined range (in general G05F)
3/04 . Arrangements for cutting-in and -out of individual track sections (by passage of the vehicle B60M 1/10)
3/06 . Arrangements for consuming regenerative power

5/00 **Arrangements along running rails or at joints thereof for current-conduction or insulation, e.g. safety devices for reducing earth currents** (insulating rail joints E01B 11/54; conductive connections between rails in general H01R 4/00, e.g. H01R 4/64)
5/02 . Means for reducing potential difference between rail and adjacent ground

7/00 **Power lines or rails specially adapted for electrically-propelled vehicles of special types, e.g. suspension tramway, ropeway, underground railway**

B60N **VEHICLE PASSENGER ACCOMMODATION NOT OTHERWISE PROVIDED FOR** (furniture construction A47)

Note

Attention is drawn to the Note following the title of class B60.

2/00 **Seats specially adapted for vehicles**; **Arrangement or mounting of seats in vehicles** (for facilitating access of patients or disabled persons to, or exit from, vehicles A61G 3/02; railway seats B61D 33/00; cycle seats B62J 1/00; aircraft seats B64D 11/06, B64D 25/04, B64D 25/10) **[5]**
2/005 . Arrangement or mounting of seats in vehicles (B60N 2/02 takes precedence) **[7]**
2/01 . . Arrangement of seats relative to one another **[7]**
2/015 . . Attaching seats directly to vehicle chassis **[7]**
2/02 . the seat or part thereof being movable, e.g. adjustable (adjustable arm-rests B60N 2/46; adjustable head-rest B60N 2/48) **[5]**
2/04 . . the whole seat being movable **[5]**
2/06 . . . slidable (B60N 2/12 takes precedence) **[5]**
2/07 . . . . Slide construction **[7]**
2/075 . . . . . roller-less **[7]**
2/08 . . . . characterised by the locking device **[5]**
2/10 . . . tiltable (B60N 2/12 takes precedence) **[5]**
2/12 . . . slidable and tiltable **[5]**
2/14 . . . rotatable, e.g. to permit easy access (B60N 2/10 takes precedence) **[5]**

2/16 . . . height-adjustable **[5]**
2/18 . . . . the front or the rear portion of the seat being adjustable, e.g. independently of each other **[5]**
2/20 . . the back-rest being tiltable, e.g. to permit easy access (B60N 2/04, B60N 2/22 take precedence) **[5]**
2/22 . . the back-rest being adjustable **[5]**
2/225 . . . by cycloidal or planetary mechanisms **[7]**
2/23 . . . by linear screw mechanisms **[7]**
2/235 . . . by gear-pawl type mechanisms **[7]**
2/24 . for particular purposes or particular vehicles **[5]**
2/26 . . for children (B60N 2/30 takes precedence) **[5]**
2/28 . . . Seats readily mountable on, and dismountable from, existing seats of the vehicle **[5]**
2/30 . . Non-dismountable seats storable in a non-use position, e.g. foldable spare seats (convertible for other use B60N 2/32) **[5]**
2/32 . . convertible for other use **[5]**
2/34 . . . into a bed (sleeping arrangements in caravans B60P 3/38) **[5]**
2/36 . . . into a loading platform **[5]**
2/38 . . specially constructed for use on tractors or like off-road vehicles **[5]**
2/39 . . . Seats tiltable to compensate for roll inclination of vehicles **[7]**
2/40 . . . saddle type **[5]**
2/42 . . the seat constructed to protect the occupant from the effect of abnormal g-forces, e.g. crash or safety seats (B60N 2/26, B60N 2/46, B60N 2/48 take precedence) **[5]**
2/427 . . . Seats or parts thereof displaced during a crash **[7]**
2/433 . . . Safety locks for back-rests, e.g. with locking bars activated by inertia **[7]**
2/44 . Details or parts not otherwise provided for **[5]**
2/46 . . Arm-rests **[5]**
2/48 . . Head-rests **[5]**
2/50 . . Seat suspension devices **[5]**
2/52 . . . using fluid means **[5]**
2/54 . . . using mechanical springs **[5]**
2/56 . . Heating or ventilating devices **[7]**
2/58 . . Seat coverings **[7]**
2/60 . . . Removable protective coverings **[7]**
2/62 . . Thigh-rests **[7]**
2/64 . . Back-rests **[7]**
2/66 . . . Lumbar supports **[7]**
2/68 . . Seat frames, e.g. for the back-rest **[7]**
2/70 . . Upholstery springs **[7]**
2/72 . . . Attachment or adjustment thereof **[7]**

3/00 **Arrangements or adaptations of other passenger fittings, not otherwise provided for** (of radio sets, television sets, telephones, safety belts, or the like B60R)
3/02 . of hand grips or straps
3/04 . of floor mats
3/06 . of footrests (floors of road vehicles B62D)
3/08 . of receptacles for refuse, e.g. ash-trays (ash-trays per se A24F)
3/10 . of receptacles for food or beverages, e.g. refrigerated (picnic sets A45F)
3/12 . of receptacles for cigarettes or the like (receptacles for cigarettes or the like A24F)
3/14 . of electrically-heated lighters
3/16 . of cooking or boiling devices (cooking or boiling devices per se A47, F24C)
3/18 . of drinking-water dispensing devices

5/00 **Arrangements or devices on vehicles for entrance or exit control of passengers, e.g. turnstiles** (turnstiles in general E06B 11/08) **[2]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

B60P **VEHICLES ADAPTED FOR LOAD TRANSPORTATION OR TO TRANSPORT, TO CARRY, OR TO COMPRISE SPECIAL LOADS OR OBJECTS** (vehicles with special provisions for transporting patients or disabled persons, or their personal conveyances A61G 3/00)

Note

Attention is drawn to the Note following the title of class B60.

1/00 **Vehicles predominantly for transporting loads and modified to facilitate loading, consolidating the load, or unloading** (vehicles for carrying harvested crops with means for self-loading or self-unloading A01D 90/00; peculiar to refuse-collecting-vehicles B65F; loading or unloading vehicles by means not incorporated therein B65G)
1/02 . with parallel up-and-down movement of load supporting or containing element (in combination with tipping B60P 1/34; devices for lifting or lowering bulky or heavy goods for loading or unloading purposes, movable on wheels or the like, e.g. fork-lift trucks, B66F 9/06)
1/04 . with a tipping movement of load supporting or containing element (dredges or soil-shifting machines E02F 3/00)
1/06 . . actuated by mechanical gearing only
1/08 . . . with relative displacement of the wheel axles
1/10 . . . with screw and nut
1/12 . . . with toothed gears, wheels, or sectors; with links, cams and rollers, or the like
1/14 . . . with cables, chains, or the like
1/16 . . actuated by fluid-operated mechanisms
1/18 . . . with relative displacement of the wheel axles
1/20 . . . with toothed gears, wheels, or sectors; with links, cams and rollers, or the like
1/22 . . . with cables, chains, or the like
1/24 . . using the weight of the load
1/26 . . Means for controlling movement of tailboards or sideboards **[5]**
1/267 . . . Controlling degree of tailboard or sideboard movement in dependence upon degree of tipping movement, e.g. by linkage or cam **[5]**

1/273 . . . Providing interdependence between tipping movement and the latching or unlatching of a freely-swingable tailboard or sideboard **[5]**
1/28 . . Tipping-body constructions
1/30 . . in combination with another movement of the element
1/32 . . . the other movement being lateral displacement
1/34 . . . the other movement being raising or lowering
1/36 . using endless chains or belts thereon
1/38 . . forming the main load supporting or containing element or part thereof
1/40 . using screw conveyers thereon
1/42 . . mounted on the load supporting or containing element
1/43 . using a loading ramp mounted on the vehicle (loading ramps per se B65G 69/28) **[5]**
1/44 . having a loading platform thereon raising the load to the level of the load supporting or containing element
1/46 . . carried in vertical guides
1/48 . using pivoted arms raisable above the load supporting or containing element (load-engaging elements B66)
1/50 . . loading from in front of the vehicle
1/52 . using rollers in the load supporting or containing element
1/54 . using cranes for self-loading or self-unloading (vehicles for transporting cranes B60P 3/28; mobile or travelling cranes B66C)
1/56 . the load supporting or containing element having bottom discharging openings
1/58 . using vibratory effect
1/60 . using fluids, e.g. having direct contact between fluid and load **[2]**
1/62 . . with porous walls
1/64 . the load supporting or containing element being readily removable (caravans, camping, or the like vehicles characterised by living accommodation in the form of a removable body supported by the vehicle unit B60P 3/33, B60P 3/345) **[5]**

3/00 Vehicles adapted to transport, to carry or to comprise special loads or objects (ambulances or other vehicles with special provisions for transporting patients or disabled persons, or their personal conveyances A61G 3/00; hearses A61G 21/00; fire-fighting land vehicles A62C 27/00; refuse-collecting vehicles B65F 3/00, B65F 7/00; snow-removing vehicles E01H; armoured or armed vehicles F41H 7/00; self-propelled mine-clearing vehicles F41H 11/16)

3/022 . for transporting prefabricated buildings or modules thereof, e.g. prefabricated garages or the like (conveying or assembling building elements E04G 21/14) **[5]**
3/025 . the object being a shop, cafeteria or display (the object being a workshop B60P 3/14) **[3]**
3/03 . for transporting money or other valuables **[3]**
3/035 . for transporting reel units **[3]**
3/04 . for transporting animals
3/05 . for transporting meat (for transporting refrigerated goods B60P 3/20) **[3]**
3/055 . for transporting bottles **[3]**
3/06 . for carrying vehicles (B60P 3/12 takes precedence; caravans, camping, or like vehicles with vehicle-carrying means B60P 3/363) **[3,5]**
3/07 . . for carrying road vehicles **[3]**
3/071 . . . Arrangement of overturned or on-edge vehicles **[5]**
3/073 . . . Vehicle retainers **[5]**
3/075 . . . . for wheels, hubs, or axle shafts **[5]**
3/077 . . . . . Wheel cradles, chocks, or wells **[5]**
3/079 . . . . Tie-downs (B60P 3/075 takes precedence) **[5]**
3/08 . . . Multilevel-deck construction carrying vehicles **[3]**
3/10 . . for carrying boats
3/11 . . for carrying aircraft **[3]**
3/12 . for salvaging damaged vehicles
3/14 . the object being a workshop for servicing, for maintenance, or for carrying workmen during work (lifting devices for movable platforms or cabins for workmen B66F 11/04)
3/16 . for carrying mixed concrete, e.g. having rotatable drums
3/18 . the object being a searchlight
3/20 . for transporting refrigerated goods (air treatment of goods space B60H)
3/22 . Tank vehicles (tank aspects B65D 88/00, B65D 90/00, F17C)
3/24 . . compartmented
3/28 . for transporting cranes (vehicles using cranes for self-loading or self-unloading B60P 1/54; mobile or travelling cranes B66C)
3/30 . Spraying-vehicles (sprinkling-wagons for fertilising liquid A01C 23/00; for destruction of noxious animals, vermin, or unwanted vegetation A01M; for spraying asphalt, bitumen, tar, or the like E01C; for cleaning streets E01H)
3/32 . comprising living accommodation for people, e.g. caravans, camping, or like vehicles (tents or canopies, in general E04H 15/00)
3/325 . . the living accommodation being neither expansible nor collapsible nor capable of rearrangement **[5]**
3/33 . . . characterised by living accommodation in the form of a removable body supported by the vehicle unit **[5]**
3/335 . . . supported by a trailer-type vehicle or being itself of the trailer-type (B60P 3/33 takes precedence) **[5]**
3/34 . . the living accommodation being expansible, collapsible or capable of rearrangement (B60P 3/39 takes precedence; tents supported at least partially by vehicles E04H 15/06) **[5]**
3/345 . . . characterised by living accommodation in the form of a removable body supported by the vehicle unit **[5]**
3/35 . . . supported by a trailer-type vehicle or being itself of the trailer-type (B60P 3/345 takes precedence) **[5]**
3/355 . . . . collapsible to a condition not usable as living accommodation, e.g. to a trailer of compact design **[5]**
3/36 . . Auxiliary arrangements; Arrangements of living accommodation (toilet or washing arrangements B60R 15/00); Details **[5]**
3/363 . . . with vehicle-carrying means **[5]**
3/367 . . . . with boat-carrying means **[5]**
3/37 . . . Exterior platforms, e.g. porch (awnings for buildings E04F 10/00; trailer awnings E04H 15/08; awnings for tents E04H 15/58) **[5]**
3/373 . . . Passageways between living accommodation and vehicle operating compartment **[5]**
3/377 . . . Means for securing living accommodation to vehicle unit **[5]**
3/38 . . . Sleeping arrangements

3/39 . . . . expansible, collapsible or repositionable elements adapted to support a bed, e.g. wall portions **[5]**
3/40 . for carrying long loads, e.g. with separate wheeled load-supporting elements (B60P 3/022 takes precedence; signal devices to be attached to overhanging load B60Q 7/02) **[5]**
3/41 . . for log transport **[6]**
3/42 . convertible from one use to a different one (vehicles capable of travelling in or on different media, rail-and-road vehicles B60F)

5/00 Arrangements of weighing machines on vehicles (adapting weighing machines to use on transport vehicles G01G 19/08)

7/00 Securing or covering of load on vehicles
7/02 . Covering of load
7/04 . . by tarpaulins or like flexible members
7/06 . Securing of load (vehicle retainers B60P 3/073) **[5]**
7/08 . . Securing to vehicle floor or sides (B60P 7/13, B60P 7/135 take precedence) **[3,5]**
7/10 . . . the load being plates, cases, or boxes
7/12 . . . the load being tree-trunks, beams, drums, tubes, or the like
7/13 . . Securing freight containers or forwarding containers on vehicles **[3]**
7/135 . . Securing or supporting by load bracing means **[5]**
7/14 . . . the load bracing means comprising a movable bulkhead
7/15 . . . the load bracing means comprising a movable bar **[5]**
7/16 . . Protecting against shocks
7/18 . . . Protecting freight containers or forwarding containers **[3]**

9/00 Other vehicles predominantly for carrying loads

B60Q ARRANGEMENT OF SIGNALLING OR LIGHTING DEVICES, THE MOUNTING OR SUPPORTING THEREOF OR CIRCUITS THEREFOR, FOR VEHICLES IN GENERAL (arrangement of signalling or lighting devices, the mounting or supporting thereof, for rail vehicles B61D, for cycles B62J, for ships B63B, for aircraft B64D; lighting in general, lighting devices per se F21, H05B; signalling in general G08; electric switches per se H01H) **[4]**

(1) This subclass covers also arrangement or adaptation of lighting switches or signal-initiating means for vehicles. **[1,7]**
(2) Attention is drawn to the Note following the title of class B60.

Subclass index

1/00 Arrangement of optical signalling or lighting devices, the mounting or supporting thereof or circuits therefor (for lighting vehicle interior B60Q 3/00) **[4]**
1/02 . the devices being primarily intended to illuminate the way ahead or to illuminate other areas of way or environments
1/04 . . the devices being headlights
1/05 . . . retractable **[5]**
1/06 . . . adjustable, e.g. remotely-controlled from inside vehicle (B60Q 1/05 takes precedence) **[5]**
1/064 . . . . by fluid means **[5]**
1/068 . . . . by mechanical means **[5]**
1/072 . . . . . comprising a flexible element, e.g. chain **[5]**
1/076 . . . . by electric means **[5]**
1/08 . . . . automatically
1/10 . . . . . due to vehicle inclination, e.g. due to load distribution
1/105 . . . . . by fluid means **[5]**
1/11 . . . . . by mechanical means **[5]**
1/115 . . . . . by electric means **[5]**
1/12 . . . . . due to steering position
1/124 . . . . . by mechanical means **[5]**
1/128 . . . . . comprising a flexible element, e.g. chain **[5]**
1/132 . . . . . comprising meshing gear elements **[5]**
1/136 . . . . . comprising rigid link elements **[5]**
1/14 . . . having dimming means
1/16 . . . illuminating the way asymmetrically
1/18 . . . being additional front lights
1/20 . . . . Fog lights
1/22 . . for reverse drive
1/24 . . for lighting other areas than only the way ahead
1/26 . the devices being primarily intended to indicate the vehicle, or parts thereof, or to give signals, to other traffic
1/28 . . for indicating front of vehicle
1/30 . . for indicating rear of vehicle, e.g. by means of reflecting surfaces
1/32 . . for indicating vehicle sides
1/34 . . for indicating change of drive direction (B60Q 1/22 takes precedence)
1/36 . . . using movable members, e.g. arms with built-in flashing lamps
1/38 . . . using immovably-mounted light sources, e.g. fixed flashing lamps
1/40 . . . having automatic return to inoperative position
1/42 . . . . due to steering-wheel position
1/44 . . for indicating braking action

1/46 . . for giving flashing caution signals during drive, other than signalling change of direction, e.g. flashing the headlights
1/48 . . for parking purposes
1/50 . . for indicating other intentions or conditions, e.g. request for waiting or overtaking
1/52 . . . for indicating emergencies
1/54 . . . for indicating speed
1/56 . . for illuminating registrations or the like

3/00 Arrangement of lighting devices for vehicle interior, the mounting or supporting thereof or circuits therefor [4]
3/02 . for lighting passenger or driving compartment
3/04 . . for dashboard
3/06 . for lighting compartments other than passenger or driving space, e.g. luggage or engine compartment

5/00 Arrangement or adaptation of acoustic signal devices

7/00 Arrangement or adaptation of portable emergency signal devices on vehicles (arrangements for enforcing caution on roads, e.g. marker posts, E01F 9/00; signs G09F, e.g. reflecting warning triangles G09F 13/16)
7/02 . to be attached to overhanging loads or extending parts of vehicle

9/00 Arrangement or adaptation of signal devices not provided for in one of main groups B60Q 1/00 to B60Q 7/00

11/00 Arrangement of monitoring devices for devices provided for in groups B60Q 1/00 to B60Q 9/00 [2]

B60R VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR (fire prevention, containment or extinguishing specially adapted for vehicles A62C 3/07)

Note

Attention is drawn to the Note following the title of class B60.

Subclass index

1/00 Optical viewing arrangements (antiglare equipment, e.g. polarising, for windscreens or windows B60J 3/00; devices per se G02B; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84) **[2]**
1/02 . Rear-view mirror arrangements (periscope arrangements B60R 1/10)
1/04 . . mounted inside vehicle (B60R 1/08 takes precedence) **[1,7]**
1/06 . . mounted on vehicle exterior (B60R 1/08 takes precedence) **[1,7]**
1/062 . . . with remote control for adjusting position **[7]**
1/064 . . . . by manually powered actuator **[7]**
1/066 . . . . . for adjusting the mirror relative to its housing **[7]**
1/068 . . . . . using cables **[7]**
1/07 . . . . by electrically powered actuator **[7]**
1/072 . . . . . for adjusting the mirror relative to its housing **[7]**
1/074 . . . . . for retracting the mirror arrangements to a non-use position alongside the vehicle **[7]**
1/076 . . . yieldable to excessive external force and provided with an indexed use position (B60R 1/062 takes precedence) **[7]**
1/078 . . . easily removable; mounted for bodily outward movement, e.g. when towing **[7]**
1/08 . . involving special optical features, e.g. avoiding blind spots
1/10 . Front-view mirror arrangements; Periscope arrangements
1/12 . Mirror assemblies combined with other articles, e.g. clocks

3/00 Arrangements of steps, e.g. running-boards (constructed as superstructure sub-units of road vehicles B62D; ladders E06C)
3/02 . Retractable steps
3/04 . with provisions for shoe-scraping

5/00 **Compartments within vehicle body primarily intended or sufficiently spacious for trunks, suit-cases, or the like** (primarily intended for stowing loads in load-transporting vehicles B60P; arrangements for stowing spare wheels B62D 43/00)

5/02 . arranged at front of vehicle

5/04 . arranged at rear of vehicle

7/00 **Stowing or holding appliances inside of vehicle primarily intended for personal property smaller than suit-cases, e.g. travelling articles, or maps** (for radio sets, television sets, telephones, or the like, mounting of cameras operative during drive, tools, or spare parts B60R 11/00; for receptacles for refuse, food, beverages, cigarettes B60N)

7/02 . in a separate luggage compartment

7/04 . in driver or passenger space

7/05 . . mounted on sun visor **[5]**

7/06 . . mounted on or below dashboards

7/08 . Disposition of racks, clips, or the like

7/10 . . for supporting hats, clothes or clothes hangers **[5]**

7/12 . . for supporting umbrellas **[5]**

7/14 . . for supporting weapons **[5]**

9/00 **Supplementary fittings on vehicle exterior for carrying loads, e.g. luggage, sports gear or the like [5]**

9/02 . at the sides, e.g. on running-board

9/04 . Carriers associated with vehicle roof (B60R 9/08 takes precedence) **[5]**

9/042 . . Carriers characterised by means to facilitate loading or unloading of the load, e.g. rollers, tracks, or the like **[5]**

9/045 . . Carriers being adjustable or transformable, e.g. expansible, collapsible **[5]**

9/048 . . Carriers characterised by article-gripping, -retaining, or -locking means **[5]**

9/05 . . Carriers characterised by wind deflecting means (wind deflectors for open roofs B60J 7/22) **[5]**

9/052 . . Carriers comprising elongate members extending only transversely of vehicle (B60R 9/08 takes precedence) **[5]**

9/055 . . Enclosure-type carriers, e.g. containers, boxes (B60R 9/048 takes precedence) **[5]**

9/058 . . characterised by releasable attaching means between carrier and roof **[5]**

9/06 . at vehicle front or rear

9/08 . specially adapted for sports gear (vehicles specially adapted for carrying aeroplanes, for carrying boats B60P)

9/10 . . for cycles

9/12 . . for skis

11/00 **Arrangements for holding or mounting articles, not otherwise provided for**

11/02 . for radio sets, television sets, telephones, or the like; Arrangement of controls thereof (of aerials H01Q)

11/04 . Mounting of cameras operative during drive; Arrangement of controls thereof relative to the vehicle (cameras per se G03B)

11/06 . for tools or spare parts (for vehicle roof parts B60J 7/20; for spare wheels B62D)

13/00 **Elements for body-finishing, identifying, or decorating**; **Arrangements or adaptations for advertising purposes**

13/01 . Liners for load platforms or load compartments **[5]**

13/02 . Trim mouldings; Ledges; Wall liners; Roof liners (B60R 13/01 takes precedence) **[5]**

13/04 . Ornamental or guard strips; Ornamental inscriptive devices

13/06 . Sealing strips (sealing arrangements for vehicle windows, windscreens, non-fixed roofs, doors, or similar devices B60J 10/00)

13/07 . Water drainage or guide means not integral with roof structure (B60R 13/06 takes precedence; water deflectors for bonnets or lids B62D 25/13) **[4]**

13/08 . Insulating elements, e.g. for sound insulation **[4]**

13/10 . Registration, licensing, or like devices

15/00 **Arrangements or adaptations of sanitation devices**

15/02 . Washing facilities

15/04 . Toilet facilities

16/00 **Electric or fluid circuits specially adapted for vehicles and not otherwise provided for**; **Arrangement of elements of electric or fluid circuits specially adapted for vehicles and not otherwise provided for [3]**

16/02 . electric **[3]**

16/023 . . for transmission of signals between vehicle parts or subsystems **[8]**

16/027 . . . between relatively movable parts of the vehicle, e.g. between steering wheel and column **[8]**

16/03 . . for supply of electrical power to vehicle subsystems **[8]**

16/033 . . . characterised by the use of electrical cells or batteries (for propulsion purposes B60K 1/04; supplying batteries to, or removing batteries from, vehicles B60S 5/06; testing of charge state G01R 31/36) **[8]**

16/037 . . for occupant comfort **[8]**

16/04 . . Arrangement of batteries **[3,6,8]**

16/06 . . for carrying-off electrostatic charges **[3]**

16/08 . fluid **[3]**

17/00 **Arrangements or adaptations of lubricating systems or devices** (lubricating in general F16N)

17/02 . Systems, e.g. central lubrication systems

19/00 **Wheel guards**; **Radiator guards**; **Obstruction removers**; **Fittings damping bouncing force in collisions** (mudguards B62D)

19/02 . Bumpers, i.e. impact receiving or absorbing members for protecting vehicles or fending off blows from other vehicles or objects (initiating brake action by contact of bumper with an external object B60T 7/22; for rail vehicles B61F 19/04; safety equipment for cycles B62J 27/00; integral with waterborne vessels or specially adapted therefor B63B 59/02) **[4]**

19/03 . . characterised by material, e.g. composite (B60R 19/18 takes precedence) **[4]**

19/04 . . formed from more than one section (B60R 19/18 takes precedence) **[4]**

19/12 . . . vertically spaced **[4]**

19/14 . . . having folding parts **[4]**

19/16 . . . having deflecting members, e.g. rollers, balls **[4]**

19/18 . . Means within the bumper to absorb impact **[4]**

19/20 . . . containing gas or liquid, e.g. inflatable (connection of valves to inflatable elastic bodies B60C 29/00) **[4]**

19/22 . . . containing cellular material, e.g. solid foam **[4]**

19/24 . . Arrangements for mounting bumpers on vehicles **[4]**

19/26 . . . comprising yieldable mounting means (springs, shock absorbers, or means for damping vibrations per se F16F) **[4]**
19/28 . . . . Metallic springs **[4]**
19/30 . . . . Elastomeric material **[4]**
19/32 . . . . Fluid shock absorbers **[4]**
19/34 . . . . destroyed upon impact, e.g. one-shot type **[4]**
19/36 . . . . Combinations of yieldable mounting means of different types **[4]**
19/38 . . . adjustably or movably mounted, e.g. horizontally displaceable for securing a space between parked vehicles **[4]**
19/40 . . . . in the direction of an obstacle before a collision **[4]**
19/42 . . extending primarily along the sides of, or completely encircling, a vehicle (ornamental or guard strips B60R 13/04) **[4]**
19/44 . . Bumper guards **[4]**
19/46 . . . spring- or pivotally-mounted **[4]**
19/48 . . combined with, or convertible into, other devices or objects, e.g. bumpers combined with road brushes, bumpers convertible into beds **[4]**
19/50 . . . with lights or registration plates **[4]**
19/52 . Radiator or grille guards **[4]**
19/54 . Obstruction removers or deflectors (B60R 19/16, B60R 21/34 take precedence) **[4]**
19/56 . Arrangements on high-riding vehicles, e.g. lorries, for preventing vehicles or objects from running thereunder **[4]**

21/00 Arrangements or fittings on vehicles for protecting or preventing injuries to occupants or pedestrians in case of accidents or other traffic risks (safety belts or body harnesses in vehicles B60R 22/00; devices, apparatus or methods for life-saving in general A62B; safety devices for propulsion unit control specially adapted for, or arranged in, vehicles B60K 28/00; seats constructed to protect the occupant from the effect of abnormal g-forces, e.g. crash or safety seats, B60N 2/42; energy-absorbing arrangements for hand wheels for steering vehicles B62D 1/11; energy-absorbing arrangements for vehicle steering columns B62D 1/19; harnessing in aircraft B64D 25/00) **[4,5]**

21/01 . Electrical circuits for triggering safety arrangements in case of vehicle accidents or impending vehicle accidents **[7]**
21/013 . . including means for detecting collisions, impending collisions or roll-over **[8]**
21/0132 . . . responsive to vehicle motion parameters **[8]**
21/0134 . . . responsive to imminent contact with an obstacle **[8]**
21/0136 . . . responsive to actual contact with an obstacle **[8]**
21/015 . . including means for detecting the presence or position of passengers, passenger seats or child seats, e.g. for disabling triggering **[8]**
21/017 . . including arrangements for providing electric power to the safety arrangements **[8]**
21/02 . Occupant safety arrangements or fittings **[4]**
21/04 . . Padded linings for the vehicle interior **[4]**
21/045 . . . associated with the instrument panel or dashboard **[4]**
21/05 . . . associated with the steering wheel, hand lever or column (yieldable steering columns B62D 1/18) **[4,5]**
21/055 . . Padded fittings, e.g. head rests, sun visors **[4]**
21/06 . . Safety nets, transparent sheets, curtains, or the like, e.g. between occupants and glass (B60R 21/11, B60R 21/12, B60R 21/16 take precedence) **[4]**
21/08 . . . movable from an inoperative to an operative position, e.g. in a collision (electrical circuits for triggering safety arrangements B60R 21/01) **[4,7]**
21/09 . . Control elements or operating handles movable from an operative to an out-of-the way position, e.g. switch knobs, window cranks **[4]**
21/11 . . Overhead guards, e.g. against loads falling down **[4]**
21/12 . . which protect the occupants against personal attack from the inside or the outside of the vehicle **[4]**
21/13 . . Roll-over protection (electrical circuits for triggering safety arrangements B60R 21/01) **[4,7]**
21/16 . . Inflatable occupant restraints or confinements designed to inflate upon impact or impending impact, e.g. air bags (connection of valves to inflatable elastic bodies B60C 29/00) **[4]**
21/18 . . . the inflatable member formed as a belt or harness or combined with a belt or harness arrangement **[4]**
21/20 . . . *Arrangements for storing inflatable members in their non-use or deflated condition; Arrangement or mounting of air bag modules or components* **[4,8,2011.01]**
21/201 . . . . *Packaging straps or envelopes for inflatable members* **[2011.01]**
21/203 . . . . in steering wheels or steering columns **[8]**
21/205 . . . . *in dashboards* **[8,2011.01]**
21/206 . . . . . *in the lower part of dashboards, e.g. for protecting the knees* **[2011.01]**
21/207 . . . . in vehicle seats **[8]**
21/21 . . . . *in vehicle side panels, e.g. doors (pillar mounted arrangements B60R 21/213)* **[8,2011.01]**
21/213 . . . . *in vehicle roof frames or pillars* **[8,2011.01]**
21/214 . . . . *in roof panels* **[2011.01]**
21/215 . . . . *characterised by the covers for the inflatable member* **[8,2011.01]**
21/2155 . . . . . *with complex motion of the cover; Retraction under the lining during opening* **[2011.01]**
21/216 . . . . . *comprising tether means for limitation of cover motion during deployment* **[2011.01]**
21/2165 . . . . . *characterised by a tear line for defining a deployment opening* **[2011.01]**
21/217 . . . . *Inflation fluid source retainers, e.g. reaction canisters; Connection of bags, covers, diffusers or inflation fluid sources therewith or together* **[8,2011.01]**
21/23 . . . Inflatable members (B60R 21/18 takes precedence) **[8]**
21/231 . . . . *characterised by their shape, construction or spatial configuration* **[8,2011.01]**
21/232 . . . . . *Curtain-type airbags deploying mainly in a vertical direction from their top edge* **[2011.01]**
21/233 . . . . . comprising a plurality of individual compartments; comprising two or more bag-like members, one within the other (B60R 21/232 takes precedence) **[8]**
21/2334 . . . . . *Expansion regulating features* **[2011.01]**

21/2338 . . . . . *Tethers* **[2011.01]**
21/2342 . . . . . *Tear seams* **[2011.01]**
21/2346 . . . . . *Soft diffusers* **[2011.01]**
21/235 . . . . characterised by their material **[8]**
21/237 . . . . characterised by the way they are folded **[8]**
21/239 . . . . characterised by their venting means **[8]**
21/26 . . . *characterised by the inflation fluid source or means to control inflation fluid flow* **[4,2011.01]**
21/261 . . . . *with means other than bag structure to diffuse or guide inflation fluid* **[2011.01]**
21/262 . . . . . *Elongated tubular diffusers, e.g. curtain-type* **[2011.01]**
21/263 . . . . *using a variable source, e.g. plural stage or controlled output (hybrid inflator B60R 21/272)* **[2011.01]**
21/264 . . . . using instantaneous generation of gas, e.g. pyrotechnic (B60R 21/268 takes precedence) **[8]**
21/268 . . . . *using instantaneous release of stored pressurised gas* **[8,2011.01]**
21/272 . . . . . with means for increasing the pressure of the gas just before or during liberation, e.g. hybrid inflators **[8]**
21/274 . . . . . *characterised by means to rupture or open the fluid source* **[2011.01]**
21/276 . . . . with means to vent the inflation fluid source, e.g. in case of overpressure **[8]**
21/30 . . . . with means to draw ambient air into the flow line and mix such air with the inflation fluid **[4]**
21/33 . . . Arrangements for non-electric triggering of inflation (electrical circuits for triggering safety arrangements B60R 21/01) **[8]**
21/34 . *Protecting non-occupants of a vehicle, e.g. pedestrians* **[4,2011.01]**
21/36 . . *using airbags* **[2011.01]**
21/38 . . *using means for lifting bonnets* **[2011.01]**

22/00 **Safety belts or body harnesses in vehicles** (safety belts or body harnesses in general A62B 35/00) **[4]**
22/02 . Semi-passive restraint systems, e.g. systems applied or removed automatically but not both **[4]**
22/03 . . Means for presenting the belt or part thereof to the wearer **[6]**
22/04 . Passive restraint systems, i.e. systems both applied and removed automatically, e.g. by movement of the vehicle door **[4]**
22/06 . . having the belt or harness connected to a member slidable in a vehicle-mounted track **[4]**
22/08 . . having the belt retractor mounted on or in a vehicle closure, e.g. the door **[4]**
22/10 . specially adapted for children or animals (children's seats B60N 2/24) **[4]**

Note

Groups B60R 22/02 to B60R 22/08 and B60R 22/12 to B60R 22/48 take precedence over group B60R 22/10. **[6]**

22/12 . Construction of belts or harnesses (B60R 21/18 takes precedence) **[4]**
22/14 . . incorporating enlarged restraint areas, e.g. vests, nets **[4]**
22/16 . . using belts which become permanently deformed, i.e. one time use **[4]**
22/18 . Anchoring devices **[4]**
22/185 . . with stopping means for acting directly upon the belt in an emergency, e.g. by clamping or friction **[7]**
22/19 . . with means for reducing belt tension during use under normal conditions **[7]**
22/195 . . with means to tension the belt in an emergency (electrical circuits for triggering safety arrangements B60R 21/01) **[7]**
22/20 . . adjustable in position, e.g. in height **[4]**
22/22 . . secured to the vehicle floor **[4]**
22/24 . . secured to the side, door, or roof of the vehicle **[4]**
22/26 . . secured to the seat **[4]**
22/28 . incorporating energy-absorbing devices **[4]**
22/30 . Coupling devices other than buckles, including length-adjusting fittings (buckles A44B 11/00; releasable fastenings in general F16B) **[4]**
22/32 . Devices for releasing in an emergency, e.g. after an accident **[4]**
22/34 . Belt retractors, e.g. reels (anchoring devices with means to tension the belt in an emergency B60R 22/195) **[4,7]**
22/343 . . with electrically actuated locking means **[6]**
22/347 . . with means for permanently locking the retractor during the wearing of the belt (B60R 22/343, B60R 22/415 take precedence) **[6]**
22/35 . . . the locking means being automatically actuated **[6]**
22/353 . . . . in response to belt movement when a wearer applies the belt **[6]**
22/357 . . . . in response to fastening of the belt buckle **[6]**
22/36 . . self-locking in an emergency (B60R 22/343 takes precedence) **[4]**
22/38 . . . responsive only to belt movement **[4]**
22/40 . . . responsive only to vehicle movement **[4]**
22/405 . . . responsive to belt movement and vehicle movement **[6]**
22/41 . . . with additional means for preventing locking under predetermined conditions **[6]**
22/415 . . . with additional means allowing a permanent locking of the retractor during the wearing of the belt **[6]**
22/42 . . . having means for acting directly upon the belt, e.g. by clamping or friction **[4]**
22/44 . . with means for reducing belt tension during use under normal conditions **[4]**
22/46 . . with means to tension the belt in an emergency (electrical circuits for triggering safety arrangements B60R 21/01) **[4,7]**
22/48 . Control systems, alarms, or interlock systems, for the correct application of the belt or harness **[4]**

25/00 **Vehicle fittings for preventing or indicating unauthorised use or theft of vehicles** (anti-theft devices for wheel cover discs, rings or the like B60B 7/16; locks or bolts per se E05) **[5]**
25/02 . operating on steering mechanism
25/04 . preventing use of engine (engines, fittings for normal use, see the relevant classes for such engines or fittings)
25/06 . operating on transmission
25/08 . operating on brake
25/10 . actuating a signalling device

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B60S SERVICING, CLEANING, REPAIRING, SUPPORTING, LIFTING, OR MANOEUVRING OF VEHICLES, NOT OTHERWISE PROVIDED FOR

Note

Attention is drawn to the Note following the title of class B60.

Subclass index

1/00 **Cleaning of vehicles** (by apparatus not integral with vehicle B60S 3/00; cleaning in general B08B; de-icing of aircraft B64D; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84)

1/02 . Cleaning windscreens, windows, or optical devices
1/04 . . Wipers or the like, e.g. scrapers
1/06 . . . characterised by the drive (producing other than swinging movement B60S 1/44)
1/08 . . . . electrically driven
1/10 . . . . pneumatically driven
1/12 . . . . hydraulically driven
1/14 . . . . personally driven
1/16 . . . . Means for transmitting drive
1/18 . . . . . mechanically
1/20 . . . . . by cable drives; by flexible shafts
1/22 . . . . . by rotary cams
1/24 . . . . . by rotary cranks
1/26 . . . . . by toothed gearing
1/28 . . . characterised by a plurality of wipers (B60S 1/06 takes precedence)
1/30 . . . . arranged both outside and inside
1/32 . . . characterised by constructional features of wiper blades or arms
1/34 . . . . Wiper arms; Mountings therefor
1/36 . . . . . Variable-length arms
1/38 . . . . Wiper blades
1/40 . . . . Connections between blades and arms
1/42 . . . . . resilient
1/44 . . . the wiper blades having other than swinging movement, e.g. rotary
1/46 . . using liquid; Windscreen washers
1/48 . . . Liquid supply therefor
1/50 . . . . Arrangement of reservoir
1/52 . . . . Arrangement of nozzles (nozzles per se B05B)
1/54 . . using gas, e.g. hot air
1/56 . . specially adapted for cleaning other parts or devices than front windows or windscreens
1/58 . . . for rear windows
1/60 . . . for signalling devices, e.g. reflectors
1/62 . Other vehicle fittings for cleaning
1/64 . . for cleaning vehicle interiors, e.g. built-in vacuum cleaners
1/66 . . for cleaning vehicle exterior
1/68 . . . for freeing wheels or tyres from foreign matter, e.g. wheel scrapers

3/00 **Vehicle cleaning apparatus not integral with vehicles** (cleaning in general B08B; cleaning peculiar to waterborne vessels B63B 57/00, B63B 59/00; ground equipment for cleaning aircraft B64F 5/00)

3/04 . for exteriors of land vehicles
3/06 . . with rotary bodies contacting the vehicles

5/00 **Servicing, maintaining, repairing, or refitting of vehicles** (vehicles adapted to carry a workshop for servicing or maintenance B60P 3/14; servicing rail locomotives B61K)

5/02 . Supplying fuel to vehicles; General disposition of plant in filling stations (apparatus for transferring measured quantities of petrol, oil, or the like from storage space to vehicles B67D)
5/04 . Supplying air for tyre inflation (arrangement of tyre inflating devices on vehicles B60C 23/00; tyre pressure gauges G01L 17/00) **[3]**
5/06 . Supplying batteries to, or removing batteries from, vehicles (circuit arrangements for charging batteries H02J 7/00) **[6]**

9/00 **Ground-engaging vehicle fittings for supporting, lifting, or manoeuvring the vehicle, wholly or in part, e.g. built-in jacks** (lifting devices in general B66F; supports in general F16M)

9/02 . for only lifting or supporting
9/04 . . mechanically
9/06 . . . of screw-and-nut type
9/08 . . . . the screw axis being substantially vertical
9/10 . . by fluid pressure
9/12 . . . of telescopic type
9/14 . for both lifting and manoeuvring
9/16 . . for operating only on one end of vehicle (B60S 9/205 takes precedence) **[4]**
9/18 . . . mechanically
9/20 . . . with fluid-pressure lift
9/205 . . Power driven manoeuvring fittings, e.g. reciprocably driven steppers or rotatably driven cams (vehicles with ground-engaging propulsion means, e.g. walking members, B62D 57/02) **[4]**
9/21 . . . comprising a rotatably driven auxiliary wheel or endless track, e.g. driven by a ground wheel (track vehicles with additional or alternative ground wheels B62D 55/02, B62D 55/04; auxiliary drives from a ground wheel B60K 25/08) **[4]**

9/215 . . . . driven by an auxiliary motor **[4]**
9/22 . Means for attaching lifting, supporting, or manoeuvring devices to vehicles (for separate devices B60S 11/00)

11/00 Vehicle modifications for receiving separate lifting, supporting, or manoeuvring devices

13/00 Vehicle-manoeuvring devices separate from the vehicle (vehicle-lifting or pushing devices B66F)
13/02 . Turntables; Traversers (incorporated in vehicle-storing garages E04H)

B60T VEHICLE BRAKE CONTROL SYSTEMS OR PARTS THEREOF; **BRAKE CONTROL SYSTEMS OR PARTS THEREOF, IN GENERAL** (control of electrodynamic brake systems B60L 7/00; conjoint control of brakes and other drive units of vehicles B60W); **ARRANGEMENT OF BRAKING ELEMENTS ON VEHICLES IN GENERAL**; **PORTABLE DEVICES FOR PREVENTING UNWANTED MOVEMENT OF VEHICLES**; **VEHICLE MODIFICATIONS TO FACILITATE COOLING OF BRAKES [1,8]**

Note

In this subclass, the following expression is used with the meaning indicated:
– "brake control systems" includes brake control systems for vehicles or of general applicability.

Subclass index

1/00 Arrangements of braking elements, i.e. of those parts where braking effect occurs
1/02 . acting by retarding wheels
1/04 . . acting directly on tread
1/06 . . acting otherwise than on tread, e.g. employing rim, drum, disc, or transmission
1/08 . . using fluid or powdered medium
1/087 . . . in hydrodynamic, i.e. non-positive displacement, retarders **[3]**
1/093 . . . in hydrostatic, i.e. positive displacement, retarders **[3]**
1/10 . . by utilising wheel movement for accumulating energy, e.g. driving air compressors (using propulsion unit as braking means, see the relevant class)
1/12 . acting otherwise than by retarding wheels, e.g. jet-action
1/14 . . directly on road (portable devices, e.g. chocks, B60T 3/00)
1/16 . . by increasing air resistance, e.g. flaps

3/00 Portable devices for preventing unwanted movement of vehicles, e.g. chocks

5/00 Vehicle modifications to facilitate cooling of brakes

Brake control systems or parts thereof

7/00 Brake-action initiating means
7/02 . for personal initiation
7/04 . . foot-actuated
7/06 . . . Disposition of pedal
7/08 . . hand-actuated
7/10 . . . Disposition of hand control
7/12 . for automatic initiation; for initiation not subject to will of driver or passenger
7/14 . . operated upon collapse of driver
7/16 . . operated by remote control, i.e. initiating means not mounted on vehicle
7/18 . . . operated by wayside apparatus
7/20 . . specially adapted for trailers, e.g. in case of uncoupling of trailer (inertia-actuated overrun brakes B60T 13/08)
7/22 . . initiated by contact of vehicle, e.g. bumper, with an external object, e.g. another vehicle **[4]**

8/00 Arrangements for adjusting wheel-braking force to meet varying vehicular or ground-surface conditions, e.g. limiting or varying distribution of braking force (by changing number of effective brake cylinders in power brake systems B60T 17/10)
8/17 . Using electrical or electronic regulation means to control braking **[8]**

Note

When classifying in group B60T 8/17, classification is also made in appropriate places in groups B60T 8/18, B60T 8/24, B60T 8/26 or B60T 8/32 if other aspects than electronic control are of interest. **[8]**

8/171 . . Detecting parameters used in the regulation; Measuring values used in the regulation **[8]**

8/172 . . Determining control parameters used in the regulation, e.g. by calculations involving measured or detected parameters **[8]**

8/173 . . Eliminating or reducing the effect of unwanted signals, e.g. due to vibrations or electrical noise **[8]**

8/174 . . characterised by using special control logic, e.g. fuzzy logic **[8]**

8/175 . . Brake regulation specially adapted to prevent excessive wheel spin during vehicle acceleration, e.g. for traction control **[8]**

8/1755 . . Brake regulation specially adapted to control the stability of the vehicle, e.g. taking into account yaw rate or transverse acceleration in a curve (road vehicle drive control systems for control of driving stability otherwise than by controlling a particular sub-unit B60W 30/02) **[8]**

8/176 . . Brake regulation specially adapted to prevent excessive wheel slip during vehicle deceleration, e.g. ABS (B60T 8/1755 takes precedence) **[8]**

8/1761 . . . responsive to wheel or brake dynamics, e.g. wheel slip, wheel acceleration or rate of change of brake fluid pressure **[8]**

8/1763 . . . responsive to the coefficient of friction between the wheels and the ground surface (B60T 8/1764 takes precedence) **[8]**

8/1764 . . . Regulation during travel on surface with different coefficients of friction, e.g. between left and right sides, mu-split **[8]**

8/1766 . . . Proportioning of brake forces according to vehicle axle loads, e.g. front to rear of vehicle **[8]**

8/1769 . . . specially adapted for vehicles having more than one driven axle, e.g. four-wheel drive vehicles **[8]**

8/18 . responsive to vehicle weight or load, e.g. load distribution (B60T 8/30 takes precedence; responsive to weight and speed condition B60T 8/58) **[4]**

8/20 . . with stepwise control action

8/22 . . with continuous control action

8/24 . responsive to vehicle inclination or change of direction, e.g. negotiating bends

8/26 . characterised by producing differential braking between front and rear wheels

8/28 . . responsive to deceleration **[4]**

8/30 . . responsive to load **[4]**

8/32 . responsive to a speed condition, e.g. acceleration or deceleration (B60T 8/28 takes precedence) **[4]**

8/34 . . having a fluid pressure regulator responsive to a speed condition **[4]**

8/36 . . . including a pilot valve responding to an electromagnetic force **[4]**

8/38 . . . including valve means of the relay or driver controlled type **[4]**

8/40 . . . comprising an additional fluid circuit including fluid pressurising means for modifying the pressure of the braking fluid, e.g. including wheel driven pumps for detecting a speed condition, or pumps which are controlled by means independent of the braking system **[4]**

8/42 . . . having expanding chambers for controlling pressure **[4]**

8/44 . . . co-operating with a power-assist booster means associated with a master cylinder for controlling the release and reapplication of brake pressure through an interaction with the power assist device **[4]**

8/46 . . . the pressure being reduced by exhausting fluid **[4]**

8/48 . . . connecting the brake actuator to an alternative or additional source of fluid pressure **[4]**

8/50 . . . having means for controlling the rate at which pressure is reapplied to the brake **[4]**

8/52 . . Torque sensing, i.e. wherein the braking action is controlled by forces producing or tending to produce a twisting or rotating motion on a braked rotating member **[4]**

8/54 . . by mechanical means **[4]**

8/56 . . having means for changing the coefficient of friction **[4]**

8/58 . . responsive to speed and another condition or to plural speed conditions **[4]**

Note

In this group, a single condition which is itself responsive to, or representative of, another single condition is not regarded as plural conditions. **[4]**

8/60 . . . using electrical circuitry for controlling the braking action, the circuitry deriving a control function relating to the dynamic of the braked vehicle or wheel **[4]**

8/62 . . . . wherein the individual vehicle wheels are provided (i) with self-contained braking systems operating the individual wheels in accordance with its dynamic state or (ii) with a central processing unit which receives input from individual wheels or wheel groups and produces a plurality of control signals for separately operating individual wheels or groups of wheels **[4]**

8/64 . . . . wherein the controlled braking action is characterised by the manner in which the braking fluid pressure is reduced or reapplied **[4]**

8/66 . . . . wherein the braking action is responsive to the difference between a computed or other theoretical vehicle speed and an actual speed of a wheel thereof **[4]**

8/68 . . . . . wherein the braking action is controlled by a difference between the rate of change of vehicle velocity and the rate of change of wheel velocity **[4]**

8/70 . . . . . sensing both acceleration and deceleration of either the vehicle or the wheel **[4]**

8/72 . . responsive to a difference between a speed condition, e.g. deceleration, and a fixed reference (B60T 8/66 takes precedence) **[4]**

8/74 . . . sensing a rate of change of velocity **[4]**

8/76 . . . two or more sensing means from different wheels indicative of the same type of speed condition **[4]**
8/78 . . . using electrical circuitry for controlling the braking action, the circuitry deriving a control function relating to the dynamics of the braked vehicle or wheel **[4]**
8/80 . . . . Means sensing a rate of change of velocity **[4]**
8/82 . . . . two or more sensing means from different wheels indicative of the same type of speed condition **[4]**
8/84 . . . . wherein two wheels or wheel groups are controlled in dependence on the behaviour of a reference wheel or wheel group, with means for changing the reference wheel, e.g. "select high, select low" operation **[4]**
8/86 . . wherein the brakes are automatically applied in accordance with a speed condition and having means for overriding the automatic braking device when a skid condition occurs **[4]**
8/88 . . with failure responsive means, i.e. means for detecting and indicating faulty operation of the speed responsive control means **[4]**
8/90 . . . using a simulated speed signal to test speed responsive control means **[4]**
8/92 . . . automatically taking corrective action **[4]**
8/94 . . . . on a fluid pressure regulator **[4]**
8/96 . . . . on speed responsive control means **[4]**

10/00 Control or regulation for continuous braking making use of fluid or powdered medium, e.g. for use when descending a long slope [4]
10/02 . with hydrodynamic brake **[4]**
10/04 . with hydrostatic brake **[4]**

11/00 Transmitting braking action from initiating means to ultimate brake actuator without power assistance or drive or where such assistance or drive is irrelevant [5]
11/04 . transmitting mechanically **[5]**
11/06 . . Equalising arrangements **[5]**
11/08 . . providing variable leverage **[5]**
11/10 . transmitting by fluid means, e.g. hydraulic **[5]**
11/12 . . the transmitted force being varied therein (B60T 11/16 to B60T 11/28 take precedence) **[5]**
11/14 . . the transmitted force being substantially unchanged **[5]**
11/16 . . Master control, e.g. master cylinders **[5]**
11/18 . . . Connection thereof to initiating means **[5]**
11/20 . . . Tandem, side-by-side, or other multiple master-cylinder units **[5]**
11/21 . . . . with two pedals operating on respective circuits, pressures therein being equalised when both pedals are operated together, e.g. for steering **[5]**
11/22 . . . characterised by being integral with reservoir **[5]**
11/224 . . . with pressure-varying means, e.g. with two stage operation provided by use of different piston diameters including continuous variation from one diameter to another **[5]**
11/228 . . . Pressure-maintaining arrangements, e.g. for replenishing the master cylinder chamber with fluid from a reservoir (B60T 11/232 takes precedence) **[5]**
11/232 . . . Recuperation valves **[5]**
11/236 . . . Piston sealing arrangements **[5]**
11/24 . . Single initiating means operating on more than one circuit, e.g. dual circuits (multiple master-cylinder units B60T 11/20) **[5]**
11/26 . . Reservoirs (integral with master controls B60T 11/22) **[5]**
11/28 . . Valves specially adapted therefor (recuperation valves B60T 11/232) **[5]**
11/30 . . . Bleed valves for hydraulic brake systems **[5]**
11/32 . . . Automatic cut-off valves for defective pipes **[5]**
11/34 . . . Pressure-reducing or limiting valves **[5]**

13/00 Transmitting braking action from initiating means to ultimate brake actuator with power assistance or drive; **Brake systems incorporating such transmitting means, e.g. air-pressure brake systems**
13/02 . with mechanical assistance or drive
13/04 . . by spring or weight (fluid-released B60T 13/10)
13/06 . . by inertia, e.g. flywheel
13/08 . . . Overrun brakes
13/10 . with fluid assistance, drive, or release
13/12 . . the fluid being liquid
13/122 . . . Systems using both master cylinder and distributor valve; Structural associations of master cylinder with distributor valve **[6]**
13/125 . . . Systems using brake pressure distributor valve without master cylinder **[6]**
13/128 . . . Systems using booster hydraulically combined with master cylinder **[6]**
13/13 . . . . with additional direct hydraulic output from booster to brake circuit **[6]**
13/132 . . . Systems using booster having mechanical output, e.g. to master cylinder **[6]**
13/135 . . . Boosters characterised by control valve in booster piston **[6]**
13/138 . . . Pressure supply arrangements **[6]**
13/14 . . . . using accumulators or reservoirs **[6]**
13/16 . . . . using pumps directly, i.e. without interposition of accumulators or reservoirs **[6]**
13/18 . . . . . with control of pump output delivery **[6]**
13/20 . . . . . with control of pump driving means **[6]**
13/22 . . . Brakes applied by springs or weights and released hydraulically
13/24 . . the fluid being gaseous
13/26 . . . Compressed-air systems
13/36 . . . . direct, i.e. brakes applied directly by compressed air
13/38 . . . . Brakes applied by springs or weights and released by compressed air
13/40 . . . . indirect, i.e. compressed-air booster units
13/44 . . . . . with two-chamber booster units
13/45 . . . . . with multiple booster units, e.g. tandem booster units **[5]**
13/46 . . . Vacuum systems
13/48 . . . . direct, i.e. brakes applied directly by vacuum
13/50 . . . . Brakes applied by springs or weights and released by vacuum
13/52 . . . . indirect, i.e. vacuum booster units
13/56 . . . . . with two-chamber booster units
13/563 . . . . . with multiple booster units, e.g. tandem booster units **[5]**
13/565 . . . . . characterised by being associated with master cylinders, e.g. integrally formed **[5]**

13/567 . . . . . characterised by constructional features of the casing or by its strengthening or mounting arrangements **[5]**
13/569 . . . . . characterised by piston details, e.g. construction, mounting of diaphragm **[5]**
13/57 . . . . . characterised by constructional features of control valves **[5]**
13/573 . . . . . characterised by reaction devices **[5]**
13/575 . . . . . using resilient discs or pads **[5]**
13/577 . . . . . using levers **[5]**
13/58 . . Combined or convertible systems
13/60 . . . both fluid pressure and vacuum
13/62 . . . both straight and automatic
13/64 . . . both single and multiple, e.g. single and tandem
13/66 . . Electrical control in fluid-pressure brake systems
13/68 . . . by electrically-controlled valves
13/70 . . . by fluid-controlled switches
13/72 . . . in vacuum systems
13/74 . with electrical assistance or drive

15/00 Construction, arrangement, or operation of valves incorporated in power brake systems and not covered by groups B60T 11/00 or B60T 13/00 (valve structures responsive to a speed condition B60T 8/34) **[4]**

15/02 . Application and release valves
15/04 . . Driver's valves
15/06 . . . Single driver's valves for pressure brakes without automatic control
15/08 . . . Driver's valves for pressure brakes having automatic control
15/10 . . . for vacuum brakes
15/12 . . . combined with relay valves or the like
15/14 . . . influencing electric control means
15/16 . . . Arrangements enabling systems to be controlled from two or more positions
15/18 . . Triple or other relay valves which allow step-wise application or release and which are actuated by brake-pipe pressure variation to connect brake cylinders or equivalent to compressed-air or vacuum source or atmosphere
15/20 . . . controlled by two fluid pressures
15/22 . . . . with one or more auxiliary valves, for braking, releasing, filling reservoirs
15/24 . . . controlled by three fluid pressures
15/26 . . . . without a quick braking action
15/28 . . . . . and having auxiliary valves
15/30 . . . . with a quick braking action
15/32 . . . . . and having auxiliary valves
15/34 . . . controlled alternatively by two or three fluid pressures
15/36 . . Other control devices or valves characterised by definite functions
15/38 . . . for quick take-up and heavy braking, e.g. with auxiliary reservoir for taking-up slack
15/40 . . . . with separate take-up and applying cylinders
15/42 . . . with a quick braking action, i.e. with accelerating valves actuated by brake-pipe pressure variation
15/44 . . . . and operating independently of the main control device
15/46 . . . for retarding braking action to prevent rear vehicles of a vehicle train from overtaking the forward ones
15/48 . . . for filling reservoirs
15/50 . . . . with means for limiting or relieving pressure in reservoirs
15/52 . . . for quick release of brakes, e.g. for influencing counter-pressure in triple valve or recirculating air from reservoir or brake cylinder to brake pipe
15/54 . . . for controlling exhaust from triple valve or from brake cylinder
15/56 . . . for filling reservoirs by means of a secondary supply pipe
15/58 . . . for supplying control impulses through a secondary air pipe
15/60 . . . for releasing or applying brakes when vehicles of a vehicle train are uncoupled

17/00 Component parts, details, or accessories of brake systems not covered by groups B60T 8/00, B60T 13/00 or B60T 15/00, or presenting other characteristic features [4]

17/02 . Arrangements of pumps or compressors, or control devices therefor
17/04 . Arrangement of piping, valves in the piping, e.g. cut-off valves, couplings or air hoses **[4]**
17/06 . Applications or arrangements of reservoirs
17/08 . Brake cylinders other than ultimate actuators
17/10 . . Two or more cylinders acting on the same brake with means for rendering them effective selectively or successively, the number of effective cylinders being variable
17/12 . . . according to vehicle weight
17/14 . . . according to vehicle speed
17/16 . . Locking of brake cylinders
17/18 . Safety devices; Monitoring
17/20 . . Safety devices operable by passengers other than the driver
17/22 . . Devices for monitoring or checking brake systems; Signal devices

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B60V AIR-CUSHION VEHICLES

Note

In this subclass, the following expression is used with the meaning indicated:
– "air-cushion vehicles" includes all vehicles which are wholly or partly supported on land or water by air or other gaseous cushions.

1/00 **Air-cushion vehicles** (land vehicles, waterborne vessels, or aircraft adapted or modified to travel on air cushions B60V 3/00)

1/02 . wherein the cushion is generated and contained by at least one peripheral fluid curtain

1/04 . wherein the cushion is contained at least in part by walls

1/06 . wherein the cushion is formed within plenum chamber

1/08 . wherein the cushion is created during forward movement of the vehicle by ram effect

1/10 . in which the curtain-forming nozzle or the vehicle base is shaped to create a vortex curtain

1/11 . Stability or attitude control **[2]**

1/12 . . by dividing the cushion **[2]**

1/14 . Propulsion; Control thereof (B60V 1/11 takes precedence) **[2]**

1/15 . . using part of the cushion-forming fluid **[2]**

1/16 . Flexible skirts

1/18 . Body structure

1/20 . Spray deflectors

1/22 . provided with hydrofoils

3/00 **Land vehicles, waterborne vessels, or aircraft, adapted or modified to travel on air cushions**

3/02 . Land vehicles, e.g. road vehicles

3/04 . . co-operating with rails or other guiding means, e.g. with air cushion between rail and vehicle

3/06 . Waterborne vessels

3/08 . Aircraft, e.g. air-cushion alighting-gear therefor

B60W CONJOINT CONTROL OF VEHICLE SUB-UNITS OF DIFFERENT TYPE OR DIFFERENT FUNCTION; CONTROL SYSTEMS SPECIALLY ADAPTED FOR HYBRID VEHICLES; ROAD VEHICLE DRIVE CONTROL SYSTEMS FOR PURPOSES NOT RELATED TO THE CONTROL OF A PARTICULAR SUB-UNIT [8]

(1) This subclass does not cover the control of a single sub-unit; such control is classified in the relevant place for the sub-unit, e.g. F02D, F16H. Where a single sub-unit is controlled by means of signals or commands from other sub-units, the control of this single sub-unit is classified in the relevant place for this sub-unit. For example, the control of variable-ratio gearing by means of signals from the engine or the accelerator is classified in the subclass for gearing, F16H. **[8]**

(2) Conjoint control of driveline units, e.g. engines, and variable-ratio gearing occurring only transiently during ratio shift and being also characterised by the control of the gearing is also classified in the subclass for gearing, F16H. **[8]**

(3) In groups B60W 20/00 to B60W 50/00, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[8]**

(4) When classifying in group B60W 10/00, classification must also be made in groups B60W 20/00 to B60W 50/00 in order to identify the purpose or use of the control. **[8]**

(5) In this subclass, the following terms are used with the meanings indicated: **[8]**

– "conjoint control" means that a programmed or condition-responsive automatic controller on board the vehicle, embodying control logic for vehicle sub-units of different type or different function, sends control signals to actuators of two or more vehicle sub-units, so that the sub-units act together to solve a particular problem or in response to a particular driving condition; **[8]**

– "drive control system" means an electronic system in a road vehicle for automatically controlling the movement of that vehicle in order to take certain actions; **[8]**

– "road vehicle" means a vehicle normally under the control of a human driver for transportation on roads, e.g. an automobile, truck or bus; **[8]**

– "sub-unit" means one of the following vehicle systems: propulsion system, clutch system, change-speed gearing system, system for distributing drive torque between front and rear axles, axle differential system, brake system, steering system, suspension system, energy storage means, fuel cells or auxiliary equipment. **[8]**

10/00 **Conjoint control of vehicle sub-units of different type or different function** (for propulsion of purely electrically-propelled vehicles with power supplied within the vehicle B60L 11/00) **[8]**

Note

When classifying in this group, each controlled sub-unit must be separately identified by a classification in a relevant place in this group. **[8]**

10/02 . including control of driveline clutches **[8]**

10/04 . including control of propulsion units **[8]**

10/06 . . including control of combustion engines **[8]**

10/08 . . including control of electric propulsion units, e.g. motors or generators **[8]**

10/10 . including control of change-speed gearings **[8]**

10/12 . including control of differentials **[8]**

10/18 . including control of braking systems **[8]**

10/20 . including control of steering systems **[8]**

10/22 . including control of suspension systems **[8]**

10/24 . including control of energy storage means **[8]**

10/26 . . for electrical energy, e.g. batteries or capacitors **[8]**

10/28 . including control of fuel cells **[8]**

10/30 . including control of auxiliary equipment, e.g. air-conditioning compressors or oil pumps **[8]**

20/00 **Control systems specially adapted for hybrid vehicles, i.e. vehicles having two or more prime movers of more than one type, e.g. electrical and internal combustion motors, all used for propulsion of the vehicle [8]**

30/00 **Purposes of road vehicle drive control systems not related to the control of a particular sub-unit, e.g. of systems using conjoint control of vehicle sub-units [8]**

30/02 . Control of vehicle driving stability **[8]**

30/04 . . related to roll-over prevention **[8]**

30/06 . Automatic manoeuvring for parking **[8]**

30/08 . Predicting or avoiding probable or impending collision **[8]**

30/10 . Path keeping **[8]**
30/12 . . Lane keeping **[8]**
30/14 . Cruise control **[8]**
30/16 . . Control of distance between vehicles, e.g. keeping a distance to preceding vehicle **[8]**
30/18 . Propelling the vehicle **[8]**
30/20 . . Reducing vibrations in the driveline **[8]**

40/00 Estimation or calculation of driving parameters for road vehicle drive control systems not related to the control of a particular sub-unit [8]

40/02 . related to ambient conditions **[8]**
40/04 . . Traffic conditions **[8]**
40/06 . . Road conditions **[8]**
40/08 . related to drivers or passengers **[8]**
40/10 . related to vehicle motion **[8]**
40/12 . related to parameters of the vehicle itself **[8]**

50/00 Details of control systems for road vehicle drive control not related to the control of a particular sub-unit [8]

50/02 . Ensuring safety in case of control system failures, e.g. by diagnosing, circumventing or fixing failures **[8]**
50/04 . Monitoring the functioning of the control system **[8]**
50/06 . Improving the dynamic response of the control system, e.g. improving the speed of regulation or avoiding hunting or overshoot **[8]**
50/08 . Interaction between the driver and the control system **[8]**

B61 RAILWAYS

Note

In this class, the following expression is used with the meaning indicated:
– "railway systems" covers:
  (a) systems in which trains or individual passenger vehicles or load carriers run on, or are guided by, ground or elevated tracks defined by rails, ropes, cables, or other guiding elements for wheels, rollers, or sliding anti-friction devices (permanently attached to a continuous traction element B65G 17/00);
  (b) systems in which carriers or impellers for persons or loads are attached to, e.g. suspended from, a guided traction rope or cable which determines their path of movement (chain conveyers, scraper conveyers B65G 17/00, B65G 19/00);
  (c) power and free systems of either of the above types in which vehicles, load-carriers, or loads may be selectively coupled to, or uncoupled from, continuous traction members, e.g. cables, chains.

B61B RAILWAY SYSTEMS; **EQUIPMENT THEREFOR NOT OTHERWISE PROVIDED FOR** (lifts or hoists, elevators, escalators, moving walkways B66B) **[4]**

Note

In this subclass, the following terms are used with the meanings indicated:
– "rope railways" covers railways using cables or chains as traction or suspension means;
– "ropes", "cables", or "chains" are equivalent unless specifically mentioned. **[2]**

Subclass index

1/00 General arrangement of stations, platforms, or sidings; **Railway networks**; **Rail-vehicle marshalling systems** (shunting humps or shunting devices B61J; construction of platforms E01F 1/00; time-tables G09D)

1/02 . General arrangement of stations and platforms including protection devices for the passengers

Elevated railways

3/00 Elevated railway systems with suspended vehicles (with suspended flexible tracks B61B 7/00; saddle or like balanced type with monorail B61B 13/06; with propelling cables and for transporting materials B65G; tracks therefor E01B 25/00)

3/02 . with self-propelled vehicles

5/00 Elevated railway systems without suspended vehicles (with monorail B61B 13/04; tracks therefor E01B 25/00)

5/02 . with two or more rails

Rope railways; **Power-and-free systems** **[2]**

7/00 Rope railway systems with suspended flexible tracks

7/02 . with separate haulage cables

7/04 . with suspended tracks serving as haulage cables

7/06 . with self-propelled vehicles

9/00 Tramway or funicular systems with rigid track and cable traction (haulage clips B61B 12/12; shunting devices with cable traction B61J) **[2]**

10/00 Power-and-free systems (ski-lift, sleigh-lift or like trackless systems with guided towing cables only B61B 11/00) **[2]**

10/02 . with suspended vehicles **[2]**

10/04 . with vehicles rolling trackless on the ground **[2]**

11/00 Ski-lift, sleigh-lift or like trackless systems with guided towing cables only

12/00 Component parts, details, or accessories for rope railways or power-and-free systems not provided for in groups B61B 7/00 to B61B 11/00 (railway brakes B61H; turntables B61J 1/06) **[2]**

12/02 . Suspension of the load; Guiding means, e.g. wheels; Attaching traction cables **[2]**

12/04 . Devices for damping vibrations **[2]**

12/06 . Safety devices or measures against cable fracture **[2]**

12/08 . Cable lubrication **[2]**

12/10 . Cable traction drives **[2]**

12/12 . Cable grippers; Haulage clips **[2]**

Other railway systems; **Combinations of systems**

13/00 Other railway systems

13/02 . Rack railways

13/04 . Monorail systems

13/06 . . Saddle or like balanced type

13/08 . Sliding or levitation systems (magnetic suspension or levitation for vehicles, per se B60L 13/04; vehicles with air cushions between rails and vehicles B60V 3/04) **[4]**

13/10 . Tunnel systems (pneumatic tube conveyers B65G)
13/12 . Systems with propulsion devices between or alongside the rails, e.g. pneumatic systems (cable traction B61B 9/00; car-shunting devices B61J)

15/00 Combinations of railway systems

B61C LOCOMOTIVES; **MOTOR RAILCARS** (vehicles in general B60; frames or bogies B61F; special railroad equipment for locomotives B61J, B61K)

Note

This subclass covers:
– general design features or items of locomotives and motor railcars not otherwise provided for;
– non-electric features of electric locomotives.

Subclass index

Locomotives or motor railcars in general or characterised by the type of motive power plant used

1/00 Steam locomotives or railcars (characterised by power transmissions B61C 9/00; engines F01; boilers F22B)
1/02 . of articulated construction; with two or more engines (appliances of booster engines B61C 15/02)
1/04 . with steam accumulators (steam accumulators F01K)
1/06 . Streamlining (of coachwork B61D)
1/08 . Arrangement or disposition of combustion apparatus or accessories therefor
1/10 . Arrangement or disposition of steam generators
1/12 . Arrangement or disposition of condensers
1/14 . Arrangement or disposition of exhaust apparatus

3/00 Electric locomotives or railcars (characterised by power transmission B61C 9/00; electrical features B60L, H02)
3/02 . with electric accumulators

5/00 Locomotives or motor railcars with IC engines or gas turbines (characterised by power transmission B61C 9/00; engines F02)
5/02 . Arrangement or disposition of intakes and apparatus for supplying, circulating, or filtering air for combustion or engine-cooling purposes
5/04 . Arrangement or disposition of exhaust apparatus

7/00 Other locomotives or motor railcars characterised by the type of motive power plant used; **Locomotives or motor railcars with two or more different kinds or types of motive power**
7/02 . Locomotives or motor railcars with pneumatic accumulators
7/04 . Locomotives or motor railcars with two or more different kinds or types of engines, e.g. steam and IC engines

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8/00 Filling stations for steam- or pneumatic-accumulator locomotives or motor railcars

9/00 Locomotives or motor railcars characterised by the type of transmission system used; **Transmission systems specially adapted for locomotives or motor railcars** (machine elements F16)
9/02 . Transmission systems in or for locomotives or motor railcars with reciprocating-piston steam engines
9/04 . . consisting of cranked axles and coupling-rods
9/06 . . having toothed, chain, friction, or belt gearing
9/08 . Transmission systems in or for locomotives or motor railcars with IC reciprocating-piston engines
9/10 . . mechanical (combined with hydraulic gearing B61C 9/14)
9/12 . . . with change-speed gearing
9/14 . . hydraulic, including combinations with mechanical gearing
9/16 . . . using gearing of the hydrostatic type
9/18 . . . using gearing of the hydrokinetic type
9/20 . . . . with mechanical change-speed gearing
9/22 . . pneumatic
9/24 . . electric (B61C 9/38 takes precedence)
9/26 . . with transmission shafts at an angle to the driving axles

9/28 . Transmission systems in or for locomotives or motor railcars with rotary prime movers, e.g. turbines
9/30 . . mechanical (combined with hydraulic gearing B61C 9/34)
9/32 . . . with change-speed gearing
9/34 . . hydraulic, including combinations with mechanical gearing
9/36 . . electric (B61C 9/38 takes precedence)
9/38 . Transmission systems in or for locomotives or motor railcars with electric motor propulsion (electrical features B60L, H02)
9/40 . . with cranked axles and coupling-rods
9/42 . . hydraulic
9/44 . . with hollow transmission shaft concentric with wheel axis
9/46 . . with motors forming parts of wheels
9/48 . . with motors supported on vehicle frames and driving axles, e.g. axle or nose suspension
9/50 . . . in bogies
9/52 . . with transmission shafts at an angle to the driving axles

Locomotives or motor railcars characterised by the type of means applying the tractive effort, or by their application to special railway systems or purposes

11/00 **Locomotives or motor railcars characterised by the type of means applying the tractive effort**; **Arrangement or disposition of running gear other than normal driving wheels** (construction of wheels B60B)
11/02 . tractive effort applied to cables or chains
11/04 . tractive effort applied to racks
11/06 . tractive effort applied or supplied by aerodynamic force or fluid reaction, e.g. air-screws or jet or rocket propulsion

13/00 **Locomotives or motor railcars characterised by their application to special systems or purposes** (B61C 11/00 takes precedence; self-propelled scaffold cars, break-down cranes, inspection trolleys B61D 15/00; general design of track recording vehicles B61K 9/00)
13/02 . for towing or transporting ships or for like special purposes
13/04 . for elevated railways with rigid rails (B61C 13/08 takes precedence)
13/06 . for railways with suspended flexible tracks, e.g. rope railways
13/08 . for saddle or like balanced-type railways

Details or accessories not otherwise provided for

15/00 **Maintaining or augmenting the starting or braking power by auxiliary devices and measures**; **Preventing wheel slippage**; **Controlling distribution of tractive effort between driving wheels** (propelling locomotives or motor railcars by special means B61C 11/00; driving wheels with non-slipping devices B60B; brakes B61H; wetting or lubricating rails B61K)
15/02 . by auxiliary driving wheels; by temporary coupling or use of flywheels or booster engines
15/04 . by controlling wheel pressure, e.g. by movable weights or heavy parts or by magnetic devices (magnetic brakes B61H)
15/06 . . by displacing fuel, ballast, or the like
15/08 . Preventing wheel slippage (adjusting wheel-braking force to prevent wheel slippage B60T 8/00)
15/10 . . by depositing sand or like friction-increasing materials (for vehicles in general B60B; combined control of sanding apparatus and brakes B61H)
15/12 . . by reducing the driving power
15/14 . controlling distribution of tractive effort between driving wheels

17/00 **Arrangement or disposition of parts**; **Details or accessories not otherwise provided for**; **Use of control gear and control systems [2]**
17/02 . Bunkers; Tanks; Tenders (coachwork B61D); Water or fuel pick-up or scoop apparatus; Water or fuel supply fittings (trackside installations, e.g. bunkers, tanks, for filling locomotives with sand or water B61K 11/00)
17/04 . Arrangement or disposition of driving cabins, footplates, or engine rooms; Ventilation thereof (driving cabins or accessories B61D)
17/06 . Power storing devices
17/08 . Lubrication systems (in general F16N)
17/10 . Connecting-rods for driving wheels; Arrangements of their bearings (connecting-rods or bearings, in general F16C 7/00, F16C 9/04)
17/12 . Control gear; Arrangements for controlling locomotives from remote points in the train or when operating in multiple units (control from points outside the train B61L 3/00; fluid-actuated telemotors, servomotors F15B; control devices in general G05)

B61D **BODY DETAILS OR KINDS OF RAILWAY VEHICLES** (vehicles in general B60; adaptation of vehicles to special systems B61B; underframes B61F)

Subclass index

KINDS OF VEHICLES
Passenger; goods; tank; mine 1/00; 3/00; 5/00; 11/00
Hopper; tipping 7/00; 9/00
Tramway 13/00
Other 15/00

BODY DETAILS AND ACCESSORIES
Details
bodywork: general; doors; steps; windows; movable roofs; loading means 17/00; 19/00; 23/00; 25/00; 39/00; 47/00
interior fittings: sleeping; seating; sanitation; air-conditioning; lighting; other 31/00; 33/00; 35/00; 27/00; 29/00; 37/00

devices using movement of vehicle 43/00
other 49/00

Accessories
signs, ticket-holders 41/00
covers; securing load 39/00; 45/00
other 49/00

Kinds of railway or tramway vehicles

1/00 **Carriages for ordinary railway passenger traffic** (mine cars B61D 11/00; tramcars B61D 13/00)
1/02 . General arrangements in sleeping or couchette carriages (B61D 1/08 takes precedence)
1/04 . General arrangements of seats (B61D 1/06 takes precedence; seats per se B61D 33/00)
1/06 . with multiple deck arrangement
1/08 . . of sleeping carriages

3/00 **Wagons or vans** (tank wagons B61D 5/00; hopper wagons B61D 7/00; tipping wagons B61D 9/00; mine cars B61D 11/00; vehicles adapted for animal transportation B60P 3/04)
3/02 . with multiple deck arrangements (for carrying vehicles B61D 3/18) **[4]**
3/04 . with movable floors, e.g. rotatable or floors which can be raised or lowered
3/06 . Flat-bottomed cars convertible into hoppers
3/08 . Flat wagons including posts or standards
3/10 . Articulated vehicles
3/12 . . comprising running gear interconnected by loads
3/14 . . comprising running gear interconnected by load supports facilitating low-level load transport
3/16 . adapted for carrying special loads **[4]**
3/18 . . for vehicles **[4]**
3/20 . . for forwarding containers **[4]**

5/00 **Tank wagons for carrying fluent materials** (tank aspects B65D 88/00, B65D 90/00, F17C)
5/02 . having more than one tank
5/06 . Mounting of tanks; Integral bodies and frames

7/00 **Hopper cars** (flat-bottomed cars convertible into hoppers B61D 3/06) **[2]**
7/02 . with discharge openings in the bottoms (with body in two halves and discharge by tipping the halves B61D 9/00)
7/04 . . the openings being above axle level during discharge
7/06 . with openings capable of discharging both between and outside the wheels
7/08 . with openings capable of discharging only outside the wheels
7/10 . . the discharge being assisted by tipping the bottom
7/12 . the hoppers being movable (B61D 9/00 takes precedence)
7/14 . Adaptations of hopper elements to railways
7/16 . . Closure elements for discharge openings
7/18 . . . pivoted
7/20 . . . sliding
7/22 . . . Sealing means thereof
7/24 . . . Opening or closing means
7/26 . . . . mechanical
7/28 . . . . hydraulic or pneumatic
7/30 . . . . controlled by means external to cars
7/32 . . Means for assisting charge or discharge

9/00 **Tipping wagons**
9/02 . characterised by operating means for tipping
9/04 . Adaptations of rail vehicle elements to tipping wagons
9/06 . . Bodies
9/08 . . Frames; Supporting or guiding means for the bodies
9/10 . . Devices preventing overturning when tipping
9/12 . . Body fitments or devices facilitating or controlling outflow on discharge
9/14 . Tipping systems controlled by trackside means

11/00 **Mine cars** (B61D 5/00 to B61D 9/00 take precedence)
11/02 . Body construction

13/00 **Tramway vehicles**
13/02 . Double-deckers

15/00 **Other railway vehicles, e.g. scaffold cars**; **Adaptations of vehicles for use on railways** (conveyer frames mounted for movement on rail tracks B65G 41/02; wheeled machines used in permanent-way construction or maintenance E01B)
15/02 . Breakdown cranes (crane gear B66C)
15/04 . convertible into other non-vehicular apparatus, e.g. exhibition stands
15/06 . Buffer cars; Arrangements or construction of railway vehicles for protecting them in case of collisions (buffers B61G 11/00)
15/08 . Railway inspection trolleys
15/10 . . hand or foot-propelled
15/12 . . power-propelled

Body details of railway or tramway vehicles

17/00 **Construction details of vehicle bodies** (for tank wagons B61D 5/00; for hopper cars B61D 7/00; body details specially adapted for tipping wagons B61D 9/06; for mine cars B61D 11/00)
17/02 . reducing air resistance by modifying contour
17/04 . with bodies of metal; with composite, e.g. metal and wood, body structures
17/06 . . End walls
17/08 . . Sides
17/10 . . Floors
17/12 . . Roofs (movable or foldable roofs, covers, or tarpaulins B61D 39/00)
17/14 . . . with gangways
17/16 . . . Hatches in roofs
17/18 . . Internal lining, e.g. insulating
17/20 . . Communication passages between coaches; Adaptation of coach ends therefor
17/22 . . . flexible, e.g. bellows
17/24 . with body structures of wood
17/26 . with body structures of concrete

19/00 **Door arrangements peculiar to rail vehicles** (vehicle door arrangements in general B60J; vehicle locks E05B 65/12; door-operating mechanisms E05F)
19/02 . for carriages

23/00 **Construction of steps for railway vehicles** (ladders in general E06C)

23/02 . Folding steps for railway vehicles

25/00 **Window arrangements peculiar to rail vehicles** (vehicle window arrangements in general B60J; cleaning vehicle windows B60S; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84)

Heating, cooling, ventilating, lighting, or air-conditioning, peculiar to rail vehicles

27/00 **Heating, cooling, ventilating, or air-conditioning**

29/00 **Arrangement of lighting devices for rail vehicles**

Furniture or furnishings peculiar to rail vehicles

31/00 **Sleeping accommodation**

33/00 **Seats**

35/00 **Sanitation**

37/00 **Other furniture or furnishings**

Other details peculiar to rail vehicles

39/00 **Wagon or like covers**; **Tarpaulins**; **Movable or foldable roofs**

41/00 **Indicators for reserved seats**; **Warning or like signs**; **Devices or arrangements in connection with tickets, e.g. ticket holders**; **Holders for cargo tickets or the like**

41/02 . Holders or devices for cargo tickets or the like

41/04 . Indicators for reserved seats

41/06 . Holders for fare tickets

43/00 **Devices for using the energy of the movements of the vehicles**

45/00 **Means or devices for securing or supporting the cargo, including protection against shocks**

47/00 **Loading or unloading devices combined with vehicles, e.g. loading platforms** (combined with vehicles in general B60P)

49/00 **Other details**

B61F RAIL VEHICLE SUSPENSIONS, E.G. UNDERFRAMES, BOGIES, ARRANGEMENTS OF WHEEL AXLES; RAIL VEHICLES FOR USE ON TRACKS OF DIFFERENT WIDTH; PREVENTING DERAILING; WHEELS GUARDS; OBSTRUCTION REMOVERS OR THE LIKE (for vehicles in general B60; axles, wheels B60B; vehicle tyres B60C)

Subclass index

1/00 **Underframes** (making railway vehicle underframes by forging or pressing B21K 7/12)

1/02 . with a single central sill

1/04 . of triangulated type

1/06 . specially adapted for locomotives or motor-driven railcars

1/08 . Details

1/10 . . End constructions

1/12 . . Cross bearers

1/14 . . Attaching or supporting vehicle body structure

3/00 **Types of bogies** (B61F 5/00 takes precedence)

3/02 . with more than one axle

3/04 . . with driven axles or wheels

3/06 . . . with three or more axles

3/08 . . without driven axles or wheels

3/10 . . . with three or more axles

3/12 . specially modified for carrying adjacent vehicle bodies of articulated trains

3/14 . specially modified for reducing air resistance

3/16 . with a separate axle for each wheel

5/00 **Constructional details of bogies**; **Connections between bogies and vehicle underframes**; **Arrangements or devices for adjusting or allowing self-adjustment of wheel axles or bogies when rounding curves**

5/02 . Arrangements permitting limited transverse relative movements between vehicle underframe or bolster and bogie; Connections between underframes and bogies

5/04 . . Bolster supports or mountings (side bearings B61F 5/14)

5/06 . . . incorporating metal springs

5/08 . . . incorporating rubber springs

5/10 . . . incorporating fluid springs

5/12 . . . incorporating dampers

5/14 . . Side bearings

5/16 . . Centre bearings or other swivel connections between underframes and bolsters or bogies

5/18 . . . King-bolts

5/20 . . . with springs allowing transverse movements

5/22 . . Guiding of the vehicle underframes with respect to the bogies

5/24 . . . Means for damping or minimising the canting, skewing, pitching, or plunging movements of the underframes
5/26 . Mounting or securing axle-boxes in vehicle or bogie underframes
5/28 . . Axle-boxes integral with, or directly secured to, vehicle or bogie underframes
5/30 . . Axle-boxes mounted for movement under spring control in vehicle or bogie underframes
5/32 . . . Guides, e.g. plates, for axle-boxes
5/34 . . . . Wedge mechanisms for adjusting clearance between underframes and axles
5/36 . . . Arrangements for equalising or adjusting the load on wheels or springs, e.g. yokes
5/38 . Arrangements or devices for adjusting or allowing self-adjustment of wheel axles or bogies when rounding curves, e.g. sliding axles, swinging axles
5/40 . . Bogies with side frames mounted for longitudinal relative movements
5/42 . . Adjustment controlled by buffer or coupling gear
5/44 . . Adjustment controlled by movements of vehicle body
5/46 . . Adjustment controlled by a sliding axle under the same vehicle underframe
5/48 . . Trailing or leading bogies for locomotives or motor-driven railcars (B61F 5/40 takes precedence) **[2]**
5/50 . Other details
5/52 . . Bogie frames

7/00 Rail vehicles equipped for use on tracks of different width

9/00 Rail vehicles characterised by means for preventing derailing, e.g. by use of guide wheels

11/00 Rail vehicles characterised by rail-engaging elements other than wheels, e.g. balls

13/00 Rail vehicles characterised by wheel arrangements, not otherwise provided for

15/00 Axle-boxes (mounting or securing axle-boxes B61F 5/26; lubrication B61F 17/00; bearings in general F16C)
15/02 . with journal bearings
15/04 . . for locomotives
15/06 . . for cars
15/08 . . the axle being slidable or tiltable in the bearings
15/10 . . . and having springs opposing such movements
15/12 . with roller, needle, or ball bearings
15/14 . . constructed for taking-up axial pressure
15/16 . . the axle being slidable or tiltable in the bearings
15/18 . . . and having springs opposing such movements
15/20 . Details
15/22 . . Sealing means preventing entrance of dust or leakage of oil
15/24 . . . preventing oil leakage when vehicle is tilted or inverted
15/26 . . Covers; Sealing thereof
15/28 . . Axle-boxes modified to ensure electrical conductivity

17/00 Lubrication specially adapted for axle-boxes of rail vehicles (lubrication in general F16N)
17/02 . with oil
17/04 . . Lubrication by stationary devices
17/06 . . . by means of a wick or the like
17/08 . . . . Devices for pressing the wick or the like against the rotating axle
17/10 . . . by means of an oil bath
17/12 . . . by gravity
17/14 . . Rotating lubricating devices
17/16 . . . with rings
17/18 . . . with chains
17/20 . . . with scoops or the like attached to, or coupled with, the axle
17/22 . . . with discs, rollers, or belts engaging the axle
17/24 . . by built-in lubricating pumps
17/26 . . by external feeding means, e.g. pneumatic devices
17/28 . . Applications of oil cleaners not otherwise provided for
17/30 . with grease
17/32 . . by manually-operated lubricators, e.g. screw cups
17/34 . . by automatic means, e.g. with spring action
17/36 . with other, e.g. mixed, lubricating agents

19/00 Wheel guards; **Bumpers**; **Obstruction removers or the like** (for vehicles in general B60R 19/00)
19/02 . Wheel guards
19/04 . Bumpers or like collision guards
19/06 . Nets, catchers, or the like for catching obstacles or removing them from the track (mailbag catchers B61K 1/02)
19/08 . . of the drop-down type
19/10 . . . automatically operated by engagement with obstacle

99/00 Subject matter not provided for in other groups of this subclass [8]

B61G COUPLINGS SPECIALLY ADAPTED FOR RAILWAY VEHICLES; DRAUGHT OR BUFFING APPLIANCES SPECIALLY ADAPTED FOR RAILWAY VEHICLES

Couplings peculiar to railway vehicles

1/00 Couplings comprising interengaging parts of different shape or form and having links, bars, pins, shackles, or hooks as coupling means
1/02 . having links or bars coupling or uncoupling by rotating around a transverse horizontal axis
1/04 . . Operating devices therefor (B61G 1/08 takes precedence)
1/06 . . and coupling when the coupling halves are pushed together
1/08 . . . Control devices therefor
1/10 . having links or bars coupling or uncoupling by rotating around a vertical axis
1/12 . . Operating devices therefor (B61G 1/16 takes precedence)
1/14 . . and coupling when the coupling halves are pushed together
1/16 . . . Control devices therefor
1/18 . having links or bars coupling or uncoupling by rotating axially
1/20 . . Operating devices therefor

1/22 . having screws incorporated in the links for lengthening or shortening the couplings
1/24 . . Operating devices therefor (B61G 1/26 takes precedence)
1/26 . . and coupling when the coupling halves are pushed together; Control devices therefor
1/28 . with vertical bolt or pin
1/30 . . Operating devices therefor
1/32 . with horizontal bolt or pin
1/34 . . Operating devices therefor
1/36 . with shackles and hooks, e.g. specially adapted for mine cars
1/38 . . rotatable about line of traction, e.g. for cars which are tiltable when coupled
1/40 . with coupling bars having an enlarged or recessed end which slips into the opposite coupling part and is gripped thereby, e.g. arrow-head type; with coupling parts having a tong-like gripping action
1/42 . . Operating devices therefor

3/00 Couplings comprising mating parts of similar shape or form which can be coupled without the use of any additional element or elements

3/02 . with interengaging movably-mounted hooks or links guided into alignment by a gathering device, e.g. "Dowty" type
3/04 . with coupling head having a guard arm on one side and a knuckle with angularly-disposed nose and tail portions pivoted to the other side thereof, the nose of the knuckle being the coupling part, and means to lock the knuckle in coupling position, e.g. "A.A.R." or "Janney" type
3/06 . . Knuckle-locking devices
3/08 . . Control devices, e.g. for uncoupling
3/10 . with coupling heads in the form of hook-like interengaging rigid jaws, e.g. "Willison" type
3/12 . . Jaw-locking devices
3/14 . . Control devices, e.g. for uncoupling
3/16 . with coupling heads rigidly connected by rotatable hook plates or discs and balancing links, the coupling members forming a parallelogram, e.g. "Scharfenberg" type
3/18 . . Locking devices
3/20 . . Control devices, e.g. for uncoupling
3/22 . with coupling heads rigidly connected by locks consisting of pivoted latches
3/24 . . Latch-locking devices
3/26 . . Control devices, e.g. for uncoupling
3/28 . with coupling heads rigidly connected by locks consisting of slidable pins
3/30 . with coupling heads rigidly connected by pins having locking noses which are brought into locking position by rotating the pins

5/00 Couplings not otherwise provided for

5/02 . for coupling articulated trains, locomotives and tenders, or the bogies of a vehicle; Coupling by means of a single coupling bar; Couplings preventing or limiting relative lateral movement of vehicles
5/04 . for matching couplings of different types, e.g. transitional couplings
5/06 . for, or combined with, couplings or connectors for fluid conduits or electric cables
5/08 . . for fluid conduits
5/10 . . for electric cables

7/00 Details or accessories

7/02 . Hand tools for coupling or uncoupling
7/04 . Coupling or uncoupling by means of trackside apparatus
7/06 . Coupling heads constructed to facilitate alignment
7/08 . Adjustable coupling heads
7/10 . Mounting of the couplings on the vehicle
7/12 . . Adjustable coupling bars, e.g. for centralisation purposes
7/14 . Safety devices

Draught or buffing appliances peculiar to railway or tramway vehicles

9/00 Draw-gear

9/02 . Draw-gear and non-integral buffing appliances with combined action or acting on the same spring
9/04 . Draw-gear combined with buffing appliances (continuous B61G 9/12)
9/06 . . with rubber springs
9/08 . . with fluid springs or fluid shock-absorbers; Combinations thereof
9/10 . . with separate mechanical friction shock-absorbers
9/12 . Continuous draw-gear combined with buffing appliances, e.g. incorporated in a centre sill
9/14 . . with rubber springs
9/16 . . with fluid springs or fluid shock-absorbers; Combinations thereof
9/18 . . with separate mechanical friction shock-absorbers
9/20 . Details; Accessories
9/22 . . Supporting framework, e.g. cradles; Spring housings
9/24 . . Linkages between draw-bar and framework (adjustable coupling bars B61G 7/12)

11/00 Buffers (springs F16F)

11/02 . with metal springs
11/04 . . with helical springs
11/06 . . . arranged to damp each other by mutual friction
11/08 . with rubber springs
11/10 . with combined rubber and metal springs
11/12 . with fluid springs or shock-absorbers; Combinations thereof
11/14 . absorbing shocks by mechanical friction action; Combinations of mechanical shock-absorbers and springs (B61G 11/06 takes precedence)
11/16 . absorbing shocks by permanent deformation of buffer element
11/18 . Details

B61H **BRAKES OR OTHER RETARDING APPARATUS PECULIAR TO RAIL VEHICLES**; **ARRANGEMENTS OR DISPOSITIONS OF BRAKES OR OTHER RETARDING APPARATUS IN RAIL VEHICLES** (electrodynamic braking of vehicles B60L, in general H02K; arrangements in rail vehicles for adjusting wheel-braking force to meet varying vehicular or permanent-way conditions B60T 8/00; transmitting braking action from initiating means to ultimate brake actuator with power assistance or drive, brake systems incorporating such transmitting means, e.g. air-pressure brake systems, B60T 13/00; construction, arrangement, or operation of valves incorporated in power brake systems B60T 15/00; component parts, details, or accessories of brake systems B60T 17/00; brakes in general F16D)

Subclass index

1/00 **Applications or arrangements of brakes with a braking member or members co-operating with the periphery of the wheel rim, a drum, or the like** (self-applying brakes B61H 11/02; combinations of different types of brakes B61H 11/14; wheels B60B)

3/00 **Applications or arrangements of brakes with an outwardly-movable braking member or members co-operating with the inner surface of a drum or the like** (self-applying brakes B61H 11/02; combinations of different types of brakes B61H 11/14)

5/00 **Applications or arrangements of brakes with substantially-radial braking surfaces pressed together in axial direction, e.g. disc brakes** (self-applying brakes B61H 11/02; combinations of different types of brakes B61H 11/14)

7/00 **Brakes with braking members co-operating with the track** (positive railway stops or track brakes secured to permanent way B61K 7/00)

7/02 . Scotch-blocks, skids, or like track-engaging shoes

7/04 . . attached to railway vehicles

7/06 . . . Skids

7/08 . . . . electromagnetically operated

7/10 . . unattached

7/12 . Grippers co-operating frictionally with tracks

9/00 **Brakes characterised by, or modified for, their application to special railway systems or purposes**

9/02 . for aerial, e.g. rope, railways

9/04 . for preventing or controlling movement in one direction or, selectively, in either direction

9/06 . for storing energy during braking action

11/00 **Applications or arrangements of braking or retarding apparatus not otherwise provided for**; **Combinations of apparatus of different kinds or types**

11/02 . of self-applying brakes

11/04 . . with brake-applying force derived from rotation of axle

11/06 . of hydrostatic, hydrodynamic, or aerodynamic brakes

11/08 . . comprising a pump or the like circulating fluid, braking being effected by throttling of the circulation

11/10 . . Aerodynamic brakes with control flaps, e.g. spoilers, attached to the vehicles

11/14 . Combinations of different types of brakes, e.g. brake blocks acting on wheel-rim combined with disc brakes

11/16 . Removable self-contained brake units

13/00 **Actuating rail-vehicle brakes** (self-applying brakes B61H 11/02; wear-compensating mechanisms B61H 15/00)

13/02 . Hand or other personal actuation

13/04 . . by mechanisms incorporating toothed gearing

13/06 . Actuating or influencing the brakes by backward-pressure of buffers or coupling gear, e.g. buffer brakes

13/20 . Transmitting mechanisms (wear-compensating mechanisms B61H 15/00)

13/22 . . for braking a single wheel or wheels at one side only, e.g. for locomotives or motor railcars

13/24 . . for cars with two axles or bogies with two axles and braking cylinder(s) for each bogie, the mechanisms at each side being interconnected

13/26 . . for cars or bogies with more than two axles or bogies, the mechanisms at each side being interconnected

13/28 . . with variable leverage or mechanical advantage to obtain quick take-up

13/30 . . adjustable to take account of variation of vehicle weight (arrangements for adjusting wheel-braking force in response to vehicle weight or load B60T 8/18)

13/32 . . . by varying brake lever leverage

13/34 . Details

13/36 . . Beams; Suspension thereof

13/38 . . Suspension of transmitting mechanisms (B61H 13/36 takes precedence)

15/00 **Wear-compensating mechanisms, e.g. slack adjusters**

B61J SHIFTING OR SHUNTING OF RAIL VEHICLES (shifting vehicles in general B60S; marshalling systems B61B)

1/00 Turntables; **Traversers**; **Transporting rail vehicles on other rail vehicles or dollies** (shunting B61J 3/00)
1/02 . Turntables; Integral stops
1/04 . . of normal railroad type
1/06 . . for railways with suspended vehicles, e.g. aerial rope railways
1/08 . . for connecting inclined tracks or tracks of different height (wagon elevators B66)
1/10 . Traversers
1/12 . Rollers or devices for shifting or transporting rail vehicles on rails

3/00 Shunting or short-distance haulage devices; **Similar devices for hauling trains on steep gradients or as starting aids**; **Car-propelling devices therefor** (overhead travelling cranes combined with auxiliary means for shunting railway vehicles B66C 17/26; capstans B66D)
3/02 . Gravity shunting humps (track brakes or retarding apparatus fixed to permanent way B61K 7/02)
3/04 . Car-shunting or haulage devices with cable traction or endless-chain driving means
3/06 . . with vehicle-engaging truck or carriage
3/08 . Devices with reciprocated pushing bars or like driving mechanisms combined with the track for shunting or hauling cars (railway systems of this kind B61B 13/12)
3/10 . Car-shunting or positioning devices with pinchbar action (pinchbars, crowbars in general B66F 15/00)
3/12 . Self-propelled tractors or pushing vehicles, e.g. mules (with cable traction B61J 3/06)

99/00 Subject matter not provided for in other groups of this subclass [8]

B61K OTHER AUXILIARY EQUIPMENT FOR RAILWAYS (energy-storing brakes B61H; protection of permanent way against weather influences E01B; rail cleaning, snow ploughs E01H)

Subclass index

1/00 Transferring passengers, articles, or freight to and from moving trains; **Slipping or coupling vehicles from or to moving trains**
1/02 . transferring articles to and from moving trains, e.g. mailbag catchers

3/00 Wetting or lubricating rails or wheel flanges
3/02 . Apparatus therefor combined with vehicles

5/00 Apparatus for placing vehicles on the track; **Derailers**; **Lifting or lowering rail vehicle axles or wheels** (hoisting apparatus B66)
5/02 . Devices secured to the vehicles; Turntables integral with the vehicles
5/04 . Devices secured to the track
5/06 . . Derailing or re-railing blocks

7/00 Railway stops fixed to permanent way; **Track brakes or retarding apparatus fixed to permanent way**; **Sand tracks or the like** (skids, wedges, vehicle-mounted scotch blocks B61H; operating mechanisms for track-mounted scotch-blocks B61L)
7/02 . Track brakes or retarding apparatus
7/04 . . with clamping action
7/06 . . . operated mechanically
7/08 . . . operated pneumatically or hydraulically
7/10 . . electrodynamic (on vehicles B60L)
7/12 . . electrically controlled
7/14 . Sand or like tracks
7/16 . Positive railway stops
7/18 . . Buffer stops
7/20 . . Positive wheel stops
7/22 . . Axle stops

9/00 Railway vehicle profile gauges; **Detecting or indicating overheating of components**; **Apparatus on locomotives or cars to indicate bad track sections**; **General design of track recording vehicles**
9/02 . Profile gauges, e.g. loading gauges
9/04 . Detectors for indicating the overheating of axle bearings and the like, e.g. associated with the brake system for applying the brakes in case of a fault
9/06 . . by detecting or indicating heat radiation from overheated axles
9/08 . Measuring installations for surveying permanent way (applications of measuring apparatus or devices for track-building purposes E01B 35/00; measuring techniques G01)

9/10 . . for detecting cracks in rails or welds thereof
9/12 . Measuring or surveying wheel-rims (measuring techniques G01)

11/00 **Serving peculiar to locomotives, e.g. filling with, or emptying of, water, sand, or the like at the depots** (lifting or lowering axles or wheels B61K 5/00; filling stations for steam or pneumatic accumulator locomotives B61C 8/00; water or fuel supply fittings on locomotives B61C 17/02; refuelling locomotives with solid fuels B65G 67/18; washing or cleaning boilers F28G)
11/02 . Water columns for locomotives

13/00 **Other auxiliaries or accessories for railways** (safety belts or body harnesses A62B 35/00)
13/02 . Starting aids for cars amplifying the draw-bar pull and transmitting it to the wheels
13/04 . Passenger-warning devices attached to vehicles; Safety devices for preventing accidents to passengers when entering or leaving vehicles

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B61L **GUIDING RAILWAY TRAFFIC**; **ENSURING THE SAFETY OF RAILWAY TRAFFIC** (power supply lines for electrically propelled vehicles B60M; arrangement of signalling devices, the mounting or supporting thereof or circuits therefor, for vehicles in general B60Q; brakes or auxiliary equipment B61H, B61K; point or crossing construction E01B; insulated rail joints E01B 11/54; optical devices in general G02; controlling in general G05; electric communication technique H04)

Note

This subclass covers:
– devices along the route interacting with trains;
– signals;
– operation of points and signals;
– interlocking;
– block systems;
– level crossings.

Subclass index

1/00 **Devices along the route controlled by interaction with the vehicle or vehicle train** (detonators B61L 5/20; operation of points or signals by passage of the vehicle B61L 11/00, B61L 13/00; central traffic control systems controlled by train B61L 27/04; operation of gates, or gates and signals, by approaching vehicle B61L 29/18)
1/02 . Electric devices associated with track
1/04 . . mechanically actuated by a part of the vehicle
1/06 . . actuated by deformation of rail; actuated by vibration in rail
1/08 . . magnetically actuated; electrostatically actuated
1/10 . . actuated by electromagnetic radiation; actuated by particle radiation
1/12 . Electric devices associated with overhead trolley wires
1/14 . Devices for indicating the passing of the end of the vehicle or vehicle train
1/16 . Devices for counting axles; Devices for counting vehicles (counting moving objects in general G06M)
1/18 . Railway track circuits (automatically-operated track circuits specially adapted for section blocking for controlling traffic B61L 23/00; rail joints E01B 11/00)
1/20 . Safety arrangements for preventing or indicating malfunction of the device, e.g. by leakage current, by lightning

3/00 Devices along the route for controlling devices on the vehicle or vehicle train, e.g. to release brake, to operate a warning signal

3/02 . at selected places along the route, e.g. intermittent control
3/04 . . controlling mechanically
3/06 . . controlling by electromagnetic or particle radiation, e.g. by light beam (using radio waves B61L 3/12)
3/08 . . controlling electrically
3/10 . . . using current passing between devices along the route and devices on the vehicle train
3/12 . . . using magnetic or electrostatic induction; using radio waves
3/14 . . to cut-off the power supply to traction motors of electrically-propelled vehicles
3/16 . Continuous control along the route
3/18 . . using electric current passing between devices along the route and devices on the vehicle or vehicle train
3/20 . . . employing different frequencies or coded pulse groups
3/22 . . using magnetic or electrostatic induction; using electromagnetic radiation
3/24 . . . employing different frequencies or coded pulse groups

5/00 Local operating mechanisms for points or track-mounted scotch-blocks (track-mounted scotch-blocks per se B61K); **Visible or audible signals**; **Local operating mechanisms for visible or audible signals** (B61L 11/00 takes precedence)

5/02 . Mechanical devices for operating points or scotch-blocks
5/04 . Fluid-pressure devices for operating points or scotch-blocks
5/06 . Electric devices for operating points or scotch-blocks
5/08 . Underground actuating arrangements, e.g. for tramways
5/10 . Locking mechanisms for points; Means for indicating the setting of points
5/12 . Visible signals
5/14 . . Form signals, e.g. semaphore arms
5/16 . . . Local operating mechanisms for form signals
5/18 . . Light signals; Mechanisms associated therewith, e.g. blinders
5/20 . Audible signals, e.g. detonator
5/22 . . Devices for initiating the release of detonators in a certain position of a signal
5/24 . . Replacement of detonators

7/00 Remote control of local operating means for points, signals, or track-mounted scotch-blocks (B61L 11/00 takes precedence; interlocking arrangements B61L 19/00)

7/02 . using mechanical transmission, e.g. wire, lever
7/04 . using fluid-pressure transmission
7/06 . using electrical transmission
7/08 . . Circuitry
7/10 . . . for light signals, e.g. for supervision, back-signalling

9/00 Illumination specially adapted for points, form signals, or gates (lighting in general F21)

9/02 . non-electric
9/04 . electric

11/00 Operation of points from the vehicle or by the passage of the vehicle

11/02 . using mechanical interaction between vehicle and track
11/04 . . Trailable point locks
11/06 . . with fluid-pressure transmission
11/08 . using electrical or magnetic interaction between vehicle and track

13/00 Operation of signals from the vehicle or by the passage of the vehicle

13/02 . using mechanical interaction between vehicle and track
13/04 . using electrical or magnetic interaction between vehicle and track

15/00 Indicators provided on the vehicle or vehicle train for signalling purposes

15/02 . Head or tail indicators, e.g. light

17/00 Switching systems for classification yards (rail brakes B61K)

17/02 . Details, e.g. indicating degree of track filling

19/00 Arrangements for interlocking between points and signals by means of a single interlocking device (station block arrangements B61L 21/00)

19/02 . Interlocking devices having mechanical or fluid-pressure operation
19/04 . . Details, e.g. hand lever, back-signalling device
19/06 . Interlocking devices having electrical operation
19/08 . . Special arrangements for power supply for interlocking devices
19/10 . . with mechanical locks
19/12 . . . Details
19/14 . . with electrical locks
19/16 . . . Details

21/00 Station blocking between signal boxes in one yard (interlocking between points and signals by means of a single interlocking device B61L 19/00)

21/02 . Mechanical locking and release of the route; Repeat locks; Coupling of semaphores
21/04 . Electrical locking and release of the route; Electrical repeat locks
21/06 . Vehicle-on-line indication; Monitoring locking and release of the route
21/08 . Order transmission and reception arrangements for giving or withholding permission
21/10 . Arrangements for trains which are closely following one another (automatic central traffic control systems B61L 27/04)

23/00 Control, warning or like safety means along the route or between vehicles or vehicle trains [4]

23/02 . for indicating along the route the failure of brakes
23/04 . for monitoring the mechanical state of the route
23/06 . for warning men working on the route
23/08 . for controlling traffic in one direction only (station blocking between signal boxes in one yard B61L 21/00)
23/10 . . manually operated
23/12 . . partly operated by train
23/14 . . automatically operated
23/16 . . . Track circuits specially adapted for section blocking
23/18 . . . specially adapted for maintaining a safe distance between vehicles or vehicle trains depending upon speed and traffic density **[1,8]**

23/20 . . . with transmission of instructions to stations along the route
23/22 . for controlling traffic in two directions over the same pair of rails (station blocking between signal boxes in one yard B61L 21/00)
23/24 . . using token systems, e.g. train staffs, tablets
23/26 . . with means for actuating signals from the vehicle or by passage of the vehicle
23/28 . . using non-automatic blocking from a place along the route
23/30 . . using automatic section blocking
23/32 . . . with provision for the blocking of passing sidings
23/34 . for indicating the distance between vehicles or vehicle trains by the transmission of signals therebetween **[4]**

25/00 Recording or indicating positions or identities of vehicles or vehicle trains or setting of track apparatus

25/02 . Indicating or recording positions or identities of vehicles or vehicle trains
25/04 . . Indicating or recording train identities
25/06 . Indicating or recording the setting of track apparatus, e.g. of points, of signals
25/08 . . Diagrammatic displays

27/00 Central traffic control systems

27/02 . Manual systems
27/04 . Automatic systems, e.g. controlled by train; Change-over to manual control

29/00 Safety means for rail/road crossing traffic

29/02 . Guards or obstacles for preventing access to the route (cattle guards connected to the permanent way E01B 17/00)
29/04 . Gates for level crossings
29/06 . . yielding to vehicles in one direction but operated in a different direction
29/08 . Operation of gates; Combined operation of gates and signals
29/10 . . Means for securing gates in their desired position
29/12 . . Manual operation
29/14 . . . mechanically
29/16 . . . electrically
29/18 . . Operation by approaching rail vehicle or rail vehicle train
29/20 . . . mechanically
29/22 . . . electrically
29/24 . Means for warning road traffic that a gate is closed or closing, or that rail traffic is approaching, e.g. for visible or audible warning
29/26 . . mechanically operated
29/28 . . electrically operated
29/30 . . . Supervision, e.g. monitoring arrangements
29/32 . . . Timing, e.g. advance warning of approaching train

99/00 Subject matter not provided for in other groups of this subclass [8]

B62 LAND VEHICLES FOR TRAVELLING OTHERWISE THAN ON RAILS

B62B HAND-PROPELLED VEHICLES, E.G. HAND CARTS OR PERAMBULATORS; SLEDGES (characterised by animal propulsion B62C; propulsion of sledges by driver or engine B62M)

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "hand carts" also embraces hand-propelled wheeled devices in so far as the features thereof are generic to hand carts and also embraces pedestrian controlled power-driven vehicles in so far as the features thereof are generic to hand carts;
– "rollers" is equivalent to wheels.

Subclass index

Hand carts

1/00 Hand carts having only one axis carrying one or more transport wheels; Equipment therefor

1/02 . in which the wheel axis is disposed between the load and the handles
1/04 . . involving parts being adjustable, collapsible, attachable, detachable, or convertible
1/06 . . involving means for grappling or securing in place objects to be carried; Loading or unloading equipment
1/08 . . having auxiliary wheels used during loading or unloading
1/10 . in which the load is intended to be transferred totally to the wheels
1/12 . . involving parts being adjustable, collapsible, attachable, detachable, or convertible
1/14 . . involving means for grappling or securing in place objects to be carried; Loading or unloading equipment
1/16 . . involving tiltably-mounted containers
1/18 . in which the load is disposed between the wheel axis and the handles, e.g. wheelbarrows
1/20 . . involving parts being collapsible, attachable, detachable or convertible
1/22 . . involving means for grappling or securing in place objects to be carried; Loading or unloading equipment
1/24 . . involving tiltably-mounted containers
1/26 . characterised by supports specially adapted to objects of definite shape

3/00 Hand carts having more than one axis carrying transport wheels; Steering devices therefor; Equipment therefor

3/02 . involving parts being adjustable, collapsible, attachable, detachable, or convertible (B62B 3/14 takes precedence) **[6]**
3/04 . involving means for grappling or securing in place objects to be carried; Load handling equipment
3/06 . . for simply clearing the load from the ground, e.g. low-lift trucks (devices movable on wheels or the like for lifting or lowering bulky or heavy goods for loading or unloading purposes, e.g. fork-lift trucks, B66F 9/06)
3/065 . . . with hydraulic lifting means **[6]**
3/08 . involving tiltably-mounted containers (B62B 3/14 takes precedence) **[6]**
3/10 . characterised by supports specially adapted to objects of definite shape
3/12 . characterised by three-wheeled construction (B62B 3/14 takes precedence) **[6]**
3/14 . characterised by provisions for nesting or stacking, e.g. shopping trolleys **[6]**
3/16 . . vertically stackable **[6]**
3/18 . . nestable by means of pivoted load supports or load support parts, e.g. baskets **[6]**

5/00 Accessories or details specially adapted for hand carts (B62B 9/00 takes precedence; wheels, axles, or axle bearings for vehicles B60B; castors for vehicles, castors in general B60B 33/00)

5/02 . providing for travelling up or down a flight of stairs (chairs or personal conveyances specially adapted for patients or disabled persons A61G 5/00)
5/04 . Braking mechanisms; Locking devices against movement
5/06 . Hand moving equipment, e.g. handle bars (for cycles B62K 11/14, B62K 21/12)
5/08 . Children's seats (B62B 3/14 takes precedence) **[6]**

Carriages for children; Perambulators

7/00 Carriages for children; Perambulators, e.g. dolls' perambulators

7/02 . having only a single wheel axis
7/04 . having more than one wheel axis; Steering devices therefor
7/06 . . collapsible or foldable
7/08 . . . in the direction of, or at right angles to, the wheel axes
7/10 . . . by folding down the body to the wheel carriage or by retracting projecting parts into the box-shaped body

7/12 . . convertible, e.g. into children's furniture or toy (children's chairs convertible to push chairs A47D 1/06)
7/14 . . with detachable or rotatably-mounted body

9/00 Accessories or details specially adapted for children's carriages or perambulators (providing for travelling on snow B62B 19/00)
9/02 . providing for travelling up or down a flight of stairs
9/04 . . with runners, e.g. sledge runners
9/06 . . with spiders or the like
9/08 . Braking mechanisms; Locking devices against movement
9/10 . Perambulator bodies; Equipment therefor (collapsible or foldable B62B 7/06; convertible B62B 7/12)
9/12 . . involving parts that are adjustable, attachable or detachable
9/14 . . Hoods; Weather screens; Cat nets
9/16 . Mud-guards or protecting devices for wheels
9/18 . Resilient suspensions of bodies
9/20 . Handle bars; Handles
9/22 . Devices for rocking or oscillating
9/24 . Safety guards for children, e.g. harness (cat nets B62B 9/14; devices for use in guiding or supporting children, e.g. safety harness, A47D 13/08)
9/26 . Securing devices for bags or toys
9/28 . Auxiliary dismountable seats

11/00 Hand-propelled vehicles not otherwise provided for (rider propulsion of vehicles B62M 1/00, B62M 6/00)

Sledges

13/00 Sledges with runners (ice boats or sailing sledges B62B 15/00)
13/02 . characterised by arrangement of runners
13/04 . . arranged in a single line
13/06 . . arranged in two or more parallel lines
13/08 . . . with steering devices
13/10 . . . . with swivelling portions of the runners; with a swivelling middle runner
13/12 . . . . with tilting or bending runners
13/14 . . . . combined with braking devices
13/16 . Collapsible or foldable sledges
13/18 . Vehicles having alternatively-usable runners and wheels

15/00 Other sledges; **Ice boats or sailing sledges**

17/00 Accessories or details of sledges
17/02 . Runners (attachable to, or replacing, vehicle wheels B62B 19/00)
17/04 . . resiliently suspended
17/06 . Superstructures; Attachments therefor
17/08 . Braking devices

19/00 Runners for carrying wheeled vehicles to facilitate travel on ice or snow
19/02 . attachable to wheels
19/04 . replacing wheels

B62C VEHICLES DRAWN BY ANIMALS

(1) This subclass covers only vehicles or parts thereof in so far as the relevant features are essential for animal-drawn vehicles.
(2) This subclass does not cover animal-drawn vehicles which have not the features mentioned in Note (1) above. They are regarded as trailers which are covered by class B60 or subclass B62D, or as sledges which are covered by subclass B62B.

1/00 Types of vehicles
1/02 . Passenger vehicles
1/04 . Load-carrying vehicles
1/06 . . convertible, e.g. with extensible parts, with changeable wheel track
1/08 . Racing vehicles, e.g. sulkies

3/00 Undercarriages or running gear of vehicles; **Axle supports** (undercarriages for supporting agricultural tools or apparatus A01B 35/30, A01B 39/24, A01B 51/00)
3/02 . Front wheel carriers; Bogies; Steering mechanisms for bogies

5/00 Draught assemblies (traction harness B68B 3/00)
5/02 . Shafts, poles, or thills; Mountings thereof, e.g. resilient, adjustable
5/04 . Swingletrees; Mountings thereof; Draught equalisers for a span of draught animals; Mountings for traces

7/00 Braking mechanisms and brake control devices specially adapted for animal-drawn vehicles
7/02 . Mechanisms for locking ground-engaging wheels, e.g. engaging spokes
7/04 . Automatic brake control devices

9/00 Carriers or holders for whips; **Holders for reins forming part of, or attached to, vehicles** (reins or whips per se B68B)

11/00 Safeguarding appliances not otherwise provided for, e.g. for readily-releasing unmanageable draught animals
11/02 . Providing for disengaging thills
11/04 . . combined with automatic braking

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

B62D **MOTOR VEHICLES**; **TRAILERS** (steering, or guiding on a desired track, of agricultural machines or implements A01B 69/00; wheels, castors, axles, increasing wheel adhesion B60B; vehicle tyres, tyre inflation or tyre changing B60C; connections between vehicles of a train or the like B60D; vehicles for use on rail and road, amphibious or convertible vehicles B60F; suspension arrangements B60G; heating, cooling, ventilating or other air treating devices B60H; windows, windscreens, non-fixed roofs, doors or similar devices, protective coverings for vehicles not in use B60J; propulsion plant arrangements, auxiliary drives, transmissions, controls, instrumentation or dashboards B60K; electric equipment or propulsion of electrically-propelled vehicles B60L; power supply for electrically-propelled vehicles B60M; passenger accommodation not otherwise provided for B60N; adaptations for load transportation or to carry special loads or objects B60P; arrangement of signalling or lighting devices, the mounting or supporting thereof or circuits therefor, for vehicles in general B60Q; vehicles, vehicle fittings or vehicle parts, not otherwise provided for B60R; servicing, cleaning, repairing, supporting, lifting, or manoeuvring, not otherwise provided for B60S; brake arrangements, brake control systems or parts thereof B60T; air-cushion vehicles B60V; motorcycles, accessories therefor B62J, B62K; testing of vehicles G01M)

Note

In this subclass, the following terms are used with the meanings indicated:
– "vehicles" includes motor vehicles and trailers;
– "trailers" includes forecars or sidecars.

Subclass index

Steering of motor vehicles or trailers [3]

1/00 Steering controls, i.e. means for initiating a change of direction of the vehicle [4,5]

1/02 . vehicle-mounted

1/04 . . Hand wheels

1/06 . . . Rims, e.g. with heating means; Rim covers (B62D 1/11 takes precedence) **[5]**

1/08 . . . Spokes, e.g. resilient (B62D 1/11 takes precedence) **[5]**

1/10 . . . Hubs; Connecting hubs to steering columns, e.g. adjustable (B62D 1/11 takes precedence) **[5]**

1/11 . . . incorporating energy-absorbing arrangements, e.g. by being yieldable or collapsible (padded linings associated with the steering wheel B60R 21/05; shock absorbers using plastic deformation of members in general F16F 7/12) **[5]**

1/12 . . Hand levers

1/14 . . . Tillers, i.e. hand levers operating on steering columns

1/16 . . Steering columns

1/18 . . . yieldable or adjustable, e.g. tiltable (padded linings associated with the steering column B60R 21/05)

Note

Group B62D 1/181 takes precedence over groups B62D 1/183 to B62D 1/187. **[7]**

1/181 . . . . with power actuated adjustment, e.g. with position memory **[7]**
1/183 . . . . adjustable between in-use and out-of-use positions, e.g. to improve access **[7]**
1/184 . . . . Mechanisms for locking columns at selected positions **[7]**
1/185 . . . . adjustable by axial displacement, e.g. telescopically (B62D 1/183, B62D 1/187, B62D 1/19 take precedence) **[7]**
1/187 . . . . with tilt adjustment; with tilt and axial adjustment (B62D 1/183, B62D 1/19 take precedence) **[7]**
1/189 . . . . . the entire steering column being tiltable as a unit **[7]**
1/19 . . . . incorporating energy-absorbing arrangements, e.g. by being yieldable or collapsible (shock-absorbers using plastic deformation of members in general F16F 7/12) **[5]**
1/20 . . . Connecting steering column to steering gear
1/22 . . Alternative steering-control elements, e.g. for teaching purposes
1/24 . not vehicle-mounted
1/26 . . mechanical, e.g. by a non-load-bearing guide (railways B61)
1/28 . . non-mechanical

3/00 **Steering gears** (power assisted or power driven B62D 5/00; steering linkages B62D 7/00; for non-deflectable wheels B62D 11/00; gearing in general F16H)
3/02 . mechanical
3/04 . . of worm type
3/06 . . . with screw and nut
3/08 . . . . using intermediate balls or the like
3/10 . . . with worm engaging in sector or roller gear
3/12 . . of rack-and-pinion type
3/14 . hydraulic

5/00 **Power-assisted or power-driven steering** (for non-deflectable wheels B62D 11/00; fluid-pressure servomotors in general F15B)
5/02 . mechanical, e.g. using a power-take-off mechanism for taking power from a rotating shaft of the vehicle and applying it to the steering gear
5/04 . electrical, e.g. using an electric servo-motor connected to, or forming part of, the steering gear
5/06 . fluid, i.e. using a pressurised fluid for most or all the force required for steering a vehicle **[4]**
5/065 . . characterised by specially adapted means for varying pressurised fluid supply based on need, e.g. on-demand, variable assist **[7]**
5/07 . . Supply of pressurised fluid for steering also supplying other consumers **[4]**
5/08 . . characterised by type of valve used (valves in general F16K) **[4]**
5/083 . . . Rotary valves **[4]**
5/087 . . . Sliding spool valves **[4]**
5/09 . . characterised by means for actuating valves **[4]**
5/093 . . . Telemotor driven by steering wheel movement (hydraulic steering gear B62D 3/14) **[4]**
5/097 . . . . gerotor type **[4]**
5/10 . . characterised by type of power unit **[4]**
5/12 . . . Piston and cylinder **[4]**
5/14 . . . Rotary motor **[4]**
5/16 . . . Expansible chamber with flexible wall **[4]**
5/18 . . characterised by power transmitting means **[4]**
5/20 . . specially adapted for particular type of steering gear or particular application (steering gears per se B62D 3/00; steering linkages not characterised by being power-assisted or power-driven B62D 7/00) **[4]**
5/22 . . . for rack-and-pinion type **[4]**
5/24 . . . for worm type **[4]**
5/26 . . . for pivoted axles **[4]**
5/28 . . . for pivoted bogies **[4]**
5/30 . . Safety devices, e.g. alternate emergency power supply or transmission means to ensure steering upon failure of the primary steering means **[4]**
5/32 . . . for telemotor systems **[4]**

6/00 **Arrangements for automatically controlling steering depending on driving conditions sensed and responded to, e.g. control circuits** (means for initiating a change in direction B62D 1/00; steering valves B62D 5/06; combined with means for inclining the vehicle body or wheels on bends B62D 9/00) **[4,6]**

(1) When classifying in this group, classification is also made in the appropriate one of groups B62D 1/00 - B62D 5/00 or B62D 7/00 - B62D 19/00 if other aspects of the steering system are of interest. **[5]**
(2) In main group B62D 6/00, but excluding its subgroups, it is desirable to add the indexing codes of groups B62D 101/00 - B62D 137/00. **[5]**

6/02 . responsive only to vehicle speed **[4]**
6/04 . responsive only to forces disturbing the intended course of the vehicle, e.g. forces acting transversely to the direction of vehicle travel **[4]**
6/06 . responsive only to vehicle vibration dampening arrangements (steering dampers for cycles B62K 21/08) **[4]**
6/08 . responsive only to input torque **[6]**
6/10 . . characterised by the means for sensing torque **[6]**

7/00 **Steering linkage**; **Stub axles or their mountings** (B62D 13/00 takes precedence; power-assisted or power-driven steering B62D 5/00) **[5]**
7/02 . for pivoted bogies
7/04 . . with more than one wheel
7/06 . for individually-pivoted wheels, e.g. on king-pins
7/08 . . the pivotal axes being situated in a single plane transverse to the longitudinal centre line of the vehicle
7/09 . . . characterised by means varying the ratio between the steering angles of the steered wheels (varying the ratio automatically depending on driving conditions B62D 6/00) **[5]**
7/10 . . . with single-output steering gear
7/12 . . . with twin-output steering gear
7/14 . . the pivotal axes being situated in more than one plane transverse to the longitudinal centre line of the vehicle, e.g. all-wheel steering

7/15 . . . characterised by means varying the ratio between the steering angles of the steered wheels (varying the ratio automatically depending on driving conditions B62D 6/00) **[5]**

7/16 . Arrangement of linkage connections (pivots per se F16C)

7/18 . Steering knuckles; King-pins

7/20 . Links, e.g. track rods (means for adjusting camber, castor, or toe-in B62D 17/00)

7/22 . Arrangements for reducing or eliminating reaction, e.g. vibration, from parts, e.g. wheels, of the steering system **[5]**

9/00 Steering deflectable wheels not otherwise provided for (steering-position indicators B62D 15/02)

9/02 . combined with means for inwardly-inclining vehicle body on bends

9/04 . combined with means for inclining vehicle wheels on bends (B62D 9/02 takes precedence) **[5]**

11/00 Steering non-deflectable wheels; **Steering endless tracks or the like**

11/02 . by differentially driving ground-engaging elements on opposite vehicle sides

11/04 . . by means of separate power sources

11/06 . . by means of a single main power source

11/08 . . . using brakes or clutches as main steering-effecting means

11/10 . . . using gearings with differential power outputs on opposite sides, e.g. twin- differential or epicyclic gears

11/12 . . . . using separate change-speed gearings

11/14 . . . . differential power outputs being effected by additional power supply to one side, e.g. power originating from secondary power source

11/16 . . . . . the additional power supply being supplied mechanically

11/18 . . . . . the additional power supply being supplied hydraulically

11/20 . Endless-track steering having pivoted bogie carrying track (B62D 11/02 takes precedence)

11/22 . Endless-track steering being effected by deflecting endless-track rollers or the like

11/24 . Endless-track steering specially adapted for vehicles having both steerable wheels and endless track

12/00 Steering specially adapted for vehicles operating in tandem or having pivotally connected frames (steering endless tracks or the like B62D 11/00; steering specially adapted for trailers B62D 13/00) **[4]**

12/02 . for vehicles operating in tandem **[4]**

13/00 Steering specially adapted for trailers (combined traction and steering hitches B60D)

13/02 . for centrally-pivoted axles

13/04 . for individually-pivoted wheels

13/06 . for backing a normally-drawn trailer

15/00 Steering not otherwise provided for

15/02 . Steering position indicators **[4]**

17/00 Means on vehicle for adjusting camber, castor, or toe-in

19/00 Radius rods, i.e. distance members

Understructures; **Superstructures**; **Vehicle bodies**

21/00 Understructures, i.e. chassis frame on which a vehicle body may be mounted (combined frame and vehicle body B62D 23/00)

21/02 . comprising longitudinally or transversely arranged frame members **[4]**

21/03 . . transverse members providing body support **[4]**

21/04 . . single longitudinal type

21/05 . . pinched frame type, i.e. formed of at least two longitudinal frame sections connected by other longitudinal frame sections of lesser transverse dimension **[4]**

21/06 . of X-shaped or fork-shaped construction, i.e. having members which form an X or fork as the frame is seen in plan view

21/07 . wide-hipped frame type, i.e. a wide box-shaped mid portion with narrower sections extending from said mid portion in both fore and aft directions **[4]**

21/08 . built-up with interlaced cross members ("Fachwerkrahmen")

21/09 . Means for mounting load bearing surfaces **[4]**

21/10 . in which the main member is plate-like

21/11 . with resilient means for suspension **[4]**

Note

This group does not cover subject matter primarily relating to the suspension, with only a nominal recitation of frame structure, which is covered by subclass B60G. **[4]**

21/12 . assembled from readily-detachable parts

21/14 . of adjustable length or width

21/15 . having impact absorbing means, e.g. a frame designed to permanently or temporarily change shape or dimension upon impact with another body (bumpers B60R 19/02; shock absorbers in general F16F) **[4]**

21/16 . having fluid storage compartment **[4]**

21/17 . forming fluid or electrical conduit means or having other means to accommodate the transmission of a force or signal **[4]**

21/18 . characterised by the vehicle type and not provided for in groups B62D 21/02 to B62D 21/17 **[4]**

21/20 . . trailer type, i.e. a frame specifically constructed for use in a non-powered vehicle **[4]**

23/00 Combined superstructure and frame, i.e. monocoque constructions (superstructure sub-units B62D 25/00)

24/00 Connections between vehicle body and vehicle frame (B62D 23/00, B62D 33/077 take precedence) **[5]**

24/02 . Vehicle body, not intended to move relatively to the vehicle frame, and mounted on vibration absorbing mountings, e.g. rubber pads **[5]**

24/04 . Vehicle body mounted on resilient suspension for movement relative to the vehicle frame **[5]**

25/00 Superstructure sub-units; **Parts or details thereof not otherwise provided for**

25/02 . Side panels

25/04 . Door pillars

25/06 . Fixed roofs (non-fixed roofs or roofs with movable panels B60J 7/00; roof liners B60R 13/02; insulating elements B60R 13/08)

25/07 . . having water drainage or guide means integral with roof structure **[4]**

25/08 . Front or rear portions

25/10 . . Bonnets or lids
25/12 . . . Parts or details thereof (locks E05B; hinges E05D; counterbalancing means E05F; springs F16F)
25/13 . . . . Water deflectors **[5]**
25/14 . . Dashboards as superstructure sub-unit (other dashboard aspects B60K)
25/16 . . Mud-guards or wings; Wheel cover panels (equipped with means for freeing wheels or tyres from foreign matter B60S)
25/18 . . . Parts or details thereof, e.g. mud-guard flaps
25/20 . Floors or bottom sub-units
25/22 . Running-boards, steps, or the like, as superstructure sub-unit (other arrangements of steps, ladders, or running-boards in vehicles B60R)
25/24 . Superstructure sub-units with access openings having movable or removable closures (inlet covers for vehicle fuel tanks B60K 15/05) **[5]**

27/00 Connections between superstructure sub-units
27/02 . rigid
27/04 . resilient
27/06 . readily releasable

29/00 Superstructures characterised by material thereof
29/02 . predominantly of wood
29/04 . predominantly of synthetic material (working of plastics or substances in a plastic state B29)

31/00 Superstructures for passenger vehicles (passenger vehicles specially adapted to co-operate with aircraft or terminal buildings B64F 1/31)
31/02 . for carrying large numbers of passengers, e.g. omnibus
31/04 . with more than one deck

33/00 Superstructures for load-carrying vehicles (in which a load-carrying element is movable B60P; liners B60R 13/00)
33/02 . Platforms; Open load compartments
33/023 . . Sideboard or tailgate structures **[5]**
33/027 . . . movable **[5]**
33/03 . . . . by swinging down **[5]**
33/033 . . . . removable **[5]**
33/037 . . . . Latching means therefor **[5]**
33/04 . Enclosed load compartments
33/06 . Drivers' cabs
33/063 . . movable from one position into at least one other position, e.g. tiltable, pivotable about a vertical axis, displaceable from one side of the vehicle to the other **[5]**
33/067 . . . tiltable **[5]**
33/07 . . . . characterised by the device for locking the cab in the tilted or in the driving position **[5]**
33/073 . . . characterised by special adaptations of vehicle control devices **[5]**
33/077 . characterised by the connection of the superstructure to the vehicle frame **[5]**
33/08 . . comprising adjustable means (B62D 33/10 takes precedence) **[5]**
33/10 . . comprising means for the suspension of the superstructure on the frame **[5]**

35/00 Vehicle bodies characterised by streamlining
35/02 . Streamlining the undersurfaces

37/00 Stabilising vehicle bodies without controlling suspension arrangements
37/02 . by aerodynamic means
37/04 . by means of movable masses
37/06 . . using gyroscopes

39/00 Vehicle bodies not otherwise provided for

41/00 Fittings for identifying vehicles in case of collision; **Fittings for marking or recording collision areas**

43/00 Spare wheel stowing, holding, or mounting arrangements
43/02 . external to the vehicle body
43/04 . . attached beneath the vehicle body
43/06 . within the vehicle body
43/08 . . and arranged substantially vertical
43/10 . . and arranged substantially horizontal

Motor vehicles or trailers classified according to type; **Parts or accessories thereof not otherwise provided for**

47/00 Motor vehicles or trailers predominantly for carrying passengers (superstructures B62D 31/00) **[3]**
47/02 . for large numbers of passengers, e.g. omnibus

49/00 Tractors (of walk type B62D 51/04; endless-track features B62D 55/00)
49/02 . modified to take lifting devices
49/04 . modified to take pushing devices
49/06 . adapted for multi-purpose use
49/08 . having means for preventing overturning or tipping (safety devices for propulsion-unit control, specially adapted for, or arranged in, vehicles B60K 28/00) **[4]**

51/00 Motor vehicles characterised by the driver not being seated
51/02 . the driver standing in the vehicle
51/04 . the driver walking
51/06 . . Uniaxle walk-type tractors

53/00 Tractor-trailer combinations; **Road trains** (traction couplings other than fifth-wheel couplings B60D)
53/02 . comprising a uniaxle tractor unit and a uniaxle trailer unit
53/04 . comprising a vehicle carrying an essential part of the other vehicle's load by having supporting means for the front or rear part of the other vehicle
53/06 . . Semi-trailers
53/08 . . Fifth-wheel traction couplings
53/10 . . . with means for preventing accidental uncoupling
53/12 . . . engaging automatically

55/00 Endless-track vehicles (steering aspects B62D 11/00)
55/02 . with tracks and additional ground wheels
55/04 . with tracks and alternative ground wheels, e.g. changeable from endless-track vehicle into wheeled vehicle and vice versa
55/06 . with tracks and without ground wheels
55/065 . . Multi-track vehicles, i.e. more than two tracks **[4]**
55/07 . . Mono-track vehicles **[4]**
55/075 . . Tracked vehicles for ascending or descending stairs (magnetic or pneumatic ground-engaging parts B62D 55/265; chairs or personal conveyances specially adapted for patients or disabled persons A61G 5/00) **[4]**
55/08 . Endless-track units; Parts thereof

55/084 . . Endless-track units or carriages mounted separably, adjustably or extensibly on vehicles, e.g. portable track units (B62D 55/07 takes precedence) **[4]**
55/088 . . with means to exclude or remove foreign matter e.g. sealing means, self-cleaning track links or sprockets, deflector plates or scrapers **[4]**
55/092 . . with lubrication means (lubricating in general F16N) **[4]**
55/096 . . with noise reducing means **[4]**
55/10 . . Bogies; Frames (track-tensioning means B62D 55/30)
55/104 . . Suspension devices for wheels, rollers, bogies or frames (vehicle suspension in general B60G) **[4]**
55/108 . . . with mechanical springs, e.g. torsion bars **[4]**
55/112 . . . with fluid springs, e.g. hydraulic, pneumatic **[4]**
55/116 . . . Attitude or position control of chassis by action on suspension, e.g. to compensate for a slope **[4]**
55/12 . . Arrangement, location, or adaptation of driving sprockets
55/125 . . . Final drives **[4]**
55/13 . . . . readily interchangeable modular type **[4]**
55/135 . . . with dismountable driving crown **[4]**
55/14 . . Arrangement, location, or adaptation of rollers
55/15 . . . Mounting devices, e.g. bushings, axles, bearings, sealings **[4]**
55/18 . . Tracks (self-cleaning track links B62D 55/088) **[4]**
55/20 . . . of articulated type, e.g. chains
55/205 . . . . Connections between track links **[4]**
55/21 . . . . . Links connected by transverse pivot pins **[4]**
55/215 . . . . . Resilient connections between links **[4]**
55/22 . . . . Arrangements for preventing or modifying back-flexing
55/24 . . . of continuously-flexible type, e.g. rubber belts
55/247 . . . . Gas filled or inflatable flexible tracks (connection of valves to inflatable elastic bodies B60C 29/00) **[4]**
55/253 . . . . having elements interconnected by one or more cables or like elements **[4]**
55/26 . . . Ground-engaging parts or elements
55/265 . . . . having magnetic or pneumatic adhesion **[4]**
55/27 . . . . having different types of crampons for progression over varying ground **[4]**
55/275 . . . . with street plate, i.e. means to prevent tread from cutting into road surface **[4]**
55/28 . . . . detachable
55/30 . . Track-tensioning means
55/32 . Assembly, disassembly, repair or servicing of endless-track systems **[4]**

57/00 Vehicles characterised by having other propulsion or other ground-engaging means than wheels or endless track, alone or in addition to wheels or endless track (sledges B62B; motor sledges B62M) **[5]**
57/02 . with ground-engaging propulsion means, e.g. walking members
57/024 . . specially adapted for moving on inclined or vertical surfaces (endless-track vehicles for ascending or descending stairs B62D 55/075; hand-carts with provision for travelling up or down stairs B62B 5/02) **[5]**
57/028 . . having wheels and mechanical legs (B62D 57/024 takes precedence; ground-engaging vehicle fittings for supporting, lifting or manoeuvring the vehicle, wholly or in part B60S 9/00) **[5]**
57/032 . . with alternately or sequentially lifted supporting base and leg; with alternately or sequentially lifted feet or skid (B62D 57/024 takes precedence) **[5]**
57/036 . . screw type, e.g. Archimedian screw (B62D 57/024 takes precedence) **[5]**
57/04 . having other than ground-engaging propulsion means, e.g. having propellers (arrangement of jet-propulsion units B60K)

59/00 Trailers with driven ground wheels or the like
59/02 . driven from external propulsion unit
59/04 . driven from propulsion unit on trailer

61/00 Motor vehicles or trailers, characterised by the arrangement or number of wheels, not otherwise provided for, e.g. four wheels in diamond pattern
61/02 . with two road wheels in tandem on the longitudinal centre line of the vehicle
61/04 . . with two other wheels which are coaxial
61/06 . with only three wheels
61/08 . . with single front wheel
61/10 . with more than four wheels
61/12 . with variable number of ground-engaging wheels, e.g. with some wheels arranged higher than others, or with retractable wheels (for manoeuvring purposes only B60S)

63/00 Motor vehicles or trailers not otherwise provided for
63/02 . Motor vehicles
63/04 . . Component parts or accessories
63/06 . Trailers (vehicles comprising living accommodation for people, e.g. caravans, camping or like vehicles, B60P 3/32)
63/08 . . Component parts or accessories

65/00 Designing, manufacturing, e.g. assembling, facilitating disassembly, or structurally modifying motor vehicles or trailers, not otherwise provided for
65/02 . Joining sub-units or components to, or positioning sub-units or components with respect to, body shell or other sub-units or components **[7]**
65/04 . . Joining preassembled modular units composed of sub-units performing diverse functions, e.g. engine and bonnet (B62D 65/06 to B62D 65/16 take precedence) **[7]**
65/06 . . the sub-units or components being doors, windows, openable roofs, lids, bonnets, or weather strips or seals therefor **[7]**
65/08 . . . Weather strips or seals **[7]**
65/10 . . the sub-units or components being engines, clutches or transmissions **[7]**
65/12 . . the sub-units or components being suspensions, brakes or wheel units **[7]**
65/14 . . the sub-units or components being passenger compartment fittings, e.g. seats, linings, trim, instrument panels **[7]**
65/16 . . the sub-units or components being exterior fittings, e.g. bumpers, lights, wipers **[7]**
65/18 . Transportation, conveyor or haulage systems specially adapted for motor vehicle or trailer assembly lines **[7]**

67/00 Systematic disassembly of vehicles for recovery of salvageable components, e.g. for recycling (for disposal of vehicles by destroying or transformation B09B 3/00, B09B 5/00) **[7]**

Indexing scheme associated with group B62D 6/00, but excluding groups B62D 6/02 to B62D 6/10, relating to driving conditions sensed and responded to. [5]

101/00 Road speed [5]

103/00 Acceleration or deceleration in the direction of travel [5]

105/00 Loss of traction, e.g. wheel spin or skid [5]

107/00 Temperature [5]

109/00 Presence, absence or inactivity of driver or operator, e.g. by sensing the operation of the clutch, brake or throttle [5]

111/00 Forces disturbing the intended course of the vehicle, e.g. forces acting transversely of the direction of travel [5]

113/00 Position of parts of the steering mechanism, e.g. the steered wheels or the steering wheel [5]

115/00 Angle of articulation of articulated vehicle; Angle of tow-bar to towing vehicle [5]

117/00 Angular velocity of steering wheel [5]

119/00 Steering wheel torque [5]

121/00 Force applied to the steering linkage [5]

123/00 Fluid pressure supply for vehicle equipment, e.g. for power-assisted steering; Presence, failure or threshold values thereof; Lubricating or other fluid capacities [5]

125/00 Particular gear ratio selected [5]

127/00 Engine speed [5]

131/00 Load, including height of vehicle dependent on load; State of vehicle vibration damping means [5]

133/00 Trim or inclination, including road gradient [5]

135/00 Air moisture content [5]

137/00 Conditions not specified in groups B62D 101/00 to B62D 135/00 [5]

B62H CYCLE STANDS; SUPPORTS OR HOLDERS FOR PARKING OR STORING CYCLES; APPLIANCES PREVENTING OR INDICATING UNAUTHORISED USE OR THEFT OF CYCLES; LOCKS INTEGRAL WITH CYCLES; DEVICES FOR LEARNING TO RIDE CYCLES

Note

In this subclass, the following term is used with the meaning indicated:
– "cycles" includes scooters.

1/00 Supports or stands forming part of, or attached to, cycles

1/02 . Articulated stands, e.g. in the shape of hinged arms (B62H 1/10 takes precedence)

1/04 . . Substantially U-shaped stands for embracing the rear wheel

1/06 . Extensible stands, e.g. with telescopic parts (B62H 1/10 takes precedence)

1/08 . Pedal supports

1/10 . involving means providing for a stabilised ride (training appliances or apparatus for cycling sport A63B 69/16)

1/12 . . using additional wheels

1/14 . . using runners for riding on ice or snow (runners for carrying wheeled vehicles to facilitate travel on ice or snow B62B 19/00)

3/00 Separate supports or holders for parking or storing cycles (cycle supports used during maintenance B25H; building aspects E04H)

3/02 . involving means for gripping the cycle by the handle-bars or by the upper part of the frame

3/04 . involving forked supports or brackets for holding a wheel (B62H 3/08 takes precedence)

3/06 . . collapsible

3/08 . involving recesses or channelled rails for embracing the bottom part of a wheel

3/10 . involving forked supports or brackets embracing the bottom part of the frame

3/12 . Hanging-up devices

5/00 Appliances preventing or indicating unauthorised use or theft of cycles; Locks integral with cycles (fittings for preventing or indicating use or theft of vehicles in general B60R; general features of locks E05B)

5/02 . for locking the steering mechanism

5/04 . . acting on the handle-bars or equivalent

5/06 . . acting on the front wheel fork or steering head tube

5/08 . preventing the drive (by acting on powered drive B62M)

5/10 . . acting on a pedal crank

5/12 . . acting on the chain wheel or the chain

5/14 . preventing wheel rotation

5/16 . . acting on parts of a road wheel

5/18 . . acting on a braking device (locking cycle brake actuating mechanisms B62L 3/06)

5/20 . indicating unauthorised use, e.g. acting on signalling devices

7/00 Devices for learning to ride cycles, not otherwise provided for, e.g. assisting balance

B62J **CYCLE SADDLES OR SEATS**; **ACCESSORIES PECULIAR TO CYCLES AND NOT OTHERWISE PROVIDED FOR, E.G. ARTICLE CARRIERS OR CYCLE PROTECTORS** (registration plates B60R 13/10; cyclometers, i.e. wheel-revolution counters, G01C 22/00)

Note

In this subclass, the following term is used with the meaning indicated:
– "cycles" includes scooters.

Subclass index

1/00 **Saddles or other seats for cycles**; **Arrangement thereof**; **Component parts** (arrangements or adaptations of vehicle seats in general B60N)
1/02 . Saddles resiliently mounted on the frame; Equipment therefor, e.g. springs (springs in general F16F)
1/04 . . Saddles capable of swinging about a horizontal pivot
1/06 . . Saddles capable of parallel motion up and down
1/08 . Frames for saddles; Connections between saddle frames and seat pillars; Seat pillars (attaching seat pillars to cycle frames B62K 19/36)
1/10 . Internal adjustment of saddles
1/12 . Box-shaped seats; Bench-type seats, e.g. dual or twin seats
1/14 . Separate pillions
1/16 . . for children
1/18 . Covers for saddles or other seats; Paddings (paddings in general B68G)
1/20 . . Detachable covers; Detachable pads
1/22 . . Covers with built-in paddings
1/24 . . Paddings involving torsional or bending springs
1/26 . . Paddings involving other resilient material, e.g. sponge rubber with inflatable compartments
1/28 . Other additional equipment, e.g. back rests for children

Signal or lighting devices specially adapted for cycles

3/00 **Acoustic signal or alarm devices** (acoustic signal or alarm devices in general G08); **Arrangement of such devices on cycles**

6/00 **Arrangement of optical signalling or lighting devices on cycles, the mounting or supporting thereof or circuits therefor** (optical signalling or lighting devices per se F21, G08, H05) **[4]**
6/02 . the devices being headlights **[4]**
6/04 . the devices being rear lights **[4]**
6/06 . Arrangement of lighting dynamos or drives therefor (dynamo construction H02K) **[4]**
6/08 . . Tyre drives **[4]**
6/10 . . Gear drives (B62J 6/12 takes precedence) **[4]**
6/12 . . Dynamos arranged in the wheel hub **[4]**
6/14 . . Belt drives **[4]**
6/16 . Arrangement of switches **[4]**
6/18 . Arrangement of electric cables **[4]**
6/20 . Arrangement of reflectors (pedals incorporating reflectors B62M 3/12) **[4]**

Article carriers

7/00 **Luggage carriers**
7/02 . characterised by the arrangement thereof on cycles
7/04 . . above or behind the rear wheel
7/06 . . above the front wheel, e.g. on the handle-bars
7/08 . Equipment for securing luggage on carriers

9/00 **Panniers, saddle bags, or other containers specially adapted to be attached to cycles**
9/02 . for tools or spare parts

11/00 **Supporting devices for attaching articles of definite shape to cycles, e.g. for maps, umbrellas, bottles**
11/02 . for pumps

Protectors; **Fairings or streamlining parts not otherwise provided for**

13/00 **Guards for chain, chain drive, or equivalent drive, e.g. belt drive** (chain guards forming part of cycle frames B62K 19/44)
13/02 . shielding only the upper run of the chain or the like
13/04 . completely enclosing the chain drive or the like
13/06 . . admitting ready access to the chain or the like

15/00 **Mud-guards for wheels**
15/02 . Fastening means; Stays
15/04 . Mud flaps

17/00 **Weather guards for riders**; **Fairings or streamlining parts not otherwise provided for** (protective clothing or garments A41D 13/00; crash helmets A42B 3/00; fairings forming part of frames B62K 19/48; fairings for sidecars B62K 27/04; hoods for sidecars B62K 27/16)

17/02 . shielding only the rider's front

17/04 . . Windscreens

17/06 . . Leg guards

17/08 . Hoods protecting the rider

19/00 **Parking covers for cycles** (convertible into protective garments for the rider A41D 15/04; convertible into camping articles A45F 4/00; for vehicles in general B60J 11/00)

21/00 **Dress protectors, e.g. clips attached to the cycle** (loose clips for trousers or skirts A41F 17/02)

23/00 **Other protectors specially adapted for cycles**

25/00 **Foot-rests**; **Rigidly-mounted knee grips, e.g. on petrol tank**

27/00 **Safety equipment, e.g. crash bars** (safety belts in general A62B 35/00)

29/00 **Adaptations or arrangements of mirrors for use on cycles** (for vehicles in general B60R)

31/00 **Installations of lubricating devices**

33/00 **Installations peculiar to cycles for warming riders** (for vehicles in general B60H)

35/00 **Fuel tanks specially adapted for motorcycles or engine-assisted cycles**; **Arrangements thereof** (fuel tanks forming part of cycle frames B62K 11/00; tanks in general B65D)

37/00 **Arrangements of fuel supply lines, taps, or the like, on motorcycles or engine-assisted cycles**

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B62K CYCLES; CYCLE FRAMES; CYCLE STEERING DEVICES; RIDER-OPERATED TERMINAL CONTROLS SPECIALLY ADAPTED FOR CYCLES; CYCLE AXLE SUSPENSIONS; CYCLE SIDECARS, FORECARS, OR THE LIKE

Subclass index

Note

Groups B62K 7/00 to B62K 15/00 take precedence over groups B62K 1/00 to B62K 5/00, e.g. a child's bicycle is classified in group B62K 9/00 and not in group B62K 3/00.

1/00 **Unicycles**

3/00 **Bicycles**

3/02 . Frames (tandem frames B62K 3/14)

3/04 . . having a substantially-horizontal top bar

3/06 . . of open type

3/08 . . . having crossing members

3/10 . . of single-beam type, i.e. connecting steering head to rear axle

3/12 . Tandems

3/14 . . Frames

3/16 . specially adapted for disabled riders

5/00 **Cycles with more than two main road wheels** (specially adapted for disabled persons A61G 5/00; cycle supports or stands equipped with additional wheels for ride stabilisation B62H 1/12)

5/02 . Tricycles

5/04 . . with two coaxial wheels

5/06 . . . Frames

5/08 . Steering devices acting on more than one wheel

7/00 **Freight- or passenger-carrying cycles**

7/02 . Frames

7/04 . . having a carrying platform (article-carrying accessories B62J 7/00 to B62J 11/00)

9/00 **Children's cycles** (toy vehicles A63H 17/00)

9/02 . Tricycles

11/00 **Motorcycles**; **Engine-assisted cycles**; **Motor-scooters** (fairings or streamlining parts, not forming part of frame B62J; transmission of drive from engine to wheels B62M)

11/02 . Frames (motorcycles or cycles with auxiliary engines characterised by position of engine B62M)

11/04 . . characterised by the engine being between front and rear wheels

11/06 . . . the frame being of single-beam type

11/08 . . . . the beam being fabricated from sheet metal, e.g. forming fuel tank walls

11/10 . . characterised by the engine being over or beside driven rear wheel

11/12 . Steering wheel forks characterised by the association therewith of engine

11/14 . Handle-bar constructions, or arrangements of controls thereon, specially adapted thereto (hand controls per se B62K 23/02)

13/00 Cycles convertible to, or transformable into, other types of cycles or land vehicles (convertible vehicles in general B60F 5/00; cycle supports or stands equipped with additional wheels for ride stabilisation B62H 1/12)

13/02 . to a tandem

13/04 . to a tricycle

13/06 . to a quadricycle, e.g. by coupling together two bicycles side by side

13/08 . Frames

15/00 Collapsible or foldable cycles

17/00 Cycles not otherwise provided for

19/00 Cycle frames (cycle frames specially adapted for one particular kind of cycle specified in groups B62K 1/00 to B62K 17/00, see the relevant group)

19/02 . characterised by material or cross-section of frame members

19/04 . . the material being wholly or mainly metallic, e.g. of high elasticity

19/06 . . . tubular

19/08 . . . made from sheet

19/10 . . . Combinations of tube and sheet

19/12 . . . having cast members

19/14 . . the material being wholly or mainly wood

19/16 . . the material being wholly or mainly of plastics

19/18 . Joints between frame members

19/20 . . welded, soldered, or brazed

19/22 . . Adhesive joints

19/24 . . Screwed joints

19/26 . . Riveted joints

19/28 . . Means for strengthening joints

19/30 . Frame parts shaped to receive other cycle parts or accessories (axle suspensions B62K 25/00)

19/32 . . Steering heads (bearings therefor B62K 21/06)

19/34 . . Bottom brackets

19/36 . . for attaching saddle pillars, e.g. adjustable during ride

19/38 . . for attaching brake members

19/40 . . for attaching accessories, e.g. article carriers, lamps

19/42 . . . for tyre pumps (attachment devices not forming part of frame B62J 11/02)

19/44 . Chain-guards forming part of frame (chain-guards per se B62J 13/00)

19/46 . Luggage carriers forming part of frame (luggage carriers per se B62J 7/00)

19/48 . Fairings forming part of frame

21/00 Steering devices (steering devices specially adapted for one particular kind of cycle specified in groups B62K 1/00 to B62K 17/00, see the relevant group)

21/02 . Front wheel forks or equivalent, e.g. single tine

21/04 . Fork crowns

21/06 . Bearings specially adapted for steering heads (bearings in general F16C)

21/08 . Steering dampers (dampers in general F16F)

21/10 . Mechanisms for restoring steering device to straight-ahead position

21/12 . Handle-bars; Handle-bar stems

21/14 . . having resilient parts therein

21/16 . . having adjustable parts therein

21/18 . Connections between forks and handle-bars or handle-bar stems

21/20 . . resilient

21/22 . . adjustable

21/24 . . readily releasable

21/26 . Handle-bar grips (twist grips B62K 23/04)

23/00 Rider-operated controls specially adapted for cycles, i.e. means for initiating control operations, e.g. levers, grips (specially adapted to cycle brake mechanisms B62L 3/00)

23/02 . hand-actuated (arrangements of controls on handle-bars of engine-driven cycles B62K 11/14)

23/04 . . Twist grips

23/06 . . Levers

23/08 . foot-actuated

25/00 Axle suspensions (for vehicles in general B60G)

25/02 . for mounting axles rigidly on cycle frame or fork, e.g. adjustably

25/04 . for mounting axles resiliently on cycle frame or fork (for sidecars, forecars, or the like B62K 27/06)

25/06 . . with telescopic fork, e.g. including auxiliary rocking arms

25/08 . . . for front wheel

25/10 . . . for rear wheel

25/12 . . with rocking arm pivoted on each fork leg (in combination with telescopic fork B62K 25/06)

25/14 . . . with single arm on each fork leg

25/16 . . . . for front wheel

25/18 . . . . . the arm being pivoted intermediate its ends

25/20 . . . . for rear wheel

25/22 . . . with more than one arm on each fork leg

25/24 . . . . for front wheel

25/26 . . . . for rear wheel

25/28 . . with pivoted chain-stay

25/30 . . . pivoted on pedal crank shelf (B62K 25/32 takes precedence)

25/32 . . . the chain-stay forming a chain-guard

27/00 Sidecars; **Forecars or the like** (trailers B60P, B62D; characterised by carrying propulsion engine B62M)

27/02 . Frames

27/04 . Car bodies; Fairings

27/06 . Resilient axle suspension

27/08 . Resilient car-body suspension on frame

27/10 . Other component parts or accessories

27/12 . . Coupling parts for attaching cars or the like to cycle; Arrangements thereof

27/14 . . . Resilient coupling parts

27/16 . . Hoods; Weather-guards, e.g. windscreens

B62L BRAKES SPECIALLY ADAPTED FOR CYCLES

(1) This subclass covers only adaptations of brakes or actuating mechanisms peculiar to their use on cycles.
(2) This subclass does not cover brakes or actuating mechanisms of wider applicability, which are regarded as of general type, irrespective of whether described or claimed only for cycles, which are covered by subclass B60T or the relevant subclasses of class F16.

1/00 **Brakes**; **Arrangements thereof** (back-pedalling brakes B62L 5/00)
1/02 . in which cycle wheels are engaged by brake elements
1/04 . . the tyre surfaces being engaged
1/06 . . the wheel-rim being engaged
1/08 . . . by the elements moving radially relative to the wheel
1/10 . . . by the elements moving substantially parallel to the wheel axis
1/12 . . . . the elements being mounted on levers pivotable about a common axis
1/14 . . . . the elements being mounted on levers pivotable about different axes
1/16 . . . . . the axes being located intermediate the ends of the levers

3/00 **Brake-actuating mechanisms** (actuating mechanisms for back-pedalling brakes B62L 5/00; Bowden mechanisms F16C 1/10); **Arrangements thereof**
3/02 . for control by a hand lever (hand levers for control of cycles in general B62K 23/06)
3/04 . for control by a foot lever (foot levers for control of cycles in general B62K 23/08)
3/06 . Means for locking the actuating mechanisms (locking a cycle braking device directly B62H 5/18)
3/08 . Mechanisms specially adapted for braking more than one wheel

5/00 **Brakes, or actuating mechanisms therefor, controlled by back-pedalling** (free-wheel devices specially adapted for cycles F16D 41/00)
5/02 . the brakes being actuated through coacting coaxial cones
5/04 . . the brakes being of expanding-brake-bushing type
5/06 . . the brakes being of disc type
5/08 . . the brakes being of shoe type
5/10 . the brakes being actuated through coacting cams and balls or rollers
5/12 . . the brakes being of expanding-brake-bushing type
5/14 . . the brakes being of disc type
5/16 . . the brakes being of shoe type
5/18 . the brakes being additionally controlled by alternative means
5/20 . the brakes having adjustable braking power

B62M RIDER PROPULSION OF WHEELED VEHICLES OR SLEDGES; POWERED PROPULSION OF SLEDGES OR CYCLES; TRANSMISSIONS SPECIALLY ADAPTED FOR SUCH VEHICLES (arrangements or mounting of transmissions in vehicles in general B60K; transmission elements per se F16)

Note

In this subclass, the following term is used with the meaning indicated:
– "transmission" means all parts between the prime mover or the part to which a rider immediately applies propulsive effort, e.g. pedal cranks, and a driven ground wheel.

Subclass index

Rider propulsion of wheeled vehicles

1/00 **Rider propulsion of wheeled vehicles** (rider propulsion with additional source of power B62M 6/00; propulsion by ground-engaging rods B62M 29/02) **[1,2010.01]**

1/02 . with rotary cranks, e.g. with pedal cranks (cranks per se B62M 3/00; immobilisable as foot-rests B62M 5/00)

1/04 . with reciprocating levers, e.g. foot levers (immobilisable as foot-rests B62M 5/00)

1/06 . driving a rotary crankshaft connected to driven axle other than by coupling-rods

1/08 . . directly driving a ratchet wheel on driven axle

1/10 . involving devices which enable the mechanical storing and releasing of energy occasionally, e.g. arrangement of flywheels **[1,2010.01]**

1/12 . operated both by hand and by foot

1/14 . exclusively by hand power (hand cranks per se B62M 3/00)

1/16 . . by means of a to-and-fro movable handle-bar

1/18 . by movement of rider's saddle

1/20 . . with additional rider propulsion means

3/00 **Construction of cranks operated by hand or foot**

3/02 . of adjustable length

3/04 . . automatically adjusting

3/06 . with elliptical or other non-circular rotary movement

3/08 . Pedals

3/10 . . All-metal pedals

3/12 . . with reflectors

3/14 . Hand-grips for hand-operated cranks

3/16 . Accessories

5/00 **Foot-driven levers as pedal cranks which can be immobilised as foot-rests** (immobilising against theft B62H 5/10)

6/00 **Rider propulsion of wheeled vehicles with additional source of power, e.g. combustion engine or electric motor [2010.01]**

Note

In this main group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place **[2010.01]**

6/10 . Rider propelled cycles with auxiliary combustion engine **[2010.01]**

6/15 . . Control or actuating devices therefor **[2010.01]**

6/20 . . power-driven at crank shaft parts **[2010.01]**

6/25 . . power-driven at axle parts **[2010.01]**

6/30 . . power-driven at single endless flexible member, e.g. chain, between cycle crankshaft and wheel axle, the engine engaging the endless flexible member **[2010.01]**

6/35 . . power-driven by friction rollers or gears engaging the ground wheel **[2010.01]**

6/40 . Rider propelled cycles with auxiliary electric motor **[2010.01]**

6/45 . . Control or actuating devices therefor **[2010.01]**

6/50 . . . characterised by detectors or sensors, or arrangement thereof **[2010.01]**

6/55 . . power-driven at crank shafts parts **[2010.01]**

6/60 . . power-driven at axle parts **[2010.01]**

6/65 . . . with axle and driving shaft arranged coaxially **[2010.01]**

6/70 . . power-driven at single endless flexible member, e.g. chain, between cycle crankshaft and wheel axle, the motor engaging the endless flexible member **[2010.01]**

6/75 . . power-driven by friction rollers or gears engaging the ground wheel **[2010.01]**

6/80 . Accessories, e.g. power sources; Arrangements thereof **[2010.01]**

6/85 . . Solar cells **[2010.01]**

6/90 . . Batteries **[2010.01]**

7/00 **Motorcycles characterised by position of motor or engine** (rider propulsion with addition source of power, e.g. auxiliary combustion engine or electric motor B62M 6/00; frames characterised by position of engine B62K 11/00) **[1,2010.01]**

7/02 . with engine between front and rear wheels

7/04 . . below the frame

7/06 . . directly under the saddle or seat

7/08 . with the engine over the rear wheel

7/10 . with the engine over the front wheel

7/12 . with the engine beside or within the driven wheel

7/14 . with the engine on an auxiliary wheeled unit, e.g. trailer, sidecar (trailers B60P, B62D; sidecars B62K 27/00)

Transmissions

9/00 **Transmissions characterised by use of an endless chain, belt, or the like** (cycle chain guards B62J 13/00)

Note

In this main group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2010.01]**

9/02 . of unchangeable ratio

9/04 . of changeable ratio

9/06 . . using a single chain, belt, or the like

9/08 . . . involving eccentrically-mounted or elliptically-shaped driving or driven wheel; with expansible driving or driven wheel

9/10 . . . involving different-sized wheels selectively engaged by the chain, belt, or the like

9/12 . . . . the chain, belt, or the like being laterally shiftable

9/121 . . . . . Rear derailleurs **[2010.01]**

9/122 . . . . . electrically or fluid actuated; Controls thereof **[2010.01]**

9/123 . . . . . changing gears automatically **[2010.01]**

9/124 . . . . . Mechanisms for shifting laterally **[2010.01]**

9/1242 . . . . . characterised by the linkage mechanisms **[2010.01]**

9/1244 . . . . . limiting or positioning the movement **[2010.01]**

9/1246 . . . . . using cams or plates **[2010.01]**

9/1248 . . . . . characterised by the use of biasing means, e.g. springs; Arrangements thereof **[2010.01]**

9/125 . . . . . Mounting the derailleur on the frame **[2010.01]**

9/126 . . . . . Chain guides; Mounting thereof **[2010.01]**

9/127 . . . . . Mounting or guiding of cables **[2010.01]**
9/128 . . . . . Accessories, e.g. protectors **[2010.01]**
9/131 . . . . Front derailleurs **[2010.01]**
9/132 . . . . . electrically or fluid actuated; Controls thereof **[2010.01]**
9/133 . . . . . changing gears automatically **[2010.01]**
9/134 . . . . . Mechanisms for shifting laterally **[2010.01]**
9/1342 . . . . . characterised by the linkage mechanisms **[2010.01]**
9/1344 . . . . . limiting or positioning the movement **[2010.01]**
9/1346 . . . . . using cams or plates **[2010.01]**
9/1348 . . . . . characterised by the use of biasing means, e.g. springs; Arrangements thereof **[2010.01]**
9/135 . . . . . Mounting the derailleur on the frame **[2010.01]**
9/136 . . . . . Chain guides; Mounting thereof **[2010.01]**
9/137 . . . . . Mounting or guiding of cables **[2010.01]**
9/138 . . . . . Accessories, e.g. protectors **[2010.01]**
9/14 . . . . the wheels being laterally shiftable
9/16 . Tensioning or adjusting equipment for chains, belts, or the like

11/00 Transmissions characterised by use of interengaging toothed wheels or frictionally-engaging wheels (with roller engaging the periphery of ground wheel B62M 6/35, B62M 6/75, B62M 13/00)
11/02 . of unchangeable ratio
11/04 . of changeable ratio
11/06 . . with spur gear wheels (B62M 11/14 takes precedence)
11/10 . . with bevel gear wheels (B62M 11/14 takes precedence)
11/12 . . with frictionally-engaging wheels (B62M 11/14 takes precedence)
11/14 . . with planetary gears
11/16 . . . built in, or adjacent to, the ground-wheel hub
11/18 . . . with a plurality of planetary gear units

13/00 Transmissions characterised by use of friction rollers engaging the periphery of the ground wheel (for rider propelled cycles with additional source of power B62M 6/35, B62M 6/75) **[1,2010.01]**
13/02 . with changeable ratio, e.g. with roller of varying diameter
13/04 . with means for moving roller into driving contact with ground wheel

15/00 Transmission characterised by use of crankshafts and coupling-rods

17/00 Transmissions characterised by use of rotary shaft, e.g. cardan shaft

19/00 Transmissions characterised by use of non-mechanical gearing, e.g. fluid gearing

21/00 Transmissions characterised by use of resilient elements therein

23/00 Transmissions characterised by use of other elements; **Other transmissions**
23/02 . characterised by the use of two or more dissimilar sources of power, e.g. transmissions for hybrid motorcycles (transmissions for wheeled vehicles using rider propulsion with additional source of power B62M 6/00) **[1,2010.01]**

25/00 Actuators for gearing speed-change mechanisms specially adapted for cycles (rider-operated controls for cycles in general B62K 23/00; gearing speed-change mechanisms F16H)
25/02 . with mechanical transmitting systems, e.g. cables, levers
25/04 . . hand actuated
25/06 . . foot actuated
25/08 . with electrical or fluid transmitting systems

27/00 Propulsion devices for sledges or the like (pushed or pulled by persons or animals B62B, B62C; wind propulsion B62B 15/00)
27/02 . power driven

29/00 Ground-engaging propulsion devices for cycles, sledges, or rider-propelled wheeled vehicles, not otherwise provided for
29/02 . using ground-engaging rods

B63 SHIPS OR OTHER WATERBORNE VESSELS; RELATED EQUIPMENT

B63B SHIPS OR OTHER WATERBORNE VESSELS; EQUIPMENT FOR SHIPPING (air-cushion vehicles B60V; arrangements of vessel ventilation, heating, cooling, or air-conditioning B63J 2/00) **[2]**

Subclass index

1/00 Hydrodynamic or hydrostatic features of hulls or of hydrofoils (hulls peculiar to submarines B63B 3/13; keels B63B 3/38; determining hydrodynamic or hydrostatic features B63B 9/00; decreasing pitch, roll, or like unwanted vessel movements by using foils acting on ambient water B63B 39/06)

- 1/02 . deriving lift mainly from water displacement (B63B 1/16 takes precedence)
- 1/04 . . with single hull
- 1/06 . . . Shape of fore part
- 1/08 . . . Shape of aft part
- 1/10 . . with multiple hulls
- 1/12 . . . the hulls being interconnected rigidly
- 1/14 . . . the hulls being interconnected resiliently
- 1/16 . deriving additional lift from hydrodynamic forces
- 1/18 . . of hydroplane type (controlling submarine attitude or depth by hydroplanes B63G 8/18)
- 1/20 . . . having more than one planing surface (B63B 1/22 takes precedence)
- 1/22 . . . with adjustable planing surfaces
- 1/24 . . of hydrofoil type
- 1/26 . . . having more than one hydrofoil (B63B 1/28 takes precedence)
- 1/28 . . . with movable hydrofoils
- 1/30 . . . . retracting or folding
- 1/32 . Other means for varying the inherent hydrodynamic characteristics of hulls
- 1/34 . . by reducing surface friction
- 1/36 . . . using mechanical means
- 1/38 . . . using air bubbles or air layers
- 1/40 . . by diminishing wave resistance

3/00 Constructions of hulls (non-metallic hulls B63B 5/00; designing, building, maintaining, or repairing methods B63B 9/00)

- 3/02 . Hulls assembled from prefabricated sub-units
- 3/04 . . with permanently-connected sub-units
- 3/06 . . . the sub-units being substantially identical
- 3/08 . . with detachably-connected sub-units
- 3/09 . Hulls constructed of non-magnetic metal
- 3/10 . Armoured hulls
- 3/12 . Frameless hulls
- 3/13 . Hulls built to withstand hydrostatic pressure when fully submerged, e.g. submarine hulls
- 3/14 . Hull parts (hull armour B63B 3/10)
- 3/16 . . Shells (ports or closures therefor B63B 19/00)
- 3/18 . . . characterised by being formed predominantly of parts that may be developed into plane surfaces
- 3/20 . . . of double type
- 3/22 . . . with corrugations
- 3/24 . . . Means for diminishing external ridges or protrusions
- 3/26 . . Frames
- 3/28 . . . of transverse type; Stringers
- 3/30 . . . . Bilge knees; Beam knees
- 3/32 . . . Web frames; Web beams
- 3/34 . . . of longitudinal type; Bulkhead connections
- 3/36 . . . Combined frame systems
- 3/38 . . Keels (movable keels B63B 41/00)
- 3/40 . . Stern posts; Stern frames
- 3/42 . . Shaft brackets
- 3/44 . . Bilge keels (stabilising aspect B63B 39/06)
- 3/46 . . Stems
- 3/48 . . Decks (planking B63B 5/06)
- 3/50 . . . of vaulted type
- 3/52 . . . Pillars; Deck girders
- 3/54 . . . Hatch openings
- 3/56 . . Bulkheads; Bulkhead reinforcements (arrangements of watertight doors B63B 43/24)
- 3/58 . . . with flat plating
- 3/60 . . . with curved or corrugated plating
- 3/62 . . Double bottoms; Tank tops
- 3/64 . . . Keelsons
- 3/66 . . Gratings
- 3/68 . . Panellings; Linings, e.g. for insulating purposes
- 3/70 . . Reinforcements for carrying localised loads, e.g. propulsion plant, guns

5/00 **Hulls characterised by their construction of non-metallic material**
5/02 . made predominantly of wood
5/04 . . Carcasses
5/06 . . Decks; Shells
5/08 . . . with single-layer planking
5/10 . . . with multiple-layer planking
5/12 . made predominantly of wood with metal reinforcement, i.e. composite construction
5/14 . made predominantly of concrete, e.g. reinforced
5/16 . . monolithic
5/18 . . built-up from elements
5/20 . . . in combination with elements of other materials
5/22 . . with reinforcing members external to shell
5/24 . made predominantly of plastics

7/00 **Collapsible, foldable, inflatable, or like vessels** (foldable pontoons B63B 35/36)
7/02 . comprising only rigid parts
7/04 . . sectionalised
7/06 . having parts of non-rigid material
7/08 . . inflatable (connection of valves to inflatable elastic bodies B60C 29/00)

9/00 **Methods of designing, building, maintaining, converting, refitting, repairing, or determining properties of, vessels, not otherwise provided for** (shuttering for building concrete vessels E04G) **[2]**
9/02 . using towing tanks or model basins for designing
9/04 . Rebuilding ships, e.g. increasing tonnage
9/06 . Methods of building hulls **[2]**
9/08 . Determining vessel properties with respect to stability or balance **[2]**

11/00 **Interior subdivision of hulls** (bulkhead space construction B63B 3/56)
11/02 . Arrangement of bulkheads, e.g. defining cargo spaces
11/04 . Constructional features of bunkers or ballast tanks, e.g. with elastic walls (cleaning of tanks B63B 57/00)
11/06 . Propeller-shaft tunnels

13/00 **Conduits for emptying or ballasting**; **Self-bailing equipment**; **Scuppers** (draining means for hatches B63B 19/26; centrifugal bilge-water separators B04; pipes in general F16L)
13/02 . Ports for passing water through vessels' sides

15/00 **Superstructures**; **Arrangements or adaptations of masts** (loading or unloading equipment B63B 27/00; sails, running rigging B63H; masts or staying in general E04H)
15/02 . Staying of masts or of other superstructures

17/00 **Vessels parts, details, or accessories, not otherwise provided for**
17/02 . Awnings
17/04 . Stanchions; Guard-rails
17/06 . Refuse discharge, e.g. for ash (removal of domestic or like refuse B65F)

19/00 **Arrangements or adaptations of ports, doors, windows, port-holes, or other openings or covers** (scuppers B63B 13/00; arrangements of watertight doors in bulkheads B63B 43/24)
19/02 . Clear-view screens
19/04 . Air-catching equipment related to windows or port-holes (ventilation B63J 2/00)
19/06 . . readily detachable
19/08 . Ports or like openings in vessels' sides
19/10 . . Coal ports
19/12 . Hatches; Hatchways (hatch coamings B63B 3/54)
19/14 . . Hatch covers (opening devices in general E05F)
19/16 . . . with detachable boards
19/18 . . . slidable
19/19 . . . foldable **[3]**
19/197 . . . . actuated by fluid pressure **[3]**
19/203 . . . . actuated by cables or the like **[3]**
19/21 . . . of roll-up type **[3]**
19/22 . . Hatch beams
19/24 . . Hatch fastenings, e.g. cleats
19/26 . . Gaskets; Draining means
19/28 . . Other safety devices

21/00 **Tying-up**; **Shifting, towing, or pushing equipment**; **Anchoring** (dynamic anchoring B63H 25/00; equipment for shipping on coasts, in harbours or on other fixed marine structures, e.g. for landing purposes, E02B) **[4]**
21/02 . Magnetic mooring equipment
21/04 . Fastening or guiding equipment for chains, ropes, hawsers, or the like
21/06 . . Bollards
21/08 . . Clamping devices (in general F16B)
21/10 . . Fairleads
21/12 . . Rat guards
21/14 . . Hawse-holes; Hawse-pipes; Hawse-hole closures
21/16 . using winches (winches per se B66D)
21/18 . Stoppers for anchor chains
21/20 . Adaptations of chains, ropes, hawsers, or the like, or of parts thereof (chains, ropes or hawsers in general, see the relevant subclasses, e.g. F16G)
21/22 . Handling or lashing anchors
21/24 . Anchors
21/26 . . securing to bed
21/27 . . . by suction **[2]**
21/28 . . . driven-in by explosive charge
21/29 . . . by weight, e.g. flukeless weight anchors **[2]**
21/30 . . rigid when in use **[3]**
21/32 . . . with one fluke
21/34 . . . with two or more flukes
21/36 . . . . foldable
21/38 . . pivoting when in use **[3]**
21/40 . . . with one fluke
21/42 . . . . of ploughshare type
21/44 . . . with two or more flukes
21/46 . . with variable, e.g. sliding, connection to chain **[2]**
21/48 . . Sea-anchors; Drogues
21/50 . Anchoring arrangements for special vessels, e.g. for floating drilling platforms or dredgers
21/54 . Boat-hooks or the like
21/56 . Towing or pushing equipment (tugs B63B 35/66)
21/58 . . Adaptations of hooks for towing; Towing-hook mountings (hooks in general F16B)
21/60 . . . Quick releases
21/62 . . characterised by moving of more than one vessel (rigid interconnections between pontoons B63B 35/38)

21/64 . . Equipment for towing or pushing vessels by vehicles or beings moving forward on ground-based paths along water-way (boat-hooks or the like B63B 21/54; shore- or ground-based equipment per se, e.g. vehicles, rails, see the relevant classes) **[2]**

21/66 . . Equipment specially adapted for towing underwater objects or vessels, e.g. fairings for tow-cables (salvaging underwater vessels or objects B63C 7/00; towed underwater vessels B63G 8/42) **[3]**

22/00 **Buoys** (means for indicating the location of underwater objects B63C 7/26; life-buoys, e.g. rings, B63C 9/08) **[4]**

22/02 . specially adapted for mooring a vessel **[4]**

22/04 . Anchoring arrangements **[4]**

22/06 . . with means to cause the buoy to surface in response to a transmitted signal **[4]**

22/08 . . having means to release or urge to the surface a buoy on submergence thereof, e.g. to mark location of a sunken object **[4]**

22/10 . . . Water soluble or water weakened means, i.e. buoy released by buoy-to-object securing means being destroyed on contact with water **[4]**

22/12 . . . the surfacing of the buoy being assisted by a gas released or generated on submergence of the buoy **[4]**

22/14 . . . Buoy-to-object securing means responsive to hydrostatic pressure **[4]**

22/16 . specially adapted for marking a navigational route (signalling or lighting devices B63B 45/00) **[4]**

22/18 . having means to control attitude or position, e.g. reaction surfaces or tether **[4]**

22/20 . . Ballast means **[4]**

22/22 . inflatable, including gas generating means (B63B 22/12 takes precedence; connection of valves to inflatable elastic bodies B60C 29/00) **[4]**

22/24 . container type, i.e. having provision for the storage of material **[4]**

22/26 . . having means to selectively release contents, e.g. swivel couplings (arrangements between ships and off-shore structures for loading or unloading, using pipe-lines B63B 27/34; pipe joints or couplings, in general F16L) **[4]**

22/28 . . submerged when not in use **[4]**

23/00 **Equipment for handling lifeboats or the like**

23/02 . Davits, i.e. devices having arms for lowering boats by cables or the like

23/04 . . with arms pivoting on substantially-horizontal axes, e.g. gravity type

23/06 . . . with actual pivots

23/08 . . . . the arms being articulated

23/10 . . . . with positive drive of the arms

23/12 . . . with simulated pivots

23/14 . . . . using linkages

23/16 . . . . using guide tracks

23/18 . . with arms pivoting on substantially-vertical axes

23/20 . . . Davits with single arms (cranes in general B66C)

23/22 . . . . Slings or the like therefor

23/24 . . . Slewing equipment therefor

23/26 . . with rectilinear translation of boat before lowering

23/28 . Devices for projecting or releasing boats for free fall

23/30 . Devices for guiding boats to water surface

23/32 . . Rigid guides, e.g. having arms pivoted near waterline

23/34 . . Guiding means for lowering by cables, e.g. for listing ships

23/36 . . . Skid fenders

23/38 . Transport of boats to davits or the like

23/40 . Use of lowering or hoisting gear

23/42 . . with braking equipment

23/44 . . . on the ship

23/46 . . . in the boat

23/48 . . using winches for boat handling (winches per se B66D)

23/50 . . . with tensioning gear

23/52 . . . with control of winches from boat

23/54 . . with trimming equipment

23/56 . . . controlled from boat

23/58 . . with tackle-engaging or release gear

23/60 . . Additional connections between boat and davit

23/62 . Fastening or storing of boats on deck

23/64 . . Lashings; Covers

23/66 . . Blocks; Chocks

23/68 . . . for stacking boats

23/70 . Condition-responsive handling equipment, e.g. automatic release of boat from lowering tackle upon contact with water **[4]**

25/00 **Load-accommodating arrangements, e.g. stowing, trimming**; **Vessels characterised thereby** (constructive aspects of cargo-spaces B63B 11/00; hatches, hatchways B63B 19/12; trimming otherwise than by cargo division. e.g. by use of ballast, B63B 43/06, B63B 43/08)

25/02 . for bulk goods

25/04 . . solid

25/06 . . . for cereals

25/08 . . fluid

25/10 . . . open to ambient air

25/12 . . . closed

25/14 . . . . pressurised

25/16 . . . . heat-insulated (insulating panellings B63B 3/68; heating or cooling B63J)

25/18 . Detachable decks

25/20 . . for motor vehicles or the like

25/22 . for palletised articles

25/24 . Means for preventing unwanted cargo movement, e.g. dunnage

25/26 . for frozen goods

25/28 . for deck loads

27/00 **Arrangement of ship-based loading or unloading equipment for cargo or passengers** (self-discharging barges or lighters B63B 35/30; shore-based equipment B65G 67/60; elevators, escalators or moving walkways per se B66B; floating cranes B66C 23/52; loading or unloading devices per se, see the relevant subclasses, e.g. B65G, B66C, B67D) **[3]**

Note

Groups B63B 27/30 to B63B 27/36 take precedence over groups B63B 27/04 to B63B 27/28. **[3]**

27/04 . of derricks (derricks per se B66C 23/60) **[3]**

27/08 . of winches (winches per se B66D) **[3]**

27/10 . of cranes (cranes per se B66C) **[3]**

27/12 . . of gantry type **[3]**

27/14 . of ramps, gangways or outboard ladders (inboard ladders B63B 29/20; loading ramps per se B65G 69/28; ladders per se E06C) **[3]**
27/16 . of lifts or hoists **[3]**
27/18 . of cableways, e.g. with breeches-buoys (cableways per se B65G) **[3]**
27/22 . of conveyers, e.g. of endless-belt or screw-type (arrangement of devices with throwing action B63B 27/26; arrangement of chutes B63B 27/28; conveyers per se B65G) **[3,6]**
27/24 . of pipe-lines (pipe-lines per se F17D) **[3]**
27/25 . . for fluidised bulk material **[3]**
27/26 . of devices with throwing action (mechanical throwing machines for articles or solid materials per se B65G 31/00) **[3]**
27/28 . of chutes (chutes per se B65G 11/00) **[3]**
27/30 . for transfer at sea between ships or between ships and off-shore structures **[3]**
27/32 . . using cableways **[3]**
27/34 . . using pipe-lines **[3]**
27/36 . for floating cargo (devices for facilitating retrieval of floating objects per se B66C 13/02) **[3]**

29/00 Accommodation for crew or passengers not otherwise provided for

29/02 . Cabins or other living spaces; Construction or arrangement thereof
29/04 . . Furniture peculiar to vessels (floatable furniture B63C 9/30)
29/06 . . . Fastening to floors
29/08 . . . Storm guards on tables, e.g. fiddles
29/10 . . . Berths; Mounting ladders therefor
29/12 . . . Self-levelling mountings
29/14 . . Closet or like flushing arrangements; Washing or bathing facilities peculiar to ships
29/16 . Soil-water discharges
29/18 . Arrangements or adaptations of swimming pools
29/20 . Arrangements or adaptations of ladders (mounting ladders for berths B63B 29/10)
29/22 . Galleys **[2]**

35/00 Vessels or like floating structures adapted for special purposes (vessels characterised by load-accommodating arrangements B63B 25/00; fire-fighting vessels A62C 29/00; submarines, mine-layers, or mine-sweepers B63G; large containers for use in or under water B65D 88/78) **[5]**

35/03 . Pipe-laying vessels (laying pipes under water F16L 1/12) **[5]**
35/04 . Cable-laying vessels **[5]**
35/06 . . for moving cable-ends from ship to shore **[5]**
35/08 . Ice-breakers **[5]**
35/10 . . having forced pitching or rolling equipment **[5]**
35/12 . . having ice-cutters **[5]**
35/14 . Fishing vessels (fishing A01K 69/00 to A01K 97/00) **[5]**
35/16 . . Trawlers **[5]**
35/18 . . . adapted to dragging nets aboard **[5]**
35/20 . . . adapted to hoisting nets aboard **[5]**
35/22 . . Whale catchers; Whale factory vessels **[5]**
35/24 . . Fish holds **[5]**
35/26 . . . for live fish **[5]**
35/28 . Barges or lighters **[5]**
35/30 . . self-discharging **[5]**
35/32 . for collecting pollution from open water **[5]**

Note

If the apparatus for collecting pollution from open water is of interest apart from ship construction aspects, it is also classified in group E02B 15/00. **[5]**

35/34 . Pontoons (floating bridges E01D 15/14) **[5]**
35/36 . . foldable **[5]**
35/38 . . Rigidly-interconnected pontoons **[5]**
35/40 . for transporting marine vessels **[5]**
35/42 . . with adjustable draught **[5]**
35/44 . Floating buildings, stores, drilling platforms, or workshops, e.g. carrying water-oil separating devices **[5]**
35/50 . Vessels or floating structures for aircraft (aircraft carriers B63G 11/00; flying-boat hulls, other flotation means for aircraft B64) **[5]**
35/52 . . Nets, slipways or the like, for recovering aircraft from the water **[5]**
35/53 . . Floating runways **[3,5]**
35/54 . Ferries (propulsion of chain ferries B63H) **[5]**
35/56 . Lightships (marking of navigational route B63B 51/00) **[5]**
35/58 . Rafts, i.e. free floating waterborne vessels, of shallow draft, with little or no freeboard, and having a platform or floor for supporting a user (lifeboats, life-rafts or the like B63C 9/02) **[4,5]**
35/607 . . having a platform or floor below the level of the buoyancy means, e.g. suspended basket type **[4,5]**
35/613 . . with tubular shaped flotation members **[4,5]**
35/62 . . formed from logs or the like **[4,5]**
35/66 . Tugs (towing or pushing equipment B63B 21/56) **[5]**
35/68 . . for towing **[5]**
35/70 . . for pushing **[5]**
35/71 . Canoes, kayaks or the like (collapsible, foldable, inflatable or like vessels B63B 7/00) **[4,5]**
35/73 . Other vessels or like floating structures for pleasure or sport **[5]**
35/74 . . Body supporting buoyant devices with seat **[4,5]**
35/76 . . . Ring-shaped buoyant member **[4,5]**
35/78 . . . U-shaped buoyant member **[4,5]**
35/79 . . Surf-boards, e.g. sailboards **[5]**
35/81 . . Water skis; Water sledges **[5]**
35/83 . . Water shoes; Bog shoes **[5]**
35/85 . . Accessories not otherwise provided for, e.g. sticks for water skiing **[5]**

38/00 Vessels or like floating structures not otherwise provided for (vessels characterised by load-accommodating arrangements B63B 25/00; fire-extinguishing vessels A62C 29/00; submarines, mine-layers or mine-sweepers B63G; large containers for use in or under water B65D 88/78) **[5]**

39/00 Equipment to decrease pitch, roll, or like unwanted vessel movements; **Apparatus for indicating vessel attitude**

39/02 . to decrease vessel movements by displacement of masses **[2]**
39/03 . . by transferring liquids **[2]**
39/04 . to decrease vessel movements by using gyroscopes directly
39/06 . to decrease vessel movements by using foils acting on ambient water (constructional aspects of bilge keels B63B 3/44)

39/08 . to decrease vessel movements by using auxiliary jets or propellers (using auxiliary jets or propellers for steering or dynamic anchoring B63H 25/00)

39/10 . to decrease vessel movements by damping the waves, e.g. by pouring oil on water **[2]**

39/12 . for indicating draught or load

39/14 . for indicating inclination or duration of roll

41/00 **Drop keels, e.g. centre boards, side boards** (keels integral with hull B63B 3/38; stabilising foils B63B 39/06)

43/00 **Improving safety of vessels, e.g. damage control, not otherwise provided for** (fire-fighting in ships A62C 3/10)

43/02 . reducing risk of capsizing or sinking (by means of watertight doors in bulkheads B63B 43/24)

43/04 . . by improving stability

43/06 . . . using ballast tanks (conduits for emptying or ballasting B63B 13/00)

43/08 . . . by transfer of solid ballast

43/10 . . by improving buoyancy

43/12 . . . using inboard air containers

43/14 . . . using outboard floating members

43/16 . . . Temporary equipment for stopping leaks, e.g. collision mats

43/18 . preventing collision; reducing collision damage

43/20 . . Feelers

43/24 . Arrangements of watertight doors in bulkheads

43/26 . . of sliding type

43/28 . . . with mechanical drive

43/30 . . . with fluid drive

43/32 . . of non-sliding type

45/00 **Arrangement or adaptation of signalling or lighting devices** (arrangement of signalling or lighting devices, the mounting or supporting thereof or circuits therefor, for vehicles in general B60Q; life-buoys, -belts, -jackets, -suits or the like, characterised by signalling means B63C 9/20; lighting devices or systems therefor F21L, F21S) **[4]**

45/02 . the devices being intended to illuminate the way ahead or other areas of environments

45/04 . the devices being intended to indicate the vessel or parts thereof

45/06 . the devices being intended to illuminate vessels' decks or interior

45/08 . the devices being acoustic

49/00 **Arrangements of nautical instruments or navigational aids** (nautical measuring instruments G01C; radio navigation, analogous arrangements using other waves G01S)

51/00 **Marking of navigational route other than with buoys** (buoys specially adapted for marking a navigational route B63B 22/16) **[4]**

51/02 . with anchored lightships; by use of lighthouses **[4]**

51/04 . with free-floating flares

57/00 **Tank cleaning specially adapted for vessels** (tank cleaning in general B08B 9/08)

57/02 . by washing

57/04 . by ventilating

59/00 **Hull protection peculiar to vessels**; **Cleaning devices peculiar to vessels** (cleaning in general B08B; cleaning of vehicles in general, e.g. windscreen wipers, B60S; inhibiting corrosion of metals by anodic or cathodic protection C23F 13/00)

59/02 . Fenders integral with waterborne vessels or specially adapted therefor; Rubbing-strakes (fenders on coasts, in harbours or on other fixed marine structures E02B 3/26)

59/04 . Preventing hull fouling (anti-fouling paints C09D 5/16) **[3]**

59/06 . Cleaning devices for hulls **[3]**

59/08 . . of underwater surfaces while afloat (B63B 59/10 takes precedence) **[3]**

59/10 . . using trolleys or the like driven along the surface **[3]**

B63C **LAUNCHING, HAULING-OUT, OR DRY-DOCKING OF VESSELS**; **LIFE-SAVING IN WATER**; **EQUIPMENT FOR DWELLING OR WORKING UNDER WATER**; **MEANS FOR SALVAGING OR SEARCHING FOR UNDERWATER OBJECTS** (floating nets, floating slipways, or the like for recovering aircraft from the water B63B 35/52)

Subclass index

1/00 **Dry-docking of vessels or flying-boats** (storing of vessels on land otherwise than by dry-docking B63C 15/00; mooring of vessels B63B 21/00; hydraulic-engineering aspects E02B)

1/02 . Floating dry-docks (ship transporters with adjustable draught B63B 35/42)

1/04 . . self-docking

1/06 . . Arrangements of pumping or filling equipment for raising or lowering docks

1/08 . Dry docks (locks E02C 1/00) **[2]**

1/10 . Centring devices

1/12 . Docks adapted for special vessels, e.g. submarines

3/00 **Launching or hauling-out, e.g. by landborne slipways**; **Slipways** (ship-borne guides for handling lifeboats or the like B63B 23/30; cranes, winches, or the like B66; ship-lifting for adapting to different water levels E02C)

3/02 . by longitudinal movement of vessel

3/04 . by sideways movement of vessel

3/06 . by vertical movement of vessel, e.g. by crane

3/08 . Tracks on slipways

3/10 . using releasing devices

3/12 . using cradles (vehicles in general for transporting boats or the like B60P)

3/14 . using braking means

5/00 **Equipment usable both on slipways and in dry docks**

5/02 . Stagings; Scaffolding; Shores or struts

5/04 . . Bilge or keel blocks

7/00 **Salvaging of disabled, stranded, or sunken vessels**; **Salvaging of vessel parts or furnishings, e.g. of safes**; **Salvaging of other underwater objects** (means for searching for underwater objects B63C 11/48)

7/02 . in which the lifting is done by hauling

7/04 . . using pontoons or the like

7/06 . in which lifting action is generated in, or adjacent to, vessels or objects

7/08 . . using rigid floats

7/10 . . using inflatable floats external to vessels or objects

7/12 . . by bringing air or floating bodies or material into vessels or objects

7/14 . using freezing for closing holes or for strengthening the vessel or the like

7/16 . Apparatus engaging vessels or objects

7/18 . . using nets

7/20 . . using grabs

7/22 . . using electromagnets or suction devices

7/24 . Apparatus for passing chains or the like under vessels or objects

7/26 . Means for indicating the location of underwater objects, e.g. sunken vessels (means for searching for underwater objects B63C 11/48; buoys in general B63B 22/00)

7/28 . Refloating stranded vessels

7/30 . Floatable safes (safes in general E05G)

9/00 **Life-saving in water** (life-saving in general A62B; arrangement or adaptation of signalling or lighting devices for ships, other waterborne vessels or for equipment for shipping B63B 45/00; rescue equipment specially adapted for submarine personnel B63G 8/40)

9/01 . Air-sea rescue devices, i.e. equipment carried by, and capable of being dropped from, an aircraft (inflatable vessels B63B 7/00; inflatable buoys B63B 22/22) **[5]**

9/02 . Lifeboats, life-rafts or the like, specially adapted for life-saving (B63C 9/01 takes precedence; floatable furniture B63C 9/30; boats in general B63B; inflatable vessels B63B 7/00; equipment for handling lifeboats or the like B63B 23/00; rafts B63B 35/58) **[4,5]**

9/03 . . enclosed **[5]**

9/04 . . Life-rafts

9/05 . Shark screens, e.g. buoyant means combined with means to surround or otherwise enclose the user (B63C 9/06 takes precedence) **[5]**

9/06 . Floatable closed containers with accommodation for one or more persons inside (B63C 9/01 takes precedence) **[5]**

9/08 . Life-buoys, e.g. rings; Life-belts, jackets, suits, or the like (B63C 9/01 takes precedence; equipment for swimming A63B, e.g. swimming aids A63B 31/00) **[5]**

9/087 . . Body suits, i.e. substantially covering the user's body (diving suits B63C 11/04, B63C 11/10) **[5]**

9/093 . . . using solid buoyant material **[5]**

9/105 . . . having gas-filled compartments (connection of valves to inflatable elastic bodies B60C 29/00) **[5]**

9/11 . . covering the torso, e.g. harnesses **[5]**

9/115 . . . using solid buoyant material **[5]**

9/125 . . . having gas-filled compartments (connection of valves to inflatable elastic bodies B60C 29/00) **[5]**

9/13 . . attachable to a body member, e.g. arm, neck, head or waist **[5]**

9/135 . . . using solid buoyant material **[5]**

9/15 . . . having gas-filled compartments (connection of valves to inflatable elastic bodies B60C 29/00) **[5]**

9/18 . . Inflatable equipment characterised by the gas-generating device **[5]**

9/19 . . . Arrangements for puncturing gas-generating cartridges **[5]**

9/20 . . characterised by signalling means, e.g. lights (arrangement or adaptation of signalling or lighting devices for ships or other waterborne vessels B63B 45/00)

9/22 . Devices for holding or launching life-buoys, inflatable life-rafts, or other floatable life-saving equipment (equipment for handling life-boats or the like B63B 23/00)

9/23 . . Containers for inflatable life-saving equipment **[5]**

9/26 . Cast or life lines; Attachments thereto; Containers therefor (adaptations of aerial cableways to shipboard use B63B 27/18; guns for line-throwing F41F; line-carrying missiles F42B 12/68)

9/28 . Adaptations of vessel parts or furnishings to life-saving purposes

9/30 . . Floatable furniture

9/32 . Equipment adapted to use on ice

11/00 **Equipment for dwelling or working under water**; **Means for searching for underwater objects** (composition of chemical substances for use in breathing apparatus A62D 9/00; swimming aids or equipment A63B 31/00 to A63B 35/00; submarines B63G 8/00)

11/02 . Divers' equipment

11/04 . . Resilient suits

11/06 . . . with rigid helmet

11/08 . . . Control of air pressure within suit, e.g. for controlling buoyancy

11/10 . . Rigid suits

11/12 . . Diving masks (swimming helmets, swimming goggles A63B 33/00)

11/14 . . . with forced air supply

11/16 . . . with air supply by suction from diver, e.g. schnorkels

11/18 . . Air supply (for diving masks B63C 11/14, B63C 11/16; respiratory apparatus in general A62B)

11/20 . . . from water surface

11/22 . . . carried by diver

11/24 . . . . in closed circulation

11/26 . . Communication means (electric communication in general H04)
11/28 . . Heating, e.g. of divers' suits, of breathing air
11/30 . . Ballast
11/32 . . Decompression arrangements; Exercise equipment
11/34 . Diving chambers with mechanical link, e.g. cable, to a base (manipulators B25J; diving chambers without mechanical link to a base B63G 8/00; caissons adapted to laying foundations E02D 23/00 to E02D 27/00)
11/36 . . of closed type
11/38 . . . with entrance above water surface
11/40 . . . adapted to specific work
11/42 . . . with independent propulsion or directional control
11/44 . . of open type, e.g. diving-bells
11/46 . Divers' sleds or like craft, i.e. craft on which man in diving-suit rides
11/48 . Means for searching for underwater objects (means for indicating the location of sunken objects B63C 7/26; locating by use of the reflection or reradiation of radio or other waves G01S)
11/49 . . Floating structures with underwater viewing devices, e.g. with windows **[5]**
11/50 . . using grapnels
11/52 . Tools specially adapted for working underwater, not otherwise provided for **[3]**

13/00 Equipment forming part of, or attachable to, vessels, facilitating transport over land (harnesses attachable to vessels for personal carrying A45F; amphibious craft, land vehicles convertible for use on water B60F; land vehicles for carrying boats B60P)

15/00 Storing of vessels on land otherwise than by dry-docking

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B63G OFFENSIVE OR DEFENSIVE ARRANGEMENTS ON VESSELS; **MINE-LAYING**; **MINE-SWEEPING**; **SUBMARINES**; **AIRCRAFT CARRIERS** (means of attack or defence in general, e.g. turrets, F41H)

Subclass index

1/00 Arrangements of guns or missile launchers; **Vessels characterised thereby** (submarines B63G 8/00; guns, missile launchers F41)

3/00 Arrangements of ammunition stores or handlers (specially for submarines B63G 8/00; feeding ammunition missiles or projectiles to guns in general F41A 9/00); **Vessels characterised thereby** (general cargo aspects B63B)
3/02 . for torpedoes
3/04 . for missiles
3/06 . for mines or depth charges

5/00 Vessels characterised by adaptation to torpedo-launching (submarines B63G 8/00; torpedo-launching per se F41F 3/00)

6/00 Laying of mines or depth charges; **Vessels characterised thereby** (arrangements on submarines for mine-laying B63G 8/33) **[2]**

7/00 Mine-sweeping; **Vessels characterised thereby**
7/02 . Mine-sweeping means; Means for destroying mines
7/04 . . by means of cables
7/06 . . of electromagnetic type
7/08 . . of acoustic type

8/00 Underwater vessels, e.g. submarines (submarine hulls B63B 3/13; diving chambers with mechanical link, e.g. cable, to a base B63C 11/34; divers' sleds B63C 11/46; torpedoes F42B 19/00)
8/04 . Superstructure
8/06 . . Conning-towers
8/08 . Propulsion (nuclear propulsion B63H 21/18; submerged exhausting apparatus F01N 13/12; propulsion power plants or units per se, see the relevant classes)
8/10 . . using steam plant
8/12 . . using internal-combustion engines
8/14 . Control of attitude or depth (of torpedoes F42B 19/00)
8/16 . . by direct use of propellers or jets
8/18 . . by hydroplanes
8/20 . . Steering equipment (B63G 8/16, B63G 8/18 take precedence; steering of vessels in general B63H 25/00) **[2]**
8/22 . . Adjustment of buoyancy by water ballasting; Emptying equipment for ballast tanks (stabilising vessels using ballast tanks B63B 43/06)
8/24 . . Automatic depth adjustment; Safety equipment for increasing buoyancy, e.g. detachable ballast, floating bodies
8/26 . . Trimming equipment
8/28 . Arrangement of offensive or defensive equipment
8/30 . . of artillery or missile-launching means
8/32 . . of torpedo-launching means (torpedo-launching means per se F41F 3/00); of torpedo stores or handlers **[2]**
8/33 . . of mine-laying means (mine-laying vessels other than submarines B63G 6/00) **[2]**
8/34 . . Camouflage (for other vessels B63G 13/02; in general F41H 3/00)

8/36 . Adaptations of ventilation, cooling, heating, or air-conditioning (reconditioning air in sealed chambers A62B 11/00; for vessels in general B63J 2/00; air-conditioning in general F24F)

8/38 . Arrangement of visual or electronic watch equipment, e.g. of periscopes, of radar

8/39 . Arrangements of sonic watch equipment, e.g. low-frequency, sonar

8/40 . Rescue equipment for personnel (life-saving in water, not specially adapted for submarine personnel B63C)

8/41 . . Capsules, chambers, water-tight boats, or the like, detachable from the submarine **[2]**

8/42 . Towed underwater vessels **[2]**

9/00 Other offensive or defensive arrangements on vessels against submarines, torpedoes, or mines

9/02 . Means for protecting vessels against torpedo attack (armoured hulls B63B 3/10)

9/04 . . Nets or the like (net barriers for harbour defence F41H 11/00)

9/06 . for degaussing vessels (demagnetising in general H01F 13/00)

11/00 Aircraft carriers, i.e. warships equipped with a flight deck on which airplanes can be launched and landed and with a hangar deck for servicing airplanes (other vessels or floating structures for aircraft B63B 35/50; aircraft-carrier-deck installations B64F 1/00)

13/00 Other offensive or defensive arrangements on vessels; **Vessels characterised thereby**

13/02 . Camouflage (for submarines B63G 8/34; in general F41H 3/00) **[2]**

B63H MARINE PROPULSION OR STEERING (propulsion of air-cushion vehicles B60V 1/14; peculiar to submarines, other than nuclear propulsion, B63G; peculiar to torpedoes F42B 19/00)

Subclass index

1/00 Propulsive elements directly acting on water (jet propulsion B63H 11/00; attachment of propellers on shafts B63H 23/34)

1/02 . of rotary type (endless-track type B63H 1/34)

1/04 . . with rotation axis substantially at right angles to propulsive direction, e.g. paddle wheels

1/06 . . . with adjustable vanes or blades

1/08 . . . . with cyclic adjustment

1/10 . . . . . with blades extending axially from a disc-shaped rotary body

1/12 . . with rotation axis substantially in propulsive direction

1/14 . . . Propellers (pitch changing B63H 3/00)

1/15 . . . . having vibration damping means (anti-vibration mounting of propulsion plant B63H 21/30; means for damping vibration in general F16F) **[4]**

1/16 . . . . having a shrouding ring attached to blades

1/18 . . . . with means for diminishing cavitation, e.g. supercavitation

1/20 . . . . Hubs; Blade connections

1/22 . . . . . the blades being foldable

1/24 . . . . . automatically foldable or unfoldable

1/26 . . . . Blades

1/28 . . . . Other means for improving propeller efficiency (water-guiding elements formed by shape of hull B63H 5/00)

1/30 . of non-rotary type

1/32 . . Flaps, pistons, or the like, reciprocating in propulsive direction

1/34 . . of endless-track type

1/36 . . Swinging flaps, e.g. fishtail type **[4]**

1/37 . . Moving-wave propellers, i.e. wherein the propelling means comprise a flexible undulating structure **[4]**

1/38 . characterised solely by flotation properties, e.g. drums

3/00 Propeller-blade pitch changing

3/02 . actuated by control element coaxial with propeller shaft, e.g. the control element being rotary

3/04 . . the control element being reciprocatable

3/06 . characterised by use of non-mechanical actuating means, e.g. electrical

3/08 . . fluid

3/10 . characterised by having pitch control conjoint with propulsion-plant control

3/12 . the pitch being adjustable only when propeller is stationary

5/00 Arrangements on vessels of propulsion elements directly acting on water

5/02 . of paddle wheels, e.g. of stern wheels

5/03 . . movably mounted with respect to the hull, e.g. having means to reposition paddle wheel assembly, or to retract paddle or to change paddle attitude **[4]**

5/04 . . with stationary water-guiding elements

5/07 . of propellers (forming part of outboard propulsion units B63H 20/00) **[6]**

5/08 . . of more than one propeller

5/10 . . . of coaxial type, e.g. of counter-rotative type

5/125 . . movably mounted with respect to hull, e.g. adjustable in direction (movably mounted for steering purposes only B63H 25/42) **[6]**

5/14 . . characterised by being mounted in non-rotating ducts or rings, e.g. adjustable for steering purposes (shrouding ring attached to blades B63H 1/16; jet propulsion B63H 11/00)

5/15 . . . Nozzles, e.g. Kort-type **[4]**

5/16 . . characterised by being mounted in recesses; with stationary water-guiding elements; Means to prevent fouling of the propeller, e.g. guards, cages or screens (anti-fouling paints C09D 5/16)

5/18 . . of emergency propellers, e.g. arranged at the side of the vessel

5/20 . . . movable from a working position to a non-working position **[4]**

7/00 Arrangements of propulsive devices directly acting on air (jet propulsion B63H 11/00)

7/02 . using propellers (air-screws of aircraft type B64C)

9/00 Propulsive devices directly acted on by wind; **Arrangements thereof** (air-driven propellers driving underwater propulsive elements B63H 13/00)

9/02 . using Magnus effect

9/04 . using sails or like wind-catching surfaces (sailing sledges or ice boats B62B 15/00)

9/06 . . Construction or types of sails; Arrangements thereof on vessels

9/08 . . Connections of sails to masts, spars, or the like

9/10 . . . Spars; Running rigging, e.g. reefing equipment (staying of masts B63B 15/02)

11/00 Effecting propulsion by jets, i.e. reaction principle (steering by jet action B63H 25/46; power plant per se, see the relevant classes)

11/01 . having means to prevent foreign material from clogging fluid passageway **[4]**

11/02 . the propulsive medium being ambient water

11/04 . . by means of pumps

11/06 . . . of reciprocating type

11/08 . . . of rotary type

11/09 . . . by means of pressure pulses applied to a column of liquid, e.g. by ignition of an air/gas or vapour mixture **[4]**

11/10 . . having means for deflecting jet or influencing cross-section thereof

11/103 . . . having means to increase efficiency of propulsive fluid, e.g. discharge pipe provided with means to improve the fluid flow **[4]**

11/107 . . . Direction control of propulsive fluid **[4]**

11/11 . . . . with bucket or clamshell-type reversing means **[4]**

11/113 . . . . Pivoted outlet **[4]**

11/117 . . . . Pivoted vane **[4]**

11/12 . the propulsive medium being steam or other gas

11/14 . . the gas being produced by combustion

11/16 . . the gas being produced by other chemical processes

13/00 Effecting propulsion by wind motors driving water-engaging propulsive elements

15/00 Effecting propulsion by use of vessel-mounted driving mechanisms co-operating with anchored chains or the like

16/00 Effecting propulsion by muscle power (swimming frameworks with swimmer-operated driving mechanisms A63B 35/00; land-based training equipment for rowing or sculling A63B 69/06)

16/02 . Movable thwarts; Foot-rests

16/04 . Oars; Sculls; Paddles; Poles

16/06 . Rowlocks; Mountings therefor

16/067 . . Rowlocks mounted on a structure extending beyond the gunwale of the vessel **[4]**

16/073 . . having oar shaft restraining means **[4]**

16/08 . Other apparatus for converting muscle power into propulsive effort (general features of propulsion elements, see the relevant groups)

16/10 . . for bow-facing rowing

16/16 . . using reciprocating pull cable, i.e. a strand-like member movable alternately backward and forward **[4]**

16/18 . . using sliding handle or pedal, i.e. the motive force being transmitted to a propelling means by means of a lever operated by the hand or foot of the occupant **[4]**

16/20 . . using rotary cranking arm **[4]**

19/00 Effecting propulsion of vessels, not otherwise provided for

19/02 . by using energy derived from movement of ambient water, e.g. from rolling or pitching of vessels

19/04 . . propelled by water current

19/06 . by discharging gas into ambient water (with jet action B63H 11/12; for reducing surface friction B63B 1/38)

19/08 . by direct engagement with water-bed or ground

20/00 Outboard propulsion units, i.e. propulsion units having a substantially vertical power leg mounted outboard of a hull and terminating in a propulsion element, e.g. "outboard motors", Z-drives (power plants per se, see the relevant classes); **Arrangements thereof on vessels [6]**

20/02 . Mounting of propulsion units (B63H 20/08 takes precedence) **[6]**

20/04 . . in a well **[6]**

20/06 . . on an intermediate support **[6]**

20/08 . Means enabling movement of the position of the propulsion element, e.g. for trim, tilt, or steering (transmissions allowing movement of the propulsion element B63H 20/14); Control of trim or tilt (initiating means for steering B63H 25/02) **[6]**

20/10 . . Means enabling trim or tilt, or lifting of the propulsion element when an obstruction is hit; Control of trim or tilt **[6]**

20/12 . . Means enabling steering **[6]**

20/14 . Transmission between propulsion power unit and propulsion element **[6]**

20/16 . . allowing movement of the propulsion element in a horizontal plane only, e.g. for steering **[6]**

20/18 . . allowing movement of the propulsion element about a longitudinal axis, e.g. the through transom shaft (B63H 20/22 takes precedence) **[6]**

20/20 . . with provision for reverse drive **[6]**

20/22 . . allowing movement of the propulsion element about at least a horizontal axis without disconnection of the drive, e.g. using universal joints **[6]**

20/24 . Exhaust gas outlets **[6]**

20/26 . . passing through the propeller or its hub **[6]**

20/28 . Cooling-water intakes **[6]**

20/30 . . for flushing **[6]**

20/32 . Housings **[6]**

20/34 . . comprising stabilising fins **[6]**

20/36 . Transporting or testing stands; Protection of power legs **[6]**

21/00 **Use of propulsion power plant or units on vessels** (use of outboard propulsion units B63H 20/00; hull reinforcements for carrying propulsion power plant or units B63B 3/70; propulsion power plant or units per se, see the relevant classes) **[6]**

Note

This group covers:
- arrangements of propulsion power plant or units on vessels;
- to some extent, adaptations of such plant or units to facilitate such arrangements.

21/02 . the vessels being steam-driven (B63H 21/18 takes precedence)

21/04 . . relating to positive-displacement steam engines

21/06 . . relating to steam turbines

21/08 . . relating to steam boilers

21/10 . . relating to condensers or engine-cooling fluid heat-exchangers

21/12 . the vessels being motor-driven (B63H 21/175, B63H 21/18 take precedence) **[4]**

21/14 . . relating to internal-combustion engines

21/16 . . relating to gas turbines

21/165 . . by hydraulic fluid motor, i.e. wherein a liquid under pressure is utilised to rotate the propelling means **[4]**

21/17 . . by electric motor (electrically-propelled vehicles B60L) **[4]**

21/175 . the vessel being powered by land vehicle supported by vessel **[4]**

21/18 . the vessels being powered by nuclear energy

21/20 . the vessels being powered by combinations of different types of propulsion units

21/21 . Control means for engine or transmission, specially adapted for use on marine vessels **[4]**

21/22 . the propulsion power units being controlled from exterior of engine room, e.g. from navigation bridge; Arrangements of order telegraphs (order telegraphs per se G08B 9/00)

21/30 . Mounting of propulsion plant or unit, e.g. for anti-vibration purposes (hull reinforcements therefor B63B 3/70; vibration-dampers, suppression of vibration in systems F16F; engine beds F16M)

21/32 . Arrangements of propulsion power-unit exhaust uptakes; Funnels peculiar to vessels (engine exhausts in general F01N; flue devices for furnaces in general F23J)

21/34 . . having exhaust-gas deflecting means

21/36 . Covers or casing arranged to protect plant or unit from marine environment (hull construction B63B 3/00) **[4]**

21/38 . Apparatus or methods specially adapted for use on marine vessels, for handling power plant or unit liquids, e.g. lubricants, coolants, fuels or the like (lubricating or cooling engines in general F01 to F04) **[4]**

23/00 **Transmitting power from propulsion power plant to propulsive elements** (changing pitch of propellers B63H 3/00; adaptation of transmission to allow adjustment in direction of propellers B63H 5/125; transmission between wind motors and propulsive elements B63H 13/00, in outboard propulsion units B63H 20/14; adaptation of transmission to allow adjustment of location of propellers B63H 20/08; for vehicles in general B60K; driving auxiliary machinery B63J; transmission elements per se F16)

23/02 . with mechanical gearing

23/04 . . the main transmitting element, e.g. shaft, being substantially vertical

23/06 . . for transmitting drive from a single propulsion power unit

23/08 . . . with provision for reversing drive

23/10 . . for transmitting drive from more than one propulsion power unit (for synchronisation of propulsive elements B63H 23/28)

23/12 . . . allowing combined use of the propulsion power units

23/14 . . . . with unidirectional drive or where reversal is immaterial

23/16 . . . . characterised by provision of reverse drive

23/18 . . . for alternative use of the propulsion power units

23/20 . . . . with separate forward and astern propulsion power units, e.g. turbines

23/22 . with non-mechanical gearing

23/24 . . electric

23/26 . . fluid

23/28 . with synchronisation of propulsive elements

23/30 . characterised by use of clutches

23/32 . Other parts

23/34 . . Propeller shafts; Paddle-wheel shafts; Attachment of propellers on shafts (shafts in general F16C; attachment of a member on a shaft in general F16D 1/06)

23/35 . . . Shaft braking or locking, i.e. means to slow or stop the rotation of the propeller shaft or to prevent the shaft from initial rotation **[4]**

23/36 . . Shaft tubes (propeller-shaft tunnels B63B 11/06; shaft-tube seals F16J)

25/00 **Steering**; **Slowing-down otherwise than by use of propulsive elements** (using adjustably-mounted propeller ducts or rings for steering B63H 5/14; using movably-installed outboard propulsion units B63H 20/00); **Dynamic anchoring, i.e. positioning vessels by means of main or auxiliary propulsive elements** (anchoring, other than dynamic, B63B 21/00; equipment to decrease pitch, roll, or like unwanted vessel movements by auxiliary jets or propellers B63B 39/08)

25/02 . Initiating means for steering

25/04 . . automatic, e.g. reacting to compass

25/06 . Steering by rudders (by rudders carrying propellers B63H 25/42)

25/08 . . Steering gear

25/10 . . . with mechanical transmission

25/12 . . . with fluid transmission
25/14 . . . power assisted; power driven, i.e. using steering engine
25/16 . . . . with alternative muscle or power- operated steering
25/18 . . . . Transmitting of movement of initiating means to steering engine
25/20 . . . . . by mechanical means
25/22 . . . . . by fluid means
25/24 . . . . . by electrical means
25/26 . . . . Steering engines
25/28 . . . . . of fluid type
25/30 . . . . . hydraulic
25/32 . . . . . steam
25/34 . . . . Transmitting of movement of engine to rudder, e.g. using quadrants, brakes
25/36 . . Rudder-position indicators
25/38 . . Rudders (stern posts B63B 3/40)
25/40 . . . using Magnus effect
25/42 . Steering or dynamic anchoring by propulsive elements (by jets B63H 25/46); Steering or dynamic anchoring by propellers used therefor only; Steering or dynamic anchoring by rudders carrying propellers **[2]**
25/44 . Steering or slowing-down by extensible flaps or the like
25/46 . Steering or dynamic anchoring by jets **[2]**
25/48 . Steering or slowing-down by deflection of propeller slip-stream otherwise than by rudder
25/50 . Slowing-down means not otherwise provided for
25/52 . Parts for steering not otherwise provided for

B63J AUXILIARIES ON VESSELS

Note

In this subclass, the following term is used with the meaning indicated:
– "auxiliaries" means only apparatus specially arranged for rendering vessels, in general, habitable or operative, in so far as such apparatus is not specifically provided for in another subclass of class B63.

1/00 Arrangements of installations for producing fresh water, e.g. by evaporation and condensation of sea water

2/00 Arrangements of ventilation, heating, cooling, or air-conditioning (for vehicles in general B60H; ventilating for cleaning tanks B63B 57/04; for underwater vessels, e.g. submarines, B63G 8/36)
2/02 . Ventilation; Air-conditioning
2/04 . . of living spaces
2/06 . . of engine rooms
2/08 . . of holds (heating or cooling of liquid-freight-carrying tanks B63J 2/14; arrangements for stowing frozen goods in vessels B63B 25/26)
2/10 . . Ventilating-shafts; Air-scoops (for port-holes B63B 19/04)
2/12 . Heating; Cooling
2/14 . . of liquid-freight-carrying tanks

3/00 Driving of auxiliaries (transmission elements per se F16)
3/02 . from propulsion power plant
3/04 . from power plant other than propulsion power plant

4/00 Arrangements of installations for treating waste-water or sewage (soil-water discharges B63B 29/16) **[3]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

B64 AIRCRAFT; AVIATION; COSMONAUTICS

B64B LIGHTER-THAN-AIR AIRCRAFT (ground installations for aircraft in general B64F)

1/00 Lighter-than-air aircraft
1/02 . Non-rigid airships (B64B 1/58 takes precedence; balloons B64B 1/40)
1/04 . . the profile being maintained by ties or cords connecting opposite surfaces
1/06 . Rigid airships; Semi-rigid airships (B64B 1/58 takes precedence)
1/08 . . Framework construction
1/10 . . Tail unit construction (B64B 1/12 takes precedence)
1/12 . . Movable control surfaces
1/14 . . Outer covering
1/16 . . . rigid
1/18 . . . Attachment to structure
1/20 . . provided with wings or stabilising surfaces
1/22 . . Arrangement of cabins or gondolas
1/24 . . Arrangement of propulsion plant (B64B 1/34 takes precedence)
1/26 . . . housed in ducts
1/28 . . . housed in nacelles
1/30 . . . Arrangement of propellers
1/32 . . . . surrounding hull
1/34 . . . . of lifting propellers
1/36 . . Arrangement of jet reaction apparatus for propulsion or directional control
1/38 . . Controlling position of centre of gravity
1/40 . Balloons (B64B 1/58 takes precedence; toy balloons A63H 27/10)
1/42 . . Construction or attachment of stabilising surfaces
1/44 . . adapted to maintain predetermined altitude
1/46 . . associated with apparatus to cause bursting
1/48 . . . to enable load to be dropped by parachute
1/50 . . Captive balloons
1/52 . . . attaching trailing entanglements
1/54 . . . connecting two or more balloons in superimposed relationship
1/56 . . . stabilised by rotary motion
1/58 . Arrangements or construction of gas-bags; Filling arrangements (connection of valves to inflatable elastic bodies B60C 29/00)
1/60 . . Gas-bags surrounded by separate containers of inert gas
1/62 . . Controlling gas pressure, heating, cooling, or discharging gas
1/64 . . Gas-valve operating mechanisms
1/66 . Mooring attachments (mooring masts B64F 1/14)
1/68 . Water flotation gear
1/70 . Ballasting arrangements

B64C AEROPLANES; HELICOPTERS (air-cushion vehicles B60V)

Note

As far as possible, classification is made according to constructional features; classification according to particular kinds of aircraft is normally regarded as being of secondary importance, except in cases where this is considered to be the characteristic feature. **[3]**

Subclass index

Aircraft structures or fairings

1/00 **Fuselages**; **Constructional features common to fuselages, wings, stabilising surfaces, or the like** (aerodynamical features common to fuselages, wings, stabilising surfaces, or the like B64C 23/00; flight-deck installations B64D)
1/06 . Frames; Stringers; Longerons
1/08 . . Geodetic or other open-frame structures
1/10 . . Bulkheads
1/12 . . Construction or attachment of skin panels
1/14 . Windows; Doors; Hatch covers or access panels; Surrounding frame structures; Canopies; Windscreens (fairings movable in conjunction with undercarriage elements B64C 25/16; bomb doors B64D 1/06)
1/16 . specially adapted for mounting power plant
1/18 . Floors
1/20 . . specially adapted for freight
1/22 . Other structures integral with fuselages to facilitate loading
1/24 . Steps mounted on, and retractable within, fuselages (readily removable B64D 9/00)
1/26 . Attaching the wing or tail units or stabilising surfaces
1/28 . Parts of fuselage relatively movable to improve pilots view
1/30 . Parts of fuselage relatively movable to reduce overall dimensions of aircraft
1/32 . Severable or jettisonable parts of fuselage facilitating emergency escape (ejector seats B64D 25/10)
1/34 . comprising inflatable structural components (connection of valves to inflatable elastic bodies B60C 29/00)
1/36 . adapted to receive aerials or radomes (aerials or radomes per se H01Q)
1/38 . Constructions adapted to reduce effects of aerodynamic or other external heating
1/40 . Sound or heat insulation

3/00 **Wings** (stabilising surfaces B64C 5/00; ornithopter wings B64C 33/02)
3/10 . Shape of wings
3/14 . . Aerofoil profile
3/16 . . Frontal aspect
3/18 . Spars; Ribs; Stringers (attaching wing unit to fuselage B64C 1/26)
3/20 . Integral or sandwich constructions (layered products or sandwich constructions in general B32B)
3/22 . Geodetic or other open-frame structures
3/24 . Moulded or cast structures
3/26 . Construction, shape, or attachment of separate skins, e.g. panels
3/28 . Leading or trailing edges attached to primary structures, e.g. forming fixed slots
3/30 . comprising inflatable structural components (connection of valves to inflatable elastic bodies B60C 29/00)
3/32 . specially adapted for mounting power plant
3/34 . Integrally-constructed tanks, e.g. for fuel (other aircraft fuel tanks or fuel systems B64D)
3/36 . Structures adapted to reduce effects of aerodynamic or other external heating
3/38 . Adjustment of complete wings or parts thereof
3/40 . . Varying angle of sweep
3/42 . . Adjusting about chordwise axes
3/44 . . Varying camber
3/46 . . . by inflatable elements (connection of valves to inflatable elastic bodies B60C 29/00)
3/48 . . . by relatively-movable parts of wing structures
3/50 . . . by leading or trailing edge flaps (ailerons B64C 9/00)
3/52 . . Warping
3/54 . . Varying in area (flaps extendable to increase camber B64C 3/44)
3/56 . . Folding or collapsing to reduce overall dimensions of aircraft
3/58 . provided with fences or spoilers (adjustable for control purposes B64C 9/00)

5/00 **Stabilising surfaces** (attaching stabilising surfaces to fuselage B64C 1/26)
5/02 . Tailplanes (fins B64C 5/06)
5/04 . Noseplanes
5/06 . Fins (specially for wings B64C 5/08)
5/08 . mounted on, or supported by, wings
5/10 . adjustable
5/12 . . for retraction against or within fuselage or nacelle
5/14 . . Varying angle of sweep
5/16 . . about spanwise axes
5/18 . . in area

7/00 **Structures or fairings not otherwise provided for**
7/02 . Nacelles

9/00 **Adjustable control surfaces or members, e.g. rudders** (trimming stabilising surfaces B64C 5/10; systems for actuating flying-control surfaces B64C 13/00)
9/02 . Mounting or supporting thereof
9/04 . with compound dependent movements
9/06 . with two or more independent movements
9/08 . bodily displaceable (varying camber of wings B64C 3/44)
9/10 . one surface adjusted by movement of another, e.g. servo tabs (B64C 9/04 takes precedence; adjusting surfaces of different type or function B64C 9/12)
9/12 . surfaces of different type or function being simultaneously adjusted
9/14 . forming slots (boundary-layer control B64C 21/00)
9/16 . . at the rear of the wing
9/18 . . . by single flaps
9/20 . . . by multiple flaps
9/22 . . at the front of the wing
9/24 . . . by single flap
9/26 . . . by multiple flaps
9/28 . . by flaps at both the front and rear of the wing operating in unison
9/30 . Balancing hinged surfaces, e.g. dynamically
9/32 . Air braking surfaces (braking by parachutes B64D 17/80)
9/34 . collapsing or retracting against or within other surfaces or other members
9/36 . . the members being fuselages or nacelles
9/38 . Jet flaps

11/00 **Propellers, e.g. of ducted type**; **Features common to propellers and rotors for rotorcraft** (rotors specially adapted for rotorcraft B64C 27/32)
11/02 . Hub construction
11/04 . . Blade mountings
11/06 . . . for variable-pitch blades
11/08 . . . for non-adjustable blades

11/10 . . . . rigid
11/12 . . . . flexible
11/14 . . Spinners
11/16 . Blades
11/18 . . Aerodynamic features
11/20 . . Constructional features
11/22 . . . Solid blades
11/24 . . . Hollow blades
11/26 . . . Fabricated blades
11/28 . . . Collapsible or foldable blades
11/30 . Blade pitch-changing mechanisms
11/32 . . mechanical
11/34 . . . automatic
11/36 . . . non-automatic
11/38 . . fluid, e.g. hydraulic
11/40 . . . automatic
11/42 . . . non-automatic
11/44 . . electric
11/46 . Arrangements of, or constructional features peculiar to, multiple propellers
11/48 . . Units of two or more coaxial propellers
11/50 . . Phase synchronisation between multiple propellers

13/00 Control systems or transmitting systems for actuating flying-control surfaces, lift-increasing flaps, air brakes, or spoilers
13/02 . Initiating means
13/04 . . actuated personally
13/06 . . . adjustable to suit individual persons
13/08 . . . Trimming zero positions
13/10 . . . comprising warning devices
13/12 . . . Dual control apparatus
13/14 . . . lockable (locking in position to suit individual persons B64C 13/06)
13/16 . . actuated automatically, e.g. responsive to gust detectors
13/18 . . . using automatic pilot (automatic pilots per se G05D 1/00)
13/20 . . . using radiated signals
13/22 . . . readily revertible to personal control
13/24 . Transmitting means
13/26 . . without power amplification or where power amplification is irrelevant
13/28 . . . mechanical
13/30 . . . . using cable, chain, or rod mechanisms
13/32 . . . . using cam mechanisms
13/34 . . . . using toothed gearing
13/36 . . . fluid
13/38 . . with power amplification
13/40 . . . using fluid pressure
13/42 . . . . having duplication or stand-by provisions
13/44 . . . . overriding of personal controls; with automatic return to inoperative position
13/46 . . . . with artificial feel
13/48 . . . . characterised by the fluid being gaseous
13/50 . . . using electrical energy

15/00 Attitude, flight direction, or altitude control by jet reaction (details of jet-engine plants, e.g. of nozzles or jet pipes, F02K) **[3]**
15/02 . the jets being propulsion jets
15/12 . . the power plant being tiltable
15/14 . the jets being other than main propulsion jets (jet flaps B64C 9/38)

17/00 Aircraft stabilisation not otherwise provided for
17/02 . by gravity or inertia-actuated apparatus
17/04 . . by pendular bodies
17/06 . . by gyroscopic apparatus (automatic-pilot control B64C 13/18)
17/08 . by ballast supply or discharge (for lighter-than-air aircraft B64B)
17/10 . Transferring fuel to adjust trim

19/00 Aircraft control not otherwise provided for
19/02 . Conjoint controls

Influencing air-flow over aircraft surfaces, not otherwise provided for

21/00 Influencing air-flow over aircraft surfaces by affecting boundary-layer flow (boundary-layer control in general F15D)
21/02 . by use of slot, ducts, porous areas, or the like
21/04 . . for blowing (B64C 21/08 takes precedence)
21/06 . . for sucking (B64C 21/08 takes precedence)
21/08 . . adjustable
21/10 . using other surface properties, e.g. roughness

23/00 Influencing air-flow over aircraft surfaces, not otherwise provided for
23/02 . by means of rotating members of cylindrical or similar form
23/04 . by generating shock waves
23/06 . by generating vortices
23/08 . using Magnus effect

25/00 Alighting gear (air-cushion alighting gear B60V 3/08)
25/02 . Undercarriages
25/04 . . Arrangement or disposition on aircraft
25/06 . . fixed
25/08 . . non-fixed, e.g. jettisonable
25/10 . . . retractable, foldable, or the like
25/12 . . . . sideways
25/14 . . . . fore-and-aft
25/16 . . . . Fairings movable in conjunction with undercarriage elements
25/18 . . . . Operating mechanisms
25/20 . . . . . mechanical
25/22 . . . . . fluid
25/24 . . . . . electric
25/26 . . . . . Control or locking systems therefor
25/28 . . . . . with indicating or warning devices
25/30 . . . . . emergency actuated
25/32 . characterised by elements which contact the ground or similar surface (arrester hooks B64C 25/68)
25/34 . . wheeled type, e.g. multi-wheeled bogies
25/36 . . . Arrangements or adaptations of wheels, tyres, or axles in general (construction of wheels or axles B60B; construction of tyres in general B60C)
25/38 . . endless-track type
25/40 . . the elements being rotated before touch-down
25/42 . . Arrangement or adaptation of brakes (the ground braking force being regulated, at least in part, by a speed condition, e.g. acceleration or deceleration of the ground engaging alighting gear, B60T 8/32) **[4]**
25/44 . . . Actuating mechanisms
25/46 . . . . Brake regulators for preventing skidding or aircraft somersaulting

25/48 . . . . differentially operated for steering purposes
25/50 . . Steerable undercarriages; Shimmy-damping (steering devices applicable to land vehicles B62D)
25/52 . . Skis or runners
25/54 . . Floats
25/56 . . . inflatable (connection of valves to inflatable elastic bodies B60C 29/00)
25/58 . . Arrangements or adaptations of shock-absorbers or springs (shimmy-dampers B64C 25/50; vehicle suspension arrangements in general B60G; shock-absorbers per se F16F)
25/60 . . . Oleo legs
25/62 . . . Spring shock-absorbers; Springs
25/64 . . . . using rubber or like elements
25/66 . . Convertible alighting gear; Combinations of different kinds of ground or like engaging elements
25/68 . Arrester hooks (arresting gear, e.g. on aircraft carriers, B64F)

Aircraft kinds or components not otherwise provided for

27/00 **Rotorcraft**; **Rotors peculiar thereto** (alighting gear B64C 25/00)
27/02 . Gyroplanes
27/04 . Helicopters
27/06 . . with single rotor
27/08 . . with two or more rotors
27/10 . . . arranged coaxially
27/12 . . Rotor drives
27/14 . . . Direct drive between power plant and rotor hub
27/16 . . . Drive of rotors by means, e.g. propellers, mounted on rotor blades
27/18 . . . . the means being jet-reaction apparatus
27/20 . Rotorcraft characterised by having shrouded rotors, e.g. flying platforms
27/22 . Compound rotorcraft, i.e. aircraft using in flight the features of both aeroplane and rotorcraft
27/24 . . with rotor blades fixed in flight to act as lifting surfaces
27/26 . . characterised by provision of fixed wings
27/28 . . with forward-propulsion propellers pivotable to act as lifting rotors
27/30 . . with provision for reducing drag of inoperative rotor
27/32 . Rotors (features common to rotors and propellers B64C 11/00)
27/33 . . having flexing arms **[3]**
27/35 . . having elastomeric joints **[3]**
27/37 . . having articulated joints (B64C 27/33, B64C 27/35 take precedence) **[3]**
27/39 . . . with individually articulated blades, i.e. with flapping or drag hinges **[3]**
27/41 . . . with flapping hinge or universal joint, common to the blades **[3]**
27/43 . . . . see-saw type, i.e. two-bladed rotor **[3]**
27/45 . . . with a feathering hinge only **[3]**
27/46 . . Blades
27/467 . . . Aerodynamic features **[6]**
27/473 . . . Constructional features **[6]**
27/48 . . . . Root attachment to rotor head
27/50 . . . . Blades foldable to facilitate stowage of aircraft
27/51 . Damping of blade movements **[3]**
27/52 . Tilting of rotor bodily relative to fuselage (of see-saw type construction B64C 27/43)
27/54 . Mechanisms for controlling blade adjustment or movement relative to rotor head, e.g. lag-lead movement
27/56 . . characterised by the control initiating means, e.g. manually actuated (B64C 27/58 takes precedence)
27/57 . . . automatic or condition responsive, e.g. responsive to rotor speed, torque or thrust **[3]**
27/58 . . Transmitting means, e.g. interrelated with initiating means or means acting on blades (initiating means B64C 27/56; means acting on blades B64C 27/72)
27/59 . . . mechanical **[3]**
27/605 . . . . including swash plate, spider or cam mechanisms **[3]**
27/615 . . . . including flaps mounted on blades **[3]**
27/625 . . . . including rotating masses or servo rotors **[3]**
27/635 . . . . specially for controlling lag-lead movements of blades **[3]**
27/64 . . . using fluid pressure, e.g. having fluid power amplification **[3]**
27/68 . . . using electrical energy, e.g. having electrical power amplification **[3]**
27/72 . . Means acting on blades
27/78 . . in association with pitch adjustment of blades of anti-torque rotor
27/80 . . for differential adjustment of blade pitch between two or more lifting rotors
27/82 . characterised by the provision of an auxiliary rotor or fluid-jet device for counter-balancing lifting-rotor torque or changing direction of rotorcraft

29/00 **Aircraft capable of landing or taking-off vertically** (attitude, flight direction, or altitude control by jet reaction B64C 15/00; rotorcraft B64C 27/00; air-cushion vehicles B60V; details of jet-engine plants, e.g. of nozzles or jet pipes, F02K)
29/02 . having its flight directional axis vertical when grounded
29/04 . . characterised by jet-reaction propulsion

30/00 **Supersonic type aircraft [3]**

31/00 **Aircraft intended to be sustained without power plant**; **Powered hang-glider-type aircraft**; **Microlight-type aircraft**
31/02 . Gliders, e.g. sailplanes (hang-gliders B64C 31/028) **[6]**
31/024 . . with auxiliary power plant **[6]**
31/028 . Hang-glider-type aircraft; Microlight-type aircraft **[6]**
31/032 . . having delta shaped wing **[6]**
31/036 . . having parachute-type wing (parachutes B64D 17/00) **[6]**
31/04 . Man-powered aircraft (ornithopters B64C 33/00)
31/06 . Kites (hang-gliders B64C 31/028; toy aspects A63H 27/08; towed targets F41J)

33/00 **Ornithopters**
33/02 . Wings; Actuating mechanisms therefor

35/00 **Flying-boats**; **Seaplanes** (alighting gear B64C 25/00)
35/02 . Flying-boat hulls **[3]**

37/00 **Convertible aircraft** (vehicles capable of travelling in or on different media B60F)

37/02 . Flying units formed by separate aircraft (towing, air-refuelling, or aircraft-carrying aircraft B64D)

39/00 **Aircraft not otherwise provided for**

39/02 . characterised by special use

39/04 . having multiple fuselages or tail booms **[3]**

39/06 . having disc- or ring-shaped wings **[3]**

39/08 . having multiple wings **[3]**

39/10 . All-wing aircraft **[3]**

39/12 . Canard-type aircraft **[3]**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

B64D EQUIPMENT FOR FITTING IN OR TO AIRCRAFT; FLYING SUITS; PARACHUTES; ARRANGEMENTS OR MOUNTING OF POWER PLANTS OR PROPULSION TRANSMISSIONS

Subclass index

1/00 **Dropping, ejecting, releasing, or receiving articles, liquids, or the like, in flight** (with respect to weapon sights, F41G takes precedence; parachutes B64D 17/00; ejectable seats B64D 25/10; ejectable capsules B64D 25/12; refuelling during flight B64D 39/00; launching apparatus for projecting projectiles or missiles F41F 1/00, F41F 7/00; rocket or torpedo launchers F41F 3/00)

1/02 . Dropping, ejecting, or releasing articles (jettisonable fuel reservoirs B64D 37/12)

1/04 . . the articles being explosive, e.g. bombs (arming or setting bomb fuzes F42C)

1/06 . . . Bomb releasing; Bomb doors

1/08 . . the articles being load-carrying devices

1/10 . . . Stowage arrangements for the devices in aircraft

1/12 . . . Releasing

1/14 . . . Absorbing landing shocks

1/16 . Dropping or releasing powdered, liquid or gaseous matter, e.g. for fire-fighting (jettisoning fuel B64D 37/26) **[5]**

1/18 . . by spraying, e.g. insecticides (spraying apparatus in general B05B)

1/20 . . for sky-writing

1/22 . Taking-up articles from earth's surface

3/00 **Aircraft adaptations to facilitate towing or being towed** (B64D 39/00 takes precedence; ground installations for launching or towing aircraft B64F; towing ropes per se D07B)

3/02 . for towing targets (towed targets per se F41J)

5/00 **Aircraft transported by aircraft, e.g. for release or reberthing during flight** (flying units formed by separate aircraft B64C 37/02)

7/00 **Arrangement of military equipment, e.g. armaments, armament accessories, or military shielding, in aircraft**; **Adaptations of armament mountings for aircraft** (dropping bombs or the like B64D 1/00; armaments or mountings therefor per se F41)

7/02 . the armaments being firearms

7/04 . . fixedly mounted

7/06 . . movably mounted

7/08 . Arrangement of rocket launchers (rocket launchers per se, e.g. rocket pods, F41F 3/06)

9/00 **Equipment for handling freight**; **Equipment for facilitating passenger embarkation or the like** (emergency equipment B64D 17/00, B64D 19/00, B64D 25/00; structures integral with fuselage to facilitate loading, fuselage floors specially adapted for freight, steps mounted on, and retractable within, aircraft B64C; ground installations B64F)

10/00 **Flying suits** (helmets in general A42B 3/00; breathing helmets A62B 18/00) **[3]**

11/00 **Passenger or crew accommodation**; **Flight-deck installations not otherwise provided for**

11/02 . Toilet fittings (of general application A47K)

11/04 . Galleys

11/06 . Arrangements or adaptations of seats (seat constructions for emergency purposes B64D 25/04)

13/00 **Arrangements or adaptations of air-treatment apparatus for aircraft crew or passengers, or freight space** (treatment rooms with artificial climate for medical purposes A61G 10/02; respiratory apparatus in general A62B; for vehicles in general B60H)
13/02 . the air being pressurised
13/04 . . Automatic control of pressure
13/06 . the air being conditioned (pressurising B64D 13/02)
13/08 . . the air being heated or cooled

15/00 **De-icing or preventing icing on exterior surfaces of aircraft** (motor vehicles specially adapted for carrying de-icing equipment B60P)
15/02 . by ducted hot gas or liquid
15/04 . . Hot gas application
15/06 . . Liquid application (in general B05)
15/08 . . . exuded from surface
15/10 . . . sprayed over surface
15/12 . by electric heating (H05B 3/84 takes precedence; electric heating elements in general H05B) **[5]**
15/14 . . controlled cyclically along length of surface
15/16 . by mechanical means, e.g. pulsating mats or shoes attached to, or built into, surface
15/18 . . the surface being an aerofoil, rotor, or propeller
15/20 . Means for detecting icing or initiating de-icing
15/22 . . Automatic initiation by icing detector

17/00 **Parachutes** (non-canopied parachutes B64D 19/00)
17/02 . Canopy arrangement or construction
17/04 . . formed with two or more canopies arranged about a common axis
17/06 . . formed with two or more canopies arranged in a cluster
17/08 . . Secondary or shock-absorbing canopies attached to load line
17/10 . . Ribbon construction or the like
17/12 . . constructed to provide variable or non-uniform porosity over area of canopy
17/14 . . with skirt or air-deflecting panels
17/16 . . . secured to hem of main canopy
17/18 . . Vent arrangement or construction
17/20 . . . variable in area
17/22 . Load suspension
17/24 . . Rigging lines
17/26 . . . attached to hem of canopy
17/28 . . . attached to apex of canopy
17/30 . . Harnesses **[4]**
17/32 . . . Construction of quick-release box
17/34 . . adapted to control direction or rate of descent
17/36 . . incorporating friction devices or frangible connections to reduce shock loading of canopy
17/38 . . Releasable fastening devices between parachute and load or pack
17/40 . Packs
17/42 . . rigid
17/44 . . . forming part of load
17/46 . . Closing means
17/48 . . with separate pack for extractor of auxiliary parachute
17/50 . . formed with separate compartments for main canopy, rigging lines, or auxiliary parachute
17/52 . . Opening, e.g. manual
17/54 . . . automatic
17/56 . . . . responsive to barometric pressure
17/58 . . . . responsive to time-delay mechanism
17/60 . . . . by static line
17/62 . Deployment
17/64 . . by extractor parachute
17/66 . . . attached to hem of main canopy
17/68 . . . attached to apex of main canopy
17/70 . . by springs
17/72 . . by explosive or inflatable means (connection of valves to inflatable elastic bodies B60C 29/00)
17/74 . . Sequential deployment of a plurality of canopies
17/76 . . facilitated by method of folding or packing
17/78 . in association with other load-retarding apparatus
17/80 . in association with aircraft, e.g. for braking thereof

19/00 **Non-canopied parachutes**
19/02 . Rotary-wing parachutes

21/00 **Testing of parachutes**

23/00 **Training of parachutists**

25/00 **Emergency apparatus or devices, not otherwise provided for** (parachutes B64D 17/00, B64D 19/00; jettisoning of fuel tanks or fuel B64D 37/00; safety belts or body harnesses in general A62B 35/00; safety belts or body harnesses for land vehicles B60R 22/00; severable or jettisonable parts of fuselage facilitating emergency escape B64C) **[4]**
25/02 . Supports or holding means for living bodies (for ejector seats B64D 25/115) **[5]**
25/04 . . Seat modifications
25/06 . . Harnessing **[4]**
25/08 . Ejecting or escaping means (escape apertures B64C)
25/10 . . Ejector seats
25/102 . . . Propelling means, e.g. by a combination of catapult and rocket means (B64D 25/11, B64D 25/112 take precedence) **[5]**
25/105 . . . . by catapult means only **[5]**
25/108 . . . . by rocket means only **[5]**
25/11 . . . Controlling attitude or direction of ejector seat or associated mechanism prior to ejection **[5]**
25/112 . . . Controlling attitude or direction of ejector seat after ejection **[5]**
25/115 . . . Occupant restraining, positioning or protecting devices **[5]**
25/118 . . . Separation of occupant from seat after ejection **[5]**
25/12 . . Ejectable capsules
25/14 . . Inflatable escape chutes (connection of valves to inflatable elastic bodies B60C 29/00)
25/16 . . Dinghy stowage
25/18 . . Flotation gear (aircraft alighting gear B64C)
25/20 . . Releasing of crash-position indicators

27/00 **Arrangement or mounting of power plant in aircraft**; **Aircraft characterised thereby** (attitude, flight-direction, or altitude control of aircraft by jet reaction B64C)
27/02 . Aircraft characterised by the type or position of power plant (fuselages or wings adapted for mounting power plant B64C)
27/04 . . of piston type
27/06 . . . within, or attached to, wing
27/08 . . . within, or attached to, fuselage
27/10 . . of gas-turbine type (B64D 27/16 takes precedence)
27/12 . . . within, or attached to, wing
27/14 . . . within, or attached to, fuselage
27/16 . . of jet type

27/18 . . . within, or attached to, wing
27/20 . . . within, or attached to, fuselage
27/22 . . using atomic energy
27/24 . . using steam, electricity, or spring force (B64D 27/16 takes precedence)
27/26 . Aircraft characterised by construction of power-plant mounting

29/00 Power-plant nacelles, fairings, or cowlings (nacelles not otherwise provided for B64C)
29/02 . associated with wings (wings adapted for mounting power plant B64C)
29/04 . associated with fuselages
29/06 . Attaching of nacelles, fairings, or cowlings
29/08 . Inspection panels for power plants

31/00 Power plant control; **Arrangement thereof** (flying controls, conjoint control of power plant and propeller B64C)
31/02 . Initiating means
31/04 . . actuated personally
31/06 . . actuated automatically
31/08 . . . for keeping cruising speed constant
31/10 . . . for preventing asymmetric thrust upon failure of one power plant
31/12 . . . for equalising or synchronising power plants
31/14 . Transmitting means between initiating means and power plants

33/00 Arrangement in aircraft of power plant parts or auxiliaries not otherwise provided for
33/02 . of combustion air intakes (air intakes for gas-turbine plants or jet-propulsion plants per se F02C 7/04; air intakes for combustion engines in general F02M 35/00)
33/04 . of exhaust outlets or jet pipes (exhaust outlets for combustion engines in general F01N; jet pipes or nozzles for jet-propulsion plants per se F02K; plants characterised by the form or arrangement of the jet pipe or nozzle F02K) **[3]**
33/08 . of power plant cooling systems (cooling of internal-combustion engines per se F01P; cooling of gas-turbine plants or jet-propulsion plants per se F02C, F02K)
33/10 . . Radiator arrangement
33/12 . . . of retractable type

35/00 Transmitting power from power plant to propellers or rotors; **Arrangements of transmissions** (propellers or rotors per se, helicopter transmissions B64C)
35/02 . characterised by the type of power plant
35/04 . characterised by the transmission driving a plurality of propellers or rotors
35/06 . . the propellers or rotors being counter-rotating
35/08 . characterised by the transmission being driven by a plurality of power plants

37/00 Arrangements in connection with fuel supply for power plant (refuelling during flight B64D 39/00)
37/02 . Tanks (tanks constructed integrally with aircraft wings B64C; tanks in general B65D)
37/04 . . Arrangement thereof in or on aircraft
37/06 . . Constructional adaptations thereof
37/08 . . . Internal partitioning
37/10 . . . to facilitate fuel pressurisation
37/12 . . . jettisonable
37/14 . . Filling or emptying (transferring fuels to adjust aircraft trim B64C)
37/16 . . . Filling systems (ground installations for fuelling aircraft B64F)
37/18 . . . . Conditioning fuel during filling
37/20 . . . Emptying systems
37/22 . . . . facilitating emptying in any position of tank
37/24 . . . . using gas pressure
37/26 . . . . Jettisoning of fuel
37/28 . . . . Control thereof
37/30 . Fuel systems for specific fuels
37/32 . Safety measures not otherwise provided for, e.g. preventing explosive conditions (extinguishing or preventing fires in aircraft A62C)
37/34 . Conditioning fuel, e.g. heating (during filling B64D 37/18)

39/00 Refuelling during flight (filling or emptying fuel tanks B64D 37/14)
39/02 . Means for paying-in or out hose
39/04 . Adaptations of hose construction (pipes in general F16L)
39/06 . Connecting hose to aircraft; Disconnecting hose therefrom

41/00 Power installations for auxiliary purposes

43/00 Arrangements or adaptations of instruments (arrangements of cameras B64D 47/08; aeronautical measuring instruments per se G01C)
43/02 . for indicating aircraft speed or stalling conditions

45/00 Aircraft indicators or protectors not otherwise provided for (camouflage F41H 3/00)
45/02 . Lightning protectors (lightning arrestors H01C 7/12, H01C 8/04, H01G 9/18, H01T; circuit arrangements therefor H02H); Static dischargers (in general H05F 3/00)
45/04 . Landing aids; Safety measures to prevent collision with earth's surface
45/06 . . mechanical
45/08 . . optical

47/00 Equipment not otherwise provided for
47/02 . Arrangements or adaptations of signal or lighting devices
47/04 . . the lighting devices being primarily intended to illuminate the way ahead
47/06 . . for indicating aircraft presence
47/08 . Arrangements of cameras

B64F GROUND OR AIRCRAFT-CARRIER-DECK INSTALLATIONS

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "installations" embraces equipment, including mobile equipment, peculiar to use in connection with aircraft and not fitted thereto;
– "ground installations" embraces waterborne installations. **[3]**

1/00 **Ground or aircraft-carrier-deck installations** (specially adapted for captive aircraft B64F 3/00; aircraft-carriers B63; fog-dispersal installations E01H; wind tunnels G01M; grounded flight trainers G09B)
1/02 . Arresting gear; Liquid barriers
1/04 . Launching or towing gear (railway aspects B61; aircraft towing aircraft B64D 3/00; ammunition launching gear F41F)
1/06 . . using catapults
1/08 . . using winches
1/10 . . using self-propelled vehicles
1/12 . Anchoring
1/14 . . Towers or masts for mooring airships or balloons (mooring attachments of lighter-than-air aircraft B64B 1/66; building aspects E04H 6/00, E04H 12/00)
1/16 . . Pickets or ground anchors; Wheel chocks
1/18 . Visual or acoustic landing aids (optical or acoustic signalling in general G08)
1/20 . . Arrangement of optical beacons
1/22 . installed for handling aircraft
1/24 . . Adaptations of turntables
1/26 . for reducing engine or jet noise; Protecting airports from jet erosion
1/28 . Liquid-handling installations specially adapted for fuelling stationary aircraft (liquid handling in general B67)
1/30 . for embarking or disembarking passengers
1/305 . . Bridges extending between terminal building and aircraft, e.g. telescopic, vertically adjustable **[3]**
1/31 . . Passenger vehicles specially adapted to co-operate, e.g. dock, with aircraft or terminal buildings **[3]**
1/315 . . Mobile stairs (movable stairways in general E04F 11/04) **[3]**
1/32 . for handling freight
1/34 . for starting propulsion plant
1/36 . Other airport installations (construction of, or surfacing for, airfields E01C)

3/00 **Ground installations specially adapted for captive aircraft** (railway aspects B61)
3/02 . with means for supplying electricity to aircraft during flight

5/00 **Designing, manufacturing, assembling, cleaning, maintaining, or repairing aircraft, not otherwise provided for**

B64G COSMONAUTICS; VEHICLES OR EQUIPMENT THEREFOR (apparatus for, or methods of, winning materials from extraterrestrial sources E21C 51/00)

(1) This subclass covers only vehicles, equipment or the like, which are specially adapted for cosmonautics.
(2) This subclass does not cover vehicles and equipment applicable to both cosmonautics and aeronautics, which are covered by the appropriate aeronautical subclasses of class B64.
(3) In this subclass, the following term is used with the meaning indicated:
– "cosmonautics" includes all transport outside the earth's atmosphere, and thus includes artificial earth satellites, and interplanetary and interstellar travel.

1/00 **Cosmonautic vehicles [3]**
1/10 . Artificial satellites; Systems of such satellites; Interplanetary vehicles (space shuttles B64G 1/14; radio transmission systems using satellites H04B 7/185)
1/12 . . manned **[3]**
1/14 . Space shuttles **[3]**
1/16 . Extraterrestrial cars (land vehicle aspects B60 to B62) **[3]**
1/22 . Parts of, or equipment specially adapted for fitting in or to, cosmonautic vehicles **[3]**
1/24 . . Guiding or controlling apparatus, e.g. for attitude control (jet-propulsion plants F02K; navigation or navigational instruments, see the relevant subclasses, e.g. G01C; automatic pilots G05D 1/00) **[3]**
1/26 . . . using jets **[3]**
1/28 . . . using inertia or gyro effect **[3]**
1/32 . . . using earth's magnetic field **[3]**
1/34 . . . using gravity gradient **[3]**
1/36 . . . using sensors, e.g. sun-sensors, horizon sensors **[3]**
1/38 . . . damping of oscillations, e.g. nutation dampers **[3]**
1/40 . . Arrangements or adaptations of propulsion systems (B64G 1/26 takes precedence; propulsion plants per se, see the relevant subclasses, e.g. F02K, F03H) **[3]**
1/42 . . Arrangements or adaptations of power supply systems (power supply systems per se, see the relevant subclasses) **[3]**

1/44 . . . using radiation, e.g. deployable solar arrays (solar cells per se H01L 31/00) **[3]**

1/46 . . Arrangements or adaptations of devices for control of environment or living conditions (space suits B64G 6/00) **[3]**

1/48 . . . for treatment of the atmosphere (B64G 1/50 takes precedence; air conditioning in general F24F) **[3]**

1/50 . . . for temperature control (temperature control in general G05D 23/00) **[3]**

1/52 . . Protection, safety or emergency devices; Survival aids (life-saving in general A62) **[3]**

1/54 . . . Protection against radiation (against radiation in general G21F) **[3]**

1/56 . . . Protection against meteorites (meteorite detectors B64G 1/68) **[3]**

1/58 . . . Thermal protection, e.g. heat shields (thermal insulation in general F16L 59/00; chemical aspects, see the relevant classes) **[3]**

1/60 . . Crew or passenger accommodations **[3]**

1/62 . . Systems for re-entry into the earth's atmosphere; Retarding or landing devices **[3]**

1/64 . . Systems for coupling or separating cosmonautic vehicles or parts thereof, e.g. docking arrangements **[3]**

1/66 . . Arrangements or adaptations of apparatus or instruments, not otherwise provided for (instruments per se, see the relevant classes, e.g. aerials for use in satellites H01Q 1/28) **[3]**

1/68 . . . of meteorite detectors **[3]**

3/00 **Observing or tracking cosmonautic vehicles** (radio or other waves systems for navigation or tracking G01S)

4/00 **Tools specially adapted for use in space [3]**

5/00 **Ground equipment for vehicles, e.g. starting towers, fuelling arrangements** (B64G 3/00 takes precedence)

6/00 **Space suits [3]**

7/00 **Simulating cosmonautic conditions, e.g. for conditioning crews** (simulators for teaching or training purposes G09B 9/00)

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

B65 CONVEYING; PACKING; STORING; HANDLING THIN OR FILAMENTARY MATERIAL

B65B MACHINES, APPARATUS OR DEVICES FOR, OR METHODS OF, PACKAGING ARTICLES OR MATERIALS; UNPACKING (bundling and pressing devices for cigars A24C 1/44; paper-bag holders as shop or office accessories A47F 13/08; apparatus for coating, e.g. by dipping, B05C; devices for tensioning and securing binders adapted to be supported by the article or articles to be bound B25B; nailing or stapling devices B25C, B27F; inserting documents in envelopes and closing the latter B43M 3/00, B43M 5/00; labelling B65C; wrappers, containers or other packaging elements, e.g. binders, closures, protective caps, B65D; transport or storage devices B65G; devices for handling sheets or webs of interest apart from their application in packaging machines B65H; applying closure members to bottles, jars or similar containers B67B; hand- or power-operated devices not attached to, or not incorporated in, containers or container closures for opening closed containers B67B 7/00; packaging of matches C06F; wrapping sugar during manufacture C13B 45/02; packaging of ammunition or explosive charges F42B 39/00; making containers or receptacles, see the appropriate subclasses)

(1) This subclass does not cover:
- operations of the types mentioned in Note (2) (a) to (f), employed in the manufacture of articles other than packages, which are covered by other appropriate subclasses, e.g. making confectionery products by casting in moulds formed by wrappers A23G, filling ammunition, e.g. cartridges, F42B 33/02;
- methods of packaging, which are wholly characterised by the form of the package produced, or the form of the container or packaging-element used, which are covered by B65D.

(2) In this subclass, the following terms are used with the meanings indicated:
- "packaging" includes mainly the following operations:
  (a) filling portable containers or receptacles with materials or small articles to form packages;
  (b) inserting articles or groups of articles into containers or receptacles;
  (c) closing filled containers or receptacles otherwise than by metal-, glass-, or wood-working operations;
  (d) enclosing, or partially enclosing, articles or quantities of material, in sheets, strips, blanks, webs, or tubes of thin flexible material, e.g. wrapping;
  (e) bundling articles, e.g. holding articles together in groups by applying string or wire;
  (f) attaching articles to cards, sheets, or webs.
- "package" means the end product of a packaging operation, e.g. a filled and closed container, an article enclosed in a wrapper, a group of articles held together by string or wire, a crate of bottles.
- "materials" includes matter, or masses of articles, which are to be packaged, as distinct from separate or individual articles.

Subclass index

Machines, apparatus, or methods of general application for packaging articles or materials

1/00 **Packaging fluent solid material, e.g. powders, granular or loose fibrous material, loose masses of small articles, in individual containers or receptacles, e.g. bags, sacks, boxes, cartons, cans, jars** (under special atmospheric or gaseous conditions B65B 31/00)

1/02 . Machines characterised by the incorporation of means for making the containers or receptacles (from flat, folded, or tubular webs of flexible sheet material B65B 9/00; making containers or receptacles of interest apart from this application, see the appropriate subclasses)

1/04 . Methods of, or means for, filling the material into the containers or receptacles

1/06 . . by gravity flow

1/08 . . by vibratory feeders

1/10 . . by rotary feeders

1/12 . . . of screw type

1/14 . . . of centrifugal type

1/16 . . by pneumatic means, e.g. by suction

1/18 . . for filling valve-bags

1/20 . Reducing volume of filled material

1/22 . . by vibration

1/24 . . by mechanical compression

1/26 . . by pneumatic means, e.g. suction

1/28 . Controlling escape of air or dust from containers or receptacles during filling (cleaning of, or removing dust from, containers, wrappers, or packages B65B 55/24)

1/30 . Devices or methods for controlling or determining the quantity or quality of the material fed or filled

1/32 . . by weighing (check-weighing of filled containers or receptacles B65B 1/46; weighing in general G01G)

1/34 . . . Adjusting weight by trickle feed

1/36 . . by volumetric devices or methods (checking volume of filled material B65B 1/48; volumetric measurement in general G01F)

1/38 . . . by pistons co-operating with measuring chambers

1/40 . . by timing of filling operations

1/42 . . . and arresting flow by cut-off means

1/44 . . Checking density of material to be filled

1/46 . . Check-weighing of filled containers or receptacles (check-weighing in general G01G)

1/48 . . Checking volume of filled material

3/00 **Packaging plastic material, semiliquids, liquids, or mixed solids and liquids, in individual containers or receptacles, e.g. bags, sacks, boxes, cartons, cans, jars** (packaging under special atmospheric or gaseous conditions, adding propellants to aerosol containers B65B 31/00; filling bottles or other containers with liquids or semi-liquids by bottling machines B67C; filling of gas bottles at high pressure for storing gases F17C)

3/02 . Machines characterised by the incorporation of means for making the containers or receptacles (making containers or receptacles of interest apart from this application, see the appropriate subclasses)

3/04 . Methods of, or means for, filling the material into the containers or receptacles

3/06 . . by gravity flow

3/08 . . by screw-type feeders

3/10 . . by application of pressure to material (by screw-type feeders B65B 3/08)

3/12 . . . mechanically, e.g. by pistons or pumps

3/14 . . . pneumatically

3/16 . . for filling collapsible tubes (for filling valve bags B65B 3/17)

3/17 . . for filling valve bags

3/18 . Controlling escape of air from containers or receptacles during filling

3/22 . Defoaming liquids in connection with filling

3/24 . Topping-up containers or receptacles to ensure complete filling

3/26 . Methods or devices for controlling the quantity of the material fed or filled

3/28 . . by weighing (in general G01G)

3/30 . . by volumetric measurement (in general G01F)

3/32 . . . by pistons co-operating with measuring chambers

3/34 . . by timing of filling operations

3/36 . . . and arresting flow by cut-off means

5/00 **Packaging individual articles in containers or receptacles, e.g. bags, sacks, boxes, cartons, cans, jars**

5/02 . Machines characterised by incorporation of means for making the containers or receptacles (from flat, folded, or tubular webs of flexible sheet material B65B 9/00; making containers or receptacles of interest apart from this application, see the appropriate subclasses)

5/04 . Packaging single articles

5/06 . Packaging groups of articles, the groups being treated as single articles

5/08 . Packaging groups of articles, the articles being individually gripped or guided for transfer to the containers or receptacles

5/10 . Filling containers or receptacles progressively or in stages by introducing successive articles, or layers of articles

5/12 . . Introducing successive articles, e.g. confectionery products, of different shape or size in predetermined positions

7/00 **Closing containers or receptacles after filling** (combinations of container-closing apparatus with apparatus for filling containers B65B 1/00, B65B 3/00, B65B 5/00; under special atmospheric or gaseous conditions B65B 31/00; devices for, or methods of, sealing or securing package folds or closures, e.g. twisted bag necks, B65B 51/00; shrinking wrappers, containers, container covers or container cover securing members during or after packaging B65B 53/00)

7/01 . Machines characterised by incorporation of means for making the closures before applying (making closures, of interest apart from this application, see the relevant subclass) **[6]**

7/02 . Closing containers or receptacles deformed by, or taking-up shape of, contents, e.g. bags, sacks

7/04 . . by tucking-in mouth portion to form two flaps and subsequently folding-down

7/06 . . by collapsing mouth portion, e.g. to form a single flap

7/08 . . . and folding

7/10 . . . and rolling-in

7/12 . . . and twisting

7/14 . Closing collapsible or resilient tubes, e.g. for tooth-paste, for lighter fuel

7/16 . Closing semi-rigid or rigid containers or receptacles not deformed by, or not taking-up shape of, contents, e.g. boxes, cartons (closing cans by metal-working operations B21D 51/26)

7/18 . . by collapsing mouth portion and subsequently folding-down or securing flaps
7/20 . . by folding-down preformed flaps
7/22 . . . and inserting flap portions between contents and wall
7/24 . . . and interengaging tongue-and-slot closures
7/26 . . by closing hinged lids
7/28 . . by applying separate preformed closures, e.g. lids, covers

9/00 Enclosing successive articles, or quantities of material, e.g. liquids or semiliquids, in flat, folded, or tubular webs of flexible sheet material; **Subdividing filled flexible tubes to form packages**

9/02 . Enclosing articles, or quantities of material, between opposed webs
9/04 . . one or both webs being formed with pockets for the reception of the articles, or of the quantities of material
9/06 . Enclosing articles, or quantities of material, in a longitudinally-folded web, or in a web folded into a tube about the articles or quantities of material placed upon it
9/08 . . in a web folded and sealed transversely to form pockets which are subsequently filled and then closed by sealing
9/10 . Enclosing articles, or quantities of material, in preformed tubular webs, or in webs formed into tubes around filling nozzles, e.g. extruded tubular webs (sausage making A22C 11/00)
9/12 . . Subdividing filled tubes to form two or more packages by sealing or securing involving displacement of contents
9/13 . . the preformed tubular webs being supplied in a flattened state **[3]**
9/14 . . . Devices for distending the tubular webs **[3]**
9/15 . . the preformed tubular webs being stored on filling nozzles **[3]**
9/18 . . . Devices for storing tubular webs **[3]**
9/20 . . the webs being formed into tubes in situ around the filling nozzles **[3]**
9/22 . . . Forming shoulders; Tube formers **[3]**
9/24 . . the tubes being formed in situ by extrusion **[3]**

11/00 Wrapping, e.g. partially or wholly enclosing, articles, or quantities of material, in strips, sheets, or blanks, of flexible material (bundling articles by applying narrow strips or bands of flexible material B65B 13/00; devices for folding or bending wrappers around contents B65B 49/00; devices for gathering or twisting wrappers B65B 51/00)

11/02 . Wrapping articles, or quantities of material, without changing their position during the wrapping operation, e.g. in moulds with hinged folders (by doubling a wrapper and securing its opposed free margins to enclose contents B65B 11/48; by disposing contents between two sheets and securing their opposed free margins B65B 11/50; covering or wrapping cores by winding webs, tapes, or filamentary material B65H 81/00)
11/04 . . the articles being rotated
11/06 . Wrapping articles, or quantities of material, by conveying wrapper and contents in defined paths
11/08 . . in a single straight path
11/10 . . . to fold the wrappers in tubular form about contents
11/12 . . . . and then to form closing folds of similar form at opposite ends of the tube
11/14 . . . . the ends of the tube being subsequently twisted
11/16 . . . to fold the wrappers in channel form about contents and then to close the ends of the channel by folding and finally the mouth of the channel by folding or twisting
11/18 . . in two or more straight paths
11/20 . . . to fold the wrappers in tubular form about contents
11/22 . . . . and then to form closing folds of similar form at opposite ends of the tube
11/24 . . . . the ends of the tube being subsequently twisted
11/26 . . . to fold the wrappers in channel form about contents and then to close the ends of the channel by folding and finally the mouth of the channel by folding or twisting
11/28 . . in a curved path, e.g. on rotary tables or turrets
11/30 . . . to fold the wrappers in tubular form about contents
11/32 . . . . and then to form closing folds of similar form at opposite ends of the tube
11/34 . . . . the ends of the tube being subsequently twisted
11/36 . . . to fold the wrappers in channel form about contents and then to close the ends of the channel by folding and finally the mouth of the channel by folding or twisting
11/38 . . in a combination of straight and curved paths
11/40 . . . to fold the wrappers in tubular form about contents
11/42 . . . . and then to form closing folds of similar form at opposite ends of the tube
11/44 . . . . the ends of the tube being subsequently twisted
11/46 . . . to fold the wrappers in channel form about contents and then to close the ends of the channel by folding and finally the mouth of the channel by folding or twisting
11/48 . Enclosing articles, or quantities of material, by folding a wrapper, e.g. a pocketed wrapper, and securing its opposed free margins to enclose contents
11/50 . Enclosing articles, or quantities of material, by disposing contents between two sheets, e.g. pocketed sheets, and securing their opposed free margins (apparatus or devices for forming pockets in or from sheets, blanks or webs B65B 47/00)
11/52 . . one sheet being rendered plastic, e.g. by heating, and forced by fluid pressure, e.g. vacuum, into engagement with the other sheet and contents, e.g. skin-packaging
11/54 . Wrapping by causing the wrapper to embrace one end and all sides of the contents, and closing the wrapper onto the opposite end by forming regular or irregular pleats
11/56 . Rolling articles with wrappers along a supporting surface (for bottles B65B 21/26)
11/58 . Applying two or more wrappers, e.g. in succession

13/00 Bundling articles (specially adapted for harvesting A01D 37/00, A01D 39/00, A01D 59/00, A01F 1/00; bundling particular articles presenting special problems using string, wire, or narrow tape or band B65B 27/00)

13/02 . Applying and securing binding material around articles or groups of articles, e.g. using strings, wires, strips, bands, or tapes (tying devices in baling presses A01F 15/14, B30B 9/30; applying reinforcing means to non-metal sleepers E01B 31/28) **[3]**

13/04 . . with means for guiding the binding material around the articles prior to severing from supply
13/06 . . . Stationary ducts or channels
13/08 . . . Single guide or carrier for the free end of material movable part-way around articles from one side only
13/10 . . . Carriers travelling completely around the articles while holding the free end of material
13/12 . . . . attached to rotating rings
13/14 . . . Pairs of carriers or guides movable around opposite sides of the articles
13/16 . . with means for severing the binding material from supply and then applying it around the articles
13/18 . Details of, or auxiliary devices used in, bundling machines
13/20 . . Means for compressing or compacting bundles prior to bundling
13/22 . . Means for controlling tension of binding means
13/24 . . Securing ends of binding material
13/26 . . . by knotting
13/28 . . . by twisting
13/30 . . . by deforming the overlapping ends of the strip or band
13/32 . . . by welding, soldering, or heat-sealing; by applying adhesive
13/34 . . . by applying separate securing members, e.g. deformable clips

15/00 Attaching articles to cards, sheets, strings, webs, or other carriers

15/02 . Attaching small articles, e.g. buttons, to cards (cards for buttons, collar-studs, or sleeve-links A44B 7/00)
15/04 . Attaching a series of articles, e.g. small electrical components, to a continuous web

17/00 Other machines, apparatus, or methods for packaging articles or materials

17/02 . Joining articles, e.g. cans, directly to each other for convenience of storage, transport, or handling

Machines, apparatus, or methods adapted for packaging articles or materials presenting special problems, or for special packaging operations; **Unpacking bottles or eggs**

19/00 Packaging rod-shaped or tubular articles susceptible to damage by abrasion or pressure, e.g. cigarettes, cigars, macaroni, spaghetti, drinking straws, welding electrodes (final treatment of cigars or cigarettes after manufacture A24C 1/38, A24C 5/60)

19/02 . Packaging cigarettes
19/04 . . Arranging, feeding, or orientating the cigarettes
19/06 . . . Turning individual cigarettes to present printed marks in desired position
19/08 . . . Positioning oval cigarettes in overlapped arrangement
19/10 . . . Arranging cigarettes in layers each comprising a predetermined number
19/12 . . Inserting the cigarettes, or wrapped groups thereof, into preformed containers
19/14 . . . into pocket boxes, e.g. boxes of rectangular form closed at one end by a flap adapted to be inserted into a slot in the body
19/16 . . . . into boxes with two pockets
19/18 . . . into drawer-and-shell type boxes or cartons
19/20 . . . into boxes with hinged lids
19/22 . . Wrapping the cigarettes; Packaging the cigarettes in containers formed by folding wrapping material around formers
19/24 . . . using hollow mandrels through which groups of cigarettes are fed
19/26 . Machines specially adapted for packaging cigars
19/28 . Control devices for cigarette or cigar packaging machines (of general application in packaging machines B65B 57/00)
19/30 . . responsive to presence of faulty articles, e.g. incorrectly-filled cigarettes
19/32 . . responsive to incorrect grouping of articles or to incorrect filling of packages
19/34 . Packaging other rod-shaped articles, e.g. sausages, macaroni, spaghetti, drinking straws, welding electrodes

21/00 Packaging or unpacking of bottles (bundling bottles B65B 27/04)

21/02 . into or from preformed containers, e.g. crates
21/04 . . Arranging, assembling, feeding, or orientating the bottles prior to introduction into, or after removal from, containers
21/06 . . . Forming groups of bottles
21/08 . . Introducing or removing single bottles, or groups of bottles, e.g. for progressive filling or emptying of containers
21/10 . . . using gravity flow
21/12 . . . using grippers engaging bottles, e.g. bottle necks (grippers in general B25J) **[3]**
21/14 . . Introducing or removing groups of bottles, for filling or emptying containers in one operation
21/16 . . . using gravity flow
21/18 . . . using grippers engaging bottles, e.g. bottle necks (grippers in general B25J) **[3]**
21/20 . . . . with means for varying spacing of bottles
21/22 . . . by inverting and raising or lowering the container relative to bottles
21/24 . Enclosing bottles in wrappers
21/26 . . Applying wrappers to individual bottles by operations involving rotation or rolling of the bottles (to articles in general B65B 11/56)

23/00 Packaging fragile or shock-sensitive articles other than bottles; **Unpacking eggs** (embedding articles in shock-absorbing media B65B 55/20)

23/02 . Packaging or unpacking eggs
23/04 . . Erecting egg trays or cartons from collapsed blanks
23/06 . . Arranging, feeding, or orientating the eggs to be packed; Removing eggs from trays or cartons
23/08 . . . using grippers (testing, sorting, or cleaning eggs A01K 43/00; egg grippers for cooking purposes A47J 29/06)
23/10 . Packaging biscuits
23/12 . . Arranging, feeding, or orientating the biscuits to be packaged (in connection with baking A21C 15/00)
23/14 . . . Forming groups of biscuits
23/16 . . Inserting the biscuits, or wrapped groups thereof, into preformed containers
23/18 . . Wrapping individual biscuits, or groups of biscuits
23/20 . Packaging plate glass, tiles, or shingles
23/22 . Packaging glass ampoules, lamp bulbs, radio valves or tubes, or the like

25/00 Packaging other articles presenting special problems (bundling B65B 27/00)

25/02 . Packaging agricultural or horticultural products

25/04 . . Packaging fruit or vegetables (bag or sack-filling devices associated with digging harvesters A01D 33/10)
25/06 . Packaging slices or specially-shaped pieces of meat, cheese, or other plastic or tacky products
25/08 . . between layers or strips of sheet or web material, e.g. in webs folded to zig-zag form
25/10 . . Forming sector-shaped packages of cheese or like plastic products
25/12 . . . and enclosing in circular containers
25/14 . Packaging paper or like sheets, envelopes, or newspapers, in flat, folded, or rolled form
25/16 . Packaging bread or like bakery products, e.g. unsliced loaves **[2]**
25/18 . . Wrapping sliced bread (cutting or slicing machines or devices specially adapted for baked articles other than bread A21C 15/04, for bread B26B, B26D)
25/20 . Packaging garments, e.g. socks, stockings, shirts
25/22 . Packaging articles of food, e.g. fish fillets, intended to be cooked in the package
25/24 . Packaging annular articles, e.g. tyres

27/00 Bundling particular articles presenting special problems using string, wire, or narrow tape or band; **Baling fibrous material, e.g. peat, not otherwise provided for** (bundling articles in general B65B 13/00)
27/02 . Bundling bricks or other building blocks
27/04 . Bundling groups of cans or bottles
27/06 . Bundling coils of wire or like annular objects
27/08 . Bundling paper sheets, envelopes, bags or other thin flat articles; Bundling newspapers
27/10 . Bundling rods, sticks, or like elongated objects
27/12 . Baling or bundling compressible fibrous material, e.g. peat (baling presses for straw, hay, or the like A01F 15/00; baling presses in general B30B 9/30)

29/00 Packaging of materials presenting special problems
29/02 . Packaging of substances, e.g. tea, which are intended to be infused in the package
29/04 . . Attaching, or forming and attaching, string handles or tags to tea bags
29/06 . Packaging of substances to which a further ingredient, e.g. water, is to be added in the package by the user for mixing prior to dispensing
29/08 . Packaging of edible materials intended to be cooked in the package (infusible substances B65B 29/02)
29/10 . Packaging two or more different substances isolated from one another in the package but capable of being mixed without opening the package, e.g. forming packages containing a resin and hardener isolated by a frangible partition

31/00 Packaging articles or materials under special atmospheric or gaseous conditions; **Adding propellants to aerosol containers** (auxiliary treatments during loading or unloading in a fluid medium other than air B65G 69/20)
31/02 . Filling, closing, or filling and closing, containers in chambers maintained under vacuum or superatmospheric pressure or containing a special atmosphere, e.g. of inert gas
31/04 . Evacuating, pressurising, or gasifying filled containers or wrappers by means of nozzles through which air or other gas, e.g. an inert gas, is withdrawn or supplied (nozzles for introducing articles or materials into containers B65B 39/00)
31/06 . . the nozzle being arranged for insertion into, and withdrawal from, the mouth of a filled container and operating in conjunction with means for sealing the container mouth
31/08 . . the nozzle being adapted to pierce the container or wrapper
31/10 . Adding propellants in solid form to aerosol containers

33/00 Packaging articles by applying removable, e.g. strippable, coatings (B65B 11/52 takes precedence; applying liquids or other fluent materials to surfaces in general B05; wrapping cores by winding B65H 81/00) **[3]**
33/02 . Packaging small articles, e.g. spare parts for machines or engines
33/04 . Packaging large articles, e.g. complete machines, aircraft
33/06 . . the coating being applied to a supporting layer or framework of sheets or strips of thin flexible material, e.g. cocoon packaging

Details of, auxiliary devices applied to, or auxiliary measures taken in, machines, apparatus, or methods, not otherwise provided for

35/00 Supplying, feeding, arranging, or orientating articles to be packaged (cigarettes B65B 19/04; bottles B65B 21/04; eggs B65B 23/06; biscuits B65B 23/12; if not restricted to packaging machines B07C, B65G, B65H)
35/02 . Supply magazines
35/04 . . with buffer storage devices
35/06 . Separating single articles from loose masses of articles
35/08 . . using pocketed conveyers
35/10 . Feeding, e.g. conveying, single articles (orientating B65B 35/56)
35/12 . . by gravity
35/14 . . by agitators or vibrators
35/16 . . by grippers
35/18 . . . by suction-operated grippers
35/20 . . by reciprocating or oscillatory pushers
35/22 . . by roller-ways
35/24 . . by endless belts or chains
35/26 . . by rotary conveyers
35/28 . . by pneumatic conveyers
35/30 . Arranging and feeding articles in groups (orientating B65B 35/56)
35/32 . . by gravity
35/34 . . by agitators or vibrators
35/36 . . by grippers
35/38 . . . by suction-operated grippers
35/40 . . by reciprocating or oscillatory pushers
35/42 . . by roller-ways
35/44 . . by endless belts or chains
35/46 . . by rotary conveyers
35/48 . . by pneumatic conveyers
35/50 . . Stacking one article, or group of articles, upon another before packaging
35/52 . . . building-up the stack from the bottom
35/54 . . Feeding articles along multiple paths to a single packaging position
35/56 . Orientating, i.e. changing the attitude of, articles, e.g. of non-uniform cross-section
35/58 . . Turning articles by positively-acting means, e.g. to present labelled portions in uppermost position

37/00 **Supplying or feeding fluent-solid, plastic, or liquid material, or loose masses of small articles, to be packaged** (methods of, or means for, filling individual containers with such materials or articles B65B 1/04, B65B 3/04)

37/02 . by gravity flow
37/04 . by vibratory feeders
37/06 . by pistons or pumps
37/08 . by rotary feeders
37/10 . . of screw type
37/12 . . of centrifugal type
37/14 . by pneumatic feeders
37/16 . Separating measured quantities from supply (in container-filling machines B65B 1/30, B65B 3/26)
37/18 . . by weighing (in general G01G)
37/20 . . by volume measurement (in general G01F)

39/00 **Nozzles, funnels, or guides for introducing articles or materials into containers or wrappers** (nozzles in general B05B; funnels in general B67C 11/00)

39/02 . Expansible or contractible nozzles, funnels, or guides
39/04 . having air-escape, or air-withdrawal, passages
39/06 . adapted to support containers or wrappers
39/08 . . by means of clamps
39/10 . . . operating automatically
39/12 . movable towards, or away from, container or wrapper during filling or depositing
39/14 . movable with a moving container or wrapper during filling or depositing

41/00 **Supplying or feeding container-forming sheets or wrapping material** (in general B65H)

41/02 . Feeding sheets or wrapper blanks
41/04 . . by grippers
41/06 . . . by suction-operated grippers
41/08 . . by reciprocating or oscillating pushers
41/10 . . by rollers
41/12 . Feeding webs from rolls
41/14 . . by grippers
41/16 . . by rollers
41/18 . Registering sheets, blanks, or webs

43/00 **Forming, feeding, opening, or setting-up containers or receptacles in association with packaging** (forming pockets in sheets, blanks, or webs, by pressing the material into forming dies or moving it through folding dies B65B 47/00)

43/02 . Forming flat bags from individual sheets or blanks
43/04 . Forming flat bags from webs
43/06 . . from more than one web
43/08 . Forming three-dimensional containers from sheet material
43/10 . . by folding the material
43/12 . Feeding flexible bags or carton blanks in flat or collapsed state; Feeding flat bags connected to form a series or chain
43/14 . . Feeding individual bags or carton blanks from piles or magazines
43/16 . . . by grippers
43/18 . . . . by suction-operated grippers
43/20 . . . by reciprocating or oscillating pushers
43/22 . . . by rollers
43/24 . Breaking creases to facilitate setting-up cartons
43/26 . Opening or distending bags; Opening, erecting, or setting-up boxes, cartons, or carton blanks
43/28 . . by grippers co-operating with fixed supports
43/30 . . by grippers engaging opposed walls, e.g. suction-operated
43/32 . . by external pressure diagonally applied
43/34 . . by internal pressure
43/36 . . . applied pneumatically
43/38 . Opening hinged lids
43/39 . . Opening-out closure flaps clear of bag, box, or carton mouth
43/40 . Removing separate lids
43/41 . Opening drawer-and-shell cartons
43/42 . Feeding or positioning bags, boxes, or cartons in the distended, opened, or set-up state; Feeding preformed rigid containers, e.g. tins, capsules, glass tubes, glasses, to the packaging position; Locating containers or receptacles at the filling position (by means of filling nozzles B65B 39/00); Supporting containers or receptacles during the filling operation (by filling nozzles B65B 39/00)
43/44 . . from supply magazines (B65B 43/46 to B65B 43/52 take precedence) **[3]**
43/46 . . using grippers
43/48 . . using reciprocating or oscillating pushers
43/50 . . using rotary tables or turrets
43/52 . . using roller-ways or endless conveyers
43/54 . . Means for supporting containers or receptacles during the filling operation
43/56 . . . movable stepwise to position container or receptacle for the reception of successive increments of contents
43/58 . . . . vertically movable
43/59 . . . vertically movable (B65B 43/58 takes precedence) **[3]**
43/60 . . . rotatable
43/62 . . . . about an axis located at the filling position, e.g. the axis of the container or receptacle

45/00 **Apparatus or devices for supporting or holding wrappers during wrapping operation** (filling nozzles, funnels, guides B65B 39/00)

47/00 **Apparatus or devices for forming pockets or receptacles in or from sheets, blanks, or webs, comprising essentially a die into which the material is pressed or a folding die through which the material is moved**

47/02 . with means for heating the material prior to forming
47/04 . by application of mechanical pressure
47/06 . . using folding dies
47/08 . by application of fluid pressure
47/10 . . by vacuum

49/00 **Devices for folding or bending wrappers around contents**

49/02 . Fixed or resiliently-mounted folders, e.g. non-driven rollers
49/04 . . Ploughs or plates with inclined slots or opposed inclined edges
49/06 . Resilient folders, e.g. brushes, diaphragms
49/08 . Reciprocating or oscillating folders
49/10 . Folders movable in closed non-circular paths
49/12 . Rotary folders
49/14 . Folders forming part of, or attached to, conveyers for partially-wrapped articles
49/16 . Pneumatic means, e.g. air jets

51/00 Devices for, or methods of, sealing or securing package folds or closures, e.g. twisted bag necks

51/02 . Applying adhesives or sealing liquids (activating adhesives by applying heat or pressure B65B 51/10)
51/04 . Applying separate sealing or securing members, e.g. clips (applying separate lids or covers B65B 7/28)
51/05 . . Stapling
51/06 . . Applying adhesive tape (adhesive tape dispensers B65H 35/07)
51/07 . . Sewing or stitching
51/08 . . Applying binding material, e.g. to twisted bag necks
51/09 . by deformation of the closure **[6]**
51/10 . Applying or generating heat or pressure or combinations thereof (B65B 51/09 takes precedence) **[6]**
51/12 . . by resilient means, e.g. brushes
51/14 . . by reciprocating or oscillating members
51/16 . . by rotary members
51/18 . . by endless bands or chains
51/20 . . by fluid pressure acting directly on folds or on opposed surfaces, e.g. using hot-air jets (shrinking wrappers by heating B65B 53/02)
51/22 . . by friction or ultrasonic or high-frequency electrical means
51/24 . . to produce bead seals (combined with severing by heated wires or rods B65B 61/10)
51/26 . . Devices specially adapted for producing transverse or longitudinal seams in webs or tubes
51/28 . . . Rollers for producing longitudinal and transverse seams simultaneously
51/30 . . . Devices, e.g. jaws, for applying pressure and heat successively, e.g. for subdividing filled tubes (for subdividing filled tubes involving displacement of contents B65B 9/12)
51/32 . Cooling, or cooling and pressing, package closures after heat-sealing

53/00 Shrinking wrappers, containers, container covers or container cover securing members during or after packaging

53/02 . by heat
53/04 . . supplied by liquids
53/06 . . supplied by gases, e.g. hot-air jets

55/00 Preserving, protecting, or purifying packages or package contents in association with packaging (by packaging under special atmospheric or gaseous conditions B65B 31/00; devices for placing protecting sheets, plugs, or wads over contents B65B 61/22; if not restricted to packaging A23L, A61L)

55/02 . Sterilising, e.g. of complete packages
55/04 . . Sterilising wrappers or receptacles prior to, or during, packaging
55/06 . . . by heat
55/08 . . . by irradiation
55/10 . . . by liquids or gases (B65B 55/06 takes precedence)
55/12 . . Sterilising contents prior to, or during, packaging
55/14 . . . by heat
55/16 . . . by irradiation
55/18 . . . by liquids or gases (B65B 55/14 takes precedence)
55/19 . . . by adding materials intended to remove free oxygen or to develop inhibitor gases, e.g. vapour-phase inhibitors
55/20 . Embedding contents in shock-absorbing media, e.g. plastic foam, granular material
55/22 . Immersing contents in protective liquids
55/24 . Cleaning of, or removing dust from, containers, wrappers, or packaging

57/00 Automatic control, checking, warning, or safety devices (registering wrapping or container-forming material fed from rolls B65B 41/18; accident-prevention measures applicable for general use F16P; photoelectric cells H01J, H01L; such devices in general, see the relevant classes)

57/02 . responsive to absence, presence, abnormal feed, or misplacement of binding or wrapping material, containers, or packages
57/04 . . and operating to control, or to stop, the feed of such material, containers, or packages
57/06 . . and operating to control, or to stop, the feed of articles or material to be packaged
57/08 . . and operating to stop, or to control the speed of, the machine as a whole
57/10 . responsive to absence, presence, abnormal feed, or misplacement of articles or materials to be packaged
57/12 . . and operating to control, or stop, the feed of wrapping materials, containers, or packages
57/14 . . and operating to control, or stop, the feed of articles or material to be packaged
57/16 . . and operating to stop, or to control the speed of, the machine as a whole
57/18 . causing operation of audible or visible alarm signals
57/20 . Applications of counting devices for controlling the feed of articles (other applications B65B 65/08)

59/00 Arrangements to enable machines to handle articles of different sizes, to produce packages of different sizes, to vary the contents of packages, or to give access for cleaning or maintenance purposes

59/02 . Arrangements to enable adjustments to be made while the machine is running (weight or volumetric adjustment of material to be packaged B65B 1/30, B65B 3/26)
59/04 . Machines constructed with readily-detachable units or assemblies, e.g. to facilitate maintenance

61/00 Auxiliary devices, not otherwise provided for, for operating on sheets, blanks, webs, binding material, containers or packages

61/02 . for perforating, scoring, or applying code or date marks on material prior to packaging
61/04 . for severing webs, or for separating joined packages
61/06 . . by cutting
61/08 . . . using rotary cutters
61/10 . . . using heated wires or cutters
61/12 . . by tearing along perforations or lines of weakness
61/14 . for incorporating, or forming and incorporating, handles or suspension means in packages (attaching, or forming and attaching, string handles or tags to tea-bags B65B 29/04)
61/16 . . Forming suspension apertures in packages
61/18 . for applying or incorporating package-opening or unpacking elements, e.g. tear-strips
61/20 . for adding cards, coupons, or other inserts to package contents (adding unpacking elements B65B 61/18; labelling B65C)
61/22 . . for placing protecting sheets, plugs, or wads over contents, e.g. cotton-wool in bottles of pills
61/24 . for shaping or reshaping completed packages

61/26 . for marking or coding completed packages
61/28 . for discharging completed packages from machines

63/00 Auxiliary devices, not otherwise provided for, for operating on articles or materials to be packaged
63/02 . for compressing or compacting articles or materials prior to wrapping or insertion in containers or receptacles (tabletting or compressing of powders B30B 11/00)
63/04 . for folding or winding articles, e.g. gloves, stockings (folding or winding webs or filamentary material in general B65H 45/00, B65H 54/00; folding textile articles in connection with laundering preparatory to packaging D06F 89/00)
63/06 . . Forming elongated hanks, e.g. of shoe laces
63/08 . for heating or cooling articles or materials to facilitate packaging

65/00 Details peculiar to packaging machines and not otherwise provided for; **Arrangements of such details**
65/02 . Driving gear
65/04 . Mechanisms for converting a continuous rotary motion to intermittent rotary motion, e.g. Geneva drives
65/06 . coated or treated with anti-friction or anti-sticking materials, e.g. polytetrafluoroethylene
65/08 . Devices for counting or registering the number of articles handled, or the number of packages produced by the machine

67/00 Apparatus or devices facilitating manual packaging operations; **Sack holders**
67/02 . Packaging of articles or materials in containers
67/04 . . Devices facilitating insertion of single articles, or groups or articles, into bags
67/06 . . Manually-operable devices for closing bag necks, by applying and securing lengths of string, wire, or tape
67/08 . Wrapping of articles
67/10 . . Wrapping-tables
67/12 . Sack holders, i.e. stands or frames with means for supporting sacks in the open condition to facilitate filling with articles or materials

69/00 Unpacking of articles or materials, not otherwise provided for

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B65C LABELLING OR TAGGING MACHINES, APPARATUS, OR PROCESSES (nailing or stapling in general B25C, B27F; processes for applying decalcomanias B44C 1/16; applying labels for packaging purposes B65B; labels, name-plates G09F)

Note

In this subclass, the following term is used with the meaning indicated:
– "labels" covers also decalcomanias, stamps or the like.

1/00 Labelling flat essentially-rigid surfaces (labelling of fabrics B65C 5/00)
1/02 . Affixing labels to one flat surface of articles, e.g. of packages, of flat bands
1/04 . Affixing labels, e.g. wrap-around labels, to two or more flat surfaces of a polyhedral article

3/00 Labelling other than flat surfaces (of fabrics B65C 5/00)
3/02 . Affixing labels to elongated objects, e.g. wires, cables, bars, tubes
3/04 . . Applying bands or labels to cigars or cigarettes
3/06 . Affixing labels to short rigid containers
3/08 . . to container bodies
3/10 . . . the container being positioned for labelling with its centre-line horizontal
3/12 . . . . by rolling the labels onto cylindrical containers, e.g. bottles
3/14 . . . the container being positioned for labelling with its centre-line vertical
3/16 . . . . by rolling the labels onto cylindrical containers, e.g. bottles
3/18 . . to container necks
3/20 . . to bottle closures (applying closures or capsules to bottles B67B)
3/22 . . . Affixing metal foil coverings
3/24 . . . Affixing labels indicating original state of bottle snap or screw closure
3/26 . Affixing labels to non-rigid containers, e.g. bottles made of polyethene, boxes to be inflated by internal air pressure prior to labelling

5/00 Labelling fabrics or comparable materials or articles with deformable surface, e.g. paper, fabric rolls, stockings, shoes (affixing labels to non-rigid containers B65C 3/26; by sewing D05B)
5/02 . using adhesives
5/04 . . Thermo-activatable adhesives
5/06 . using staples

7/00 Affixing tags (in combination with filling of tea bags B65B 29/04)

9/00 Details of labelling machines or apparatus
9/02 . Devices for moving articles, e.g. containers, past labelling station
9/04 . . having means for rotating the articles
9/06 . Devices for presenting articles in predetermined attitude or position at labelling station
9/08 . Label feeding
9/10 . . Label magazines
9/12 . . Removing separate labels from stacks (for printing B41F)
9/14 . . . by vacuum
9/16 . . . by wetting devices
9/18 . . Label feeding from strips, e.g. from rolls
9/20 . Gluing the labels or articles

9/22 . . by wetting, e.g. by applying liquid glue or a liquid to a dry glue coating
9/24 . . by heat
9/25 . . . by thermo-activating the glue **[2]**
9/26 . Devices for applying labels
9/28 . . Air-blast devices
9/30 . . Rollers
9/32 . . . Co-operating rollers between which articles and labels are fed
9/34 . . Flexible bands
9/36 . . Wipers; Pressers
9/38 . Label cooling or drying
9/40 . Controls; Safety devices
9/42 . . Label feed control
9/44 . . . by special means responsive to marks on labels or articles (feed control in wrapping B65B)
9/46 . Applying date marks, code marks, or the like, to the label during labelling (manually-controlled or operable apparatus having printing equipment B65C 11/02; ticket printing and issuing G07B 1/00)

11/00 Manually-controlled or manually-operable label dispensers, e.g. modified for the application of labels to articles (special furniture, fittings, or accessories for shops, storehouses, bars, or the like A47F; for paper napkins, for toilet paper A47K; for playing cards A63F; movable-strip writing or reading apparatus B42D 19/00; adhesive tape dispensers B65H 35/07; dispensers for tickets G07B; coin-operated dispensers for stamps G07F)
11/02 . having printing equipment
11/04 . having means for moistening the labels
11/06 . having means for heating thermo-activatable labels

B65D CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, E.G. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; **ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR**; **PACKAGING ELEMENTS**; **PACKAGES** (containers specially adapted for storing agricultural or horticultural products A01F 25/14; containers specially adapted for use in dairies A01J; purses, luggage, hand carried bags A45C; travelling or camp equipment, sacks or packs carried on the body A45F; household or table equipment A47G; mail or newspapers receptacles A47G 29/12; kitchen equipment A47J; packages or wrapping arrangements for used absorbent pads A61F 13/551; associated with vehicles, see the appropriate subclass of B60 to B64; machines, apparatus, or devices for, or methods of, packaging articles or materials B65B; sack holders B65B 67/00; refuse receptacles B65F 1/00; handling sheets, webs or filamentary material B65H; load-engaging elements or devices attached to lifting or lowering gear of cranes or adapted for connection therewith for transmitting lifting forces B66C; liquid handling B67; storing gases F17; making containers, see subclasses dealing with the working of the material concerned)

(1) This subclass covers: **[6]**
– containers, packaging elements or packages with auxiliary means or provision for displaying articles or materials; **[6]**
– methods of packaging which are wholly characterised by the form of the package produced or the form of the container or packaging element used, as distinct from the operations performed or the apparatus employed, which are covered by subclass B65B. **[6]**

(2) This subclass, which is intended to be as comprehensive as possible, only excludes containers or packages of a nature clearly confined to a single other subclass, which are classified in that subclass.

(3) In this subclass, groups B65D 5/00, B65D 27/00, B65D 30/00 or B65D 65/00 include constructional features of foldable or erectable container or wrapper blanks as well as the containers or wrappers formed by folding or erecting such blanks.

(4) Containers, packaging elements or packages classified in group B65D 85/00, are also classified according to the constructional or functional features, if such features are of interest. **[6]**

(5) Large containers, as defined in Note (6) below, are classified in groups B65D 88/00 or B65D 90/00. Features that are of interest for containers in general may also be classified in other groups of subclass B65D when they are considered to represent information of interest for search. **[2009.01]**

(6) In this subclass, the following terms or expressions are used with the meanings indicated:
– "rigid or semi-rigid containers" includes:
  (a) containers not deformed by, or not taking-up the shape of, their contents;
  (b) containers adapted to be temporarily deformed to expel their contents;
  (c) pallets;
  (d) trays;
– "flexible containers" includes:
  (a) containers deformed by, or taking-up the shape of, their contents;
  (b) containers adapted to be permanently deformed to expel their contents;
– "packaging elements" includes:
  (a) elements, other than containers, for covering, protecting, stiffening, or holding together articles or materials to be stored or transported;
  (b) packaging materials of special type or form not provided for in other subclasses;
– "packages" includes:
  (a) combinations of containers or packaging elements with articles or materials to be stored or transported;
  (b) articles joined together for convenience of storage or transport;
– "paper" includes materials, e.g. cardboard, plastic sheet materials, laminated materials, or metal foils, worked in a manner analogous to paper;
– "large containers", in groups B65D 88/00or B65D 90/00, means containers having about the size of containers used in container traffic, sometimes referred to as freight, forwarding or "ISO" (International Standardization Organization) containers, or larger containers. **[3]**

(7) Tamper-indicating means for containers or closures are classified in the group appropriate to the type of container or closure, e.g. B65D 5/43, B65D 5/54, B65D 17/00, B65D 27/30, B65D 27/34, B65D 33/34, B65D 41/32, B65D 47/36, B65D 49/12, B65D 51/20, B65D 55/06. **[6]**

Subclass index

General kinds of rigid or semi-rigid containers [3]

1/00 **Rigid or semi-rigid containers having bodies formed in one piece, e.g. by casting metallic material, by moulding plastics, by blowing vitreous material, by throwing ceramic material, by moulding pulped fibrous material or by deep-drawing operations performed on sheet material** (by winding, bending, or folding paper B65D 3/00, B65D 5/00; specially constructed to be opened by cutting, piercing, or tearing of wall portions B65D 17/00; pallets B65D 19/00; details of bottles or of jars B65D 23/00; bundles of articles held together by packaging elements for convenience of storage or transport, e.g. portable segregating carriers for plural receptacles such as beer cans or pop bottles, B65D 71/00) **[5]**

1/02 . Bottles or similar containers with necks or like restricted apertures, designed for pouring contents (thermally insulated containers B65D 81/38, A47J 41/00)

1/04 . . Multi-cavity bottles

1/06 . . with closable apertures at bottom

1/08 . . adapted to discharge drops (droppers B65D 47/18)

1/09 . Ampoules (specially adapted for medical or pharmaceutical purposes A61J 1/06) **[5]**

1/10 . Jars, e.g. for preserving foodstuffs

1/12 . Cans, casks, barrels, or drums

1/14 . . characterised by shape

1/16 . . . of curved cross-section, e.g. cylindrical

1/18 . . . of polygonal cross-section

1/20 . . characterised by location or arrangement of filling or discharge apertures

1/22 . Boxes or like containers with side walls of substantial depth for enclosing contents

1/24 . . with moulded compartments or partitions

1/26 . . Thin-walled containers, e.g. formed by deep-drawing operations

1/28 . . . formed of laminated material

1/30 . . . Groups of containers joined together end-to-end or side-by-side

1/32 . Containers adapted to be temporarily deformed by external pressure to expel contents (containers with disinfecting linings A61L 2/00; oil cans F16N 3/00)

1/34 . Trays or like shallow containers

1/36 . . with moulded compartments or partitions

1/38 . Baskets or like containers of skeleton or apertured construction

1/40 . Details of walls (other container details B65D 23/00, B65D 25/00)

1/42 . . Reinforcing or strengthening parts or members

1/44 . . . Corrugations

1/46 . . . Local reinforcements, e.g. adjacent closures

1/48 . . . Reinforcements of dissimilar materials, e.g. metal frames in plastic walls

3/00 **Rigid or semi-rigid containers having bodies or peripheral walls of curved or partially-curved cross-section made by winding or bending paper without folding along defined lines** (with end walls of different materials B65D 6/00, B65D 8/00)

3/02 . characterised by shape

3/04 . . essentially cylindrical

3/06 . . essentially conical or frusto-conical

3/08 . . having a cross-section of varying shape, e.g. circular merging into square or rectangular

3/10 . characterised by form of integral or permanently-secured end closure

3/12 . . Flanged discs permanently secured, e.g. by adhesives, by heat-sealing

3/14 . . . Discs fitting within container end and secured by bending, rolling, or folding operations

3/16 . . Discs without flanges engaging a groove in the container body

3/18 . . . and secured by rolling in the end of the body

3/20 . . with end portion of body adapted to be closed, by flattening or folding operations, e.g. formed with crease lines or flaps

3/22 . with double walls; with walls incorporating air-chambers; with walls made of laminated material
3/24 . with several compartments
3/26 . Opening arrangements or devices incorporated in, or attached to, containers
3/28 . Other details of walls
3/30 . . Local reinforcements, e.g. metallic rims

5/00 Rigid or semi-rigid containers of polygonal cross-section, e.g. boxes, cartons, trays, formed by folding or erecting one or more blanks made of paper (pallets B65D 19/00; bundles of articles held together by packaging elements for convenience of storage or transport, e.g. portable segregating carriers for plural receptacles such as beer cans, pop bottles, B65D 71/00; forming foldable or erectable blanks B31B) **[5]**

5/02 . by folding or erecting a single blank to form a tubular body with or without subsequent folding operations, or the addition of separate elements, to close the ends of the body (B65D 5/36 takes precedence)
5/04 . . the tubular body having no end closures (shells of drawer-and-shell type containers B65D 5/38)
5/06 . . with end-closing or contents-supporting elements formed by folding inwardly a wall extending from, and continuously around, an end of the tubular body
5/08 . . with end closures formed by inward-folding of portions of body, e.g. flaps, interconnected by, or incorporating, gusset folds (by inward-folding of a wall extending continuously around an end of the body and incorporating gusset folds B65D 5/06)
5/10 . . with end closures formed by inward-folding of self-locking flaps hinged to tubular body
5/12 . . with end closures formed separately from tubular body
5/14 . . . with inset end closures
5/16 . . the tubular body being formed with an aperture or removable portion arranged to allow removal or insertion of contents through one or more sides (contents-dispensing means B65D 5/72)
5/18 . by folding a single blank to U-shape to form the base of the container and opposite sides of the body portion, the remaining sides being formed primarily by extensions of one or more of these opposite sides, e.g. flaps hinged thereto (B65D 5/36 takes precedence)
5/20 . by folding-up portions connected to a central panel from all sides to form a container body, e.g. of tray-like form (B65D 5/36 takes precedence)
5/22 . . held erect by extensions of one or more sides being doubled-over to enclose extensions of adjacent sides
5/24 . . with adjacent sides interconnected by gusset folds
5/26 . . with extensions of opposite sides mutually interlocking to lie against other sides
5/28 . . with extensions of sides permanently secured to adjacent sides, with sides permanently secured together by adhesive strips, or with sides held in place solely by rigidity of material
5/30 . . with tongue-and-slot or like connections between sides and extensions of other sides
5/32 . having bodies formed by folding and interconnecting two or more blanks (B65D 5/36 takes precedence)
5/34 . . one blank forming three sides of the body, and the other blank forming the remaining sides, a hinged lid, and the opposite end closure
5/35 . . . one blank forming three sides of a four-sided body, and the other blank forming the remaining side, a hinged lid, and the opposite end closure **[2]**
5/355 . specially adapted to be of variable capacity **[6]**
5/36 . specially constructed to allow collapsing and re-erecting without disengagement of side or bottom connections
5/38 . Drawer-and-shell type containers
5/40 . specially constructed to contain liquids
5/42 . Details of containers or of foldable or erectable container blanks
5/43 . . Containers characterised by means discouraging or indicating unauthorised opening of the container **[6]**
5/44 . . Integral, inserted or attached portions forming internal or external fittings **[6]**
5/46 . . . Handles
5/462 . . . . formed by folding a blank **[6]**
5/465 . . . . . not integral with the container **[6]**
5/468 . . . . Handholds in container body **[6]**
5/472 . . . . of metal, e.g. wire **[6]**
5/475 . . . . of plastics **[6]**
5/478 . . . . of cord **[6]**
5/48 . . . Partitions
5/4805 . . . . integral **[6]**
5/481 . . . . . forming compartments in at least two rows **[6]**
5/482 . . . . . Longitudinal partition provided with cut flaps which are folded perpendicular to the partition **[6]**
5/483 . . . . . formed by folding extensions hinged to the upper or lower edges of a tubular container body (B65D 5/482 takes precedence) **[6]**
5/484 . . . . . formed by folding extensions of side panels of a tray-like container body blank **[6]**
5/485 . . . . . combined with inserted partitions **[6]**
5/486 . . . . . formed by folding extensions hinged to a tubular container body along hinge lines parallel to its axis (B65D 5/481 takes precedence) **[6]**
5/487 . . . . . formed by folding extensions hinged to the upper or lower edges of a tubular container body (B65D 5/483 takes precedence) **[6]**
5/488 . . . . . formed by folding extensions of side panels of a tray-like container body blank (B65D 5/484 takes precedence) **[6]**
5/489 . . . . . formed by folding inwardly portions cut in the container body (B65D 5/481 takes precedence) **[6]**
5/49 . . . . inserted **[6]**
5/491 . . . . . forming compartments in at least two rows (B65D 5/485 takes precedence) **[6]**
5/492 . . . . . formed by folding a single blank (B65D 5/493, B65D 5/494 take precedence) **[6]**
5/493 . . . . . provided with an at least partial bottom **[6]**
5/494 . . . . . Longitudinal partition provided with cut flaps which are folded perpendicular to the partition **[6]**
5/495 . . . . . formed by crossed strips with inter-engaging slots **[6]**

5/496 . . . . . formed by folding strips into a tubular, U- or S- section (B65D 5/491 takes precedence) **[6]**
5/497 . . . . . Blank provided with cut flaps which are folded perpendicular to the blank (B65D 5/491 takes precedence) **[6]**
5/498 . . . . . Partitions with one or more flaps formed by folding, and fixed to, or maintained in position by, the sides of the container body (B65D 5/491, B65D 5/496, B65D 5/497 take precedence) **[6]**
5/499 . . . . . Partitions formed from non-folded strips engaged in slots or grooves in the sides of the container body (B65D 5/491 takes precedence) **[6]**
5/50 . . . Internal supporting or protecting elements for contents (elements formed by inward- folding of a wall extending from, and continuously around, an end of a tubular body B65D 5/06; partitions B65D 5/48)
5/52 . . . External stands or display elements for contents
5/54 . . Lines of weakness to facilitate opening of container or dividing it into separate parts by cutting or tearing (break-in flaps, or members adapted to be torn-off, to provide pouring openings B65D 5/70)
5/56 . . Linings or internal coatings
5/58 . . . Linings spaced appreciably from container wall
5/60 . . . Loose linings
5/62 . . External coverings or coatings
5/63 . . having two or more separate access openings (contents-dispensing means B65D 5/72) **[6]**
5/64 . . Lids
5/66 . . . Hinged lids (B65D 5/34 takes precedence)
5/68 . . . Telescope flanged lids
5/70 . . Break-in flaps, or members adapted to be torn-off, to provide pouring openings (B65D 5/74 takes precedence)
5/72 . . Contents-dispensing means
5/74 . . . Spouts
5/76 . . . for discharging metered quantities

6/00 Containers having bodies formed by interconnecting or uniting two or more rigid, or substantially rigid, components made wholly or mainly of metal, plastics, wood or substitutes therefor (containers having a curved cross-section B65D 8/00; specially constructed to be opened by cutting, piercing, or tearing of wall portions B65D 17/00; pallets B65D 19/00) **[3]**

6/02 . characterised by shape **[3]**
6/04 . . Trays or like containers without lids **[3]**
6/06 . . of drawer-and-shell type **[3]**
6/08 . of skeleton or like apertured construction, e.g. made of interwoven or intermeshing flexible material **[3]**
6/10 . with walls comprising multiple panels in spaced face-to-face relationship, e.g. double walls **[3]**
6/12 . . with walls, e.g. bottoms, movable under influence of contents **[3]**
6/14 . with walls comprising laminated panels, e.g. plywood **[3]**
6/16 . collapsible **[3]**
6/18 . . with hinged components **[3]**
6/20 . . . bound by flexible wire, or strip-like, elements **[3]**
6/22 . . . and detachable components **[3]**
6/24 . . with detachable components (B65D 6/22 takes precedence) **[3]**
6/26 . . Devices for holding collapsible containers in erected state **[3]**
6/28 . with permanent connections between walls, e.g. corner connections **[3]**
6/30 . . formed by rolling or by rolling and pressing **[3]**
6/32 . . formed by soldering, welding, or otherwise uniting opposed surfaces **[3]**
6/34 . Reinforcing or strengthening parts or members **[3]**
6/36 . . Battens, bands, strips or fittings **[3]**
6/38 . . Deformations, e.g. corrugations **[3]**
6/40 . with walls formed with filling or emptying apertures **[3]**

8/00 Containers having a curved cross-section formed by interconnecting or uniting two or more rigid, or substantially rigid, components made wholly or mainly of metal, plastics, wood or substitutes therefor (specially constructed to be opened by cutting, piercing, or tearing of wall portions B65D 17/00; pallets B65D 19/00) **[3]**

8/02 . Arrangements of filling or discharging apertures **[3]**
8/04 . characterised by wall construction or by connection between walls **[3]**
8/06 . . with multiple walls in spaced face-to-face relationship, e.g. double walls **[3]**
8/08 . . Reinforcing or strengthening parts or members **[3]**
8/10 . . . Battens, bands, strips or fittings **[3]**
8/12 . . Deformations, e.g. corrugations **[3]**
8/14 . . collapsible **[3]**
8/16 . . with walls comprising laminated panels, e.g. plywood **[3]**
8/18 . . with permanent connections between walls **[3]**
8/20 . . . formed by rolling or by rolling and pressing **[3]**
8/22 . . . formed by soldering, welding, or otherwise uniting opposed surfaces (B65D 8/20 takes precedence) **[3]**

13/00 Containers having bodies formed by interconnecting two or more rigid, or substantially rigid, components made wholly or mainly of the same material, other than metal, plastics, wood, or substitutes therefor (pallets B65D 19/00) **[4]**

13/02 . of glass, pottery, or other ceramic material

17/00 Rigid or semi-rigid containers specially constructed to be opened by cutting or piercing, or by tearing of frangible member or portion (opening arrangements or devices for containers made by winding, bending or folding paper B65D 3/00, B65D 5/00; frangible inner closure members associated with caps, lids or covers B65D 51/20; opening devices added or incorporated during filling or closing of containers B65D 77/30; separate devices for opening closed containers B67B 7/00)

17/28 . about line or point of weakness **[3]**
17/30 . . using cutting device **[3]**
17/32 . . having non-detachable member or portion **[3]**
17/34 . . Arrangement or construction of pull or lift tab (B65D 17/32 takes precedence) **[3]**
17/347 . . . characterised by the connection between the tab and a detachable member or portion of the container **[6]**
17/353 . . . . the connecting means being integral with the tab or with the detachable member or portion **[6]**
17/36 . . . adapted for engagement with opening tool, e.g. slotted key (attachments of opening tools, e.g. slotted keys, to containers B65D 17/52) **[3]**

17/38 . . . . with strip or tool guide **[3]**
17/40 . . characterised having the line of weakness extending circumferentially of the container mouth **[3]**
17/42 . with cutting, punching, or cutter accommodating means (about line or point of weakness B65D 17/28) **[3]**
17/44 . . puncturing tool serves as closure **[3]**
17/46 . . Wire, string or like, e.g. rip cord **[3]**
17/48 . . . located in the seam-adjoining parts of the container **[3]**
17/50 . Non-integral frangible members applied to, or inserted in, a preformed opening, e.g. tearable strips, plastic plugs (B65D 53/08 takes precedence) **[3]**
17/52 . Attachments of opening tools, e.g., slotted keys, to containers **[3]**

19/00 Pallets or like platforms, with or without side walls, for supporting loads to be lifted or lowered (in devices for lifting or lowering bulky or heavy goods for loading or unloading purposes B66F 9/12)
19/02 . Rigid pallets with side walls, e.g. box pallets
19/04 . . with bodies moulded or otherwise fabricated in one piece
19/06 . . with bodies formed by uniting or interconnecting two or more components
19/08 . . . made wholly or mainly of metal
19/10 . . . . of skeleton construction, e.g. made of wire
19/12 . . . . Collapsible pallets
19/14 . . . made wholly or mainly of wood
19/16 . . . . Collapsible pallets
19/18 . . . made wholly or mainly of plastics material
19/20 . . . made wholly or mainly of paper
19/22 . Rigid pallets without side walls
19/24 . . with bodies moulded or otherwise fabricated in one piece
19/26 . . with bodies formed by uniting or interconnecting two or more components
19/28 . . . made wholly or mainly of metal
19/30 . . . . of skeleton construction, e.g. made of wire
19/31 . . . made wholly or mainly of wood **[4]**
19/32 . . . made wholly or mainly of plastics material
19/34 . . . made wholly or mainly of paper
19/36 . Pallets comprising a flexible load carrier extending between guide elements, e.g. guide tubes
19/38 . Details or accessories
19/40 . . Elements for spacing platforms from supporting surface
19/42 . . . Arrangements or applications of rollers or wheels
19/44 . . Elements or devices for locating articles on platforms

21/00 Nestable, stackable or joinable containers; **Containers of variable capacity**
21/02 . Containers specially shaped, or provided with fittings or attachments, to facilitate nesting, stacking, or joining together **[5]**
21/024 . . for stacking containers lying on their sides, or for joining containers side-by-side, by means which are lateral with respect to the normal orientation of the containers **[6]**
21/028 . . . with interconnecting means forming part of the containers, e.g. dovetails, snap connectors, hook elements **[6]**
21/032 . . for stacking containers one upon another in the upright or upside down position, e.g. with vertically projecting elements or recesses **[6]**
21/036 . . . having closure means specially adapted for facilitating stacking **[6]**
21/04 . . Open-ended containers shaped to be nested when empty and to be superposed when full
21/06 . . with movable parts adapted to be placed in alternative positions for nesting the containers when empty and for stacking them when full
21/08 . Containers of variable capacity (containers of polygonal cross-section adapted to be of variable capacity formed by folding or erecting blanks made of paper B65D 5/355)

Details of rigid or semi-rigid containers not otherwise provided for [3]

23/00 Details of bottles or jars not otherwise provided for (closure-securing elements B65D 45/00)
23/02 . Linings or internal coatings
23/04 . Means for mixing or for promoting flow of contents (hydrodynamic means for influencing the flow of liquids F15D)
23/06 . Integral drip catchers or drip-preventing means
23/08 . Coverings or external coatings (wrappers B65D 65/00)
23/10 . Handles
23/12 . Means for the attachment of smaller articles
23/14 . . of tags
23/16 . . of thermometers (feeding bottles with thermometers A61J 9/02)

25/00 Details of other kinds or types of rigid or semi-rigid containers
25/02 . Internal fittings (of containers made by folding or erecting blanks made of paper B65D 5/44)
25/04 . . Partitions
25/06 . . . adapted to be fitted in two or more alternative positions
25/08 . . . with provisions for removing or destroying, e.g. to facilitate mixing of contents
25/10 . . Devices to locate articles in containers
25/14 . Linings or internal coatings (of containers made by folding or erecting blanks made of paper B65D 5/56)
25/16 . . Loose, or loosely-attached, linings
25/18 . . spaced appreciably from container wall
25/20 . External fittings (of containers made by folding or erecting blanks made of paper B65D 5/44)
25/22 . . for facilitating lifting or suspending of containers
25/24 . . for spacing bases of containers from supporting surfaces, e.g. legs (for pallets B65D 19/40)
25/26 . . Devices for protecting contents against shock
25/28 . Handles (of containers made by folding or erecting blanks made of paper B65D 5/46; of bottles or jars B65D 23/10)
25/30 . . Hand holes
25/32 . . Bail handles, i.e. pivoted handles of generally semi-circular shape
25/34 . Coverings or external coatings (of containers made by folding or erecting blanks made of paper B65D 5/62; for bottles or jars B65D 23/08; wrappers B65D 65/00)
25/36 . . formed by applying sheet material

25/38 . Devices for discharging contents (incorporated in removable or non-permanently-secured closure members B65D 47/00; for discharging thin flat articles B65D 83/08)
25/40 . . Nozzles or spouts (in general B05B)
25/42 . . . Integral or attached nozzles or spouts
25/44 . . . . Telescopic or retractable nozzles or spouts
25/46 . . . . Hinged or pivoted nozzles or spouts
25/48 . . . Separable nozzles or spouts
25/50 . . . . arranged to be plugged in two alternate positions
25/52 . . Devices for discharging successive articles or portions of contents
25/54 . Inspection openings or windows
25/56 . . with means for indicating level of contents

General kinds of flexible containers [3]

27/00 Envelopes or like essentially-rectangular flexible containers for postal or other purposes having no structural provision for thickness of contents (with shock-absorbing properties B65D 81/03; letter-cards B42D 15/00)
27/02 . with stiffening inserts
27/04 . with apertures or windows for viewing contents
27/06 . with provisions for repeated re-use
27/08 . with two or more compartments
27/10 . Chains of interconnected envelopes
27/12 . Closures (separate fasteners B42F 1/00)
27/14 . . using adhesive applied to integral parts, e.g. flaps
27/16 . . . using pressure-sensitive adhesive
27/18 . . . using heat-activatable adhesive
27/20 . . using self-locking integral or attached elements
27/22 . . . Tongue-and-slot or like closures; Tuck-in flaps
27/24 . . . String closures
27/26 . . . Deformable metallic elements
27/28 . . Applications of separate closing elements
27/30 . . with special means for indicating unauthorised opening
27/32 . Opening devices incorporated during envelope manufacture (incorporated during closing of envelope B43M 5/00; separate devices for opening envelopes B43M 7/00)
27/34 . . Lines of weakness
27/36 . . Finger openings, slots, or gripping tabs
27/38 . . Tearing-strings or -strips

30/00 Sacks, bags or like containers [3]
30/02 . characterised by the material used **[3]**
30/04 . . made of fabric **[3]**
30/06 . . . net-like **[3]**
30/08 . . with laminated or multiple walls in spaced face-to-face relationship, e.g. double walls (B65D 30/14, B65D 30/26 take precedence; with shock-absorbing properties B65D 81/03) **[3]**
30/10 . characterised by shape or construction **[3]**
30/12 . . Cross bottom bags **[3]**
30/14 . . . multi-layered **[3]**
30/16 . . with rigid end walls, e.g. free standing bags **[3]**
30/18 . . with block bottoms **[3]**
30/20 . . with folds, e.g. to facilitate collapsing **[3]**
30/22 . . with two or more compartments **[3]**
30/24 . . Bags having valves **[3]**
30/26 . . . multi-layered **[3]**
30/28 . . Triangular- or conical-shaped bags **[3]**

33/00 Details of, or accessories for, sacks or bags
33/01 . Ventilation or draining of bags **[3]**
33/02 . Local reinforcements or stiffening inserts, e.g. wires, strings, strips, frames
33/04 . Windows or other apertures, e.g. for viewing contents
33/06 . Handles
33/08 . . Hand holes
33/10 . . formed of similar material to that used for the bag
33/12 . . String handles
33/14 . Suspension means (handles B65D 33/06)
33/16 . End- or aperture-closing arrangements or devices (valves of valve bags B65D 30/24; removable stoppers or caps B65D 39/00, B65D 41/00; closures of filled bags B65D 77/10; closing filled bags in association with packaging B65B 7/00, B65B 51/00)
33/17 . . with brackets, rings or locks **[4]**
33/18 . . using adhesive applied to integral parts, e.g. to flaps (of envelopes B65D 27/14)
33/20 . . . using pressure-sensitive adhesive
33/22 . . . using heat-activatable adhesive
33/24 . . using self-locking integral or attached closure elements, e.g. flaps (B65D 33/25 takes precedence) **[4]**
33/25 . . Riveting; Dovetailing; Screwing; using press buttons or slide fasteners **[4]**
33/26 . . using staples or stitches
33/28 . . Strings or strip-like closures **[4]**
33/30 . . Deformable or resilient metal or like strips or bands
33/32 . . Metallic chain closures
33/34 . . with special means for indicating unauthorised opening
33/36 . Means for discharging contents
33/38 . . Spouts

35/00 Pliable tubular containers adapted to be permanently deformed to expel contents, e.g. collapsible tubes for toothpaste or other plastic or semi-liquid material; **Holders therefor**
35/02 . Body construction
35/04 . . made in one piece
35/06 . . . from metallic material
35/08 . . . from plastics material
35/10 . . made by uniting or interconnecting two or more components
35/12 . . Connections between body and closure-receiving bush
35/14 . with linings or inserts
35/16 . . for minimising or preventing corrosion of body
35/18 . . for keeping body in rolled state after partial expulsion of contents
35/20 . . for retracting contents
35/22 . with two or more compartments
35/24 . with auxiliary devices (linings or inserts B65D 35/14)
35/26 . . for filling
35/28 . . for expelling contents
35/30 . . . Pistons
35/32 . . Winding keys
35/34 . . . connected to, or associated with, tube holders
35/36 . . for applying contents to surfaces (brushes combined or associated with tubular containers A46B 11/00)
35/38 . . . Nozzles
35/40 . . for metering discharge
35/42 . . for preventing loss of removable closure members

35/44 . Closures (closure members of interest apart from this application B65D 39/00 to B65D 55/00; forming bottom closures after filling B65B 7/14)
35/46 . . with valves (bureau accessories for applying liquids, e.g. adhesive, B43M 11/00)
35/48 . . . Hand-operated valves
35/50 . . . opening when tubular containers is deformed
35/52 . . . Slits
35/54 . . . opening when closure is pressed against a surface to which contents are applied (nozzles B65D 35/38)
35/56 . Holders for collapsible tubes

37/00 Portable flexible containers not otherwise provided for

Closure members, other than those folded of paper and incorporated in or attached to the container, for opening of rigid or semi-rigid containers without destroying outer wall portions of the container itself, or of flexible containers presenting similar closing problems; **Arrangements or devices for preventing refilling of containers**; **Parts of containers co-operating with closure members or characterised by the form of closure members [3]**

39/00 Closures arranged within necks or pouring openings or in discharge apertures, e.g. stoppers (lids or covers B65D 43/00; with additional securing elements B65D 45/00)
39/02 . Disc closures (discs with flanges B65D 39/04)
39/04 . Cup-shaped plugs or like hollow flanged members
39/06 . Balls
39/08 . Threaded or like closure members secured by rotation; Bushes therefor
39/10 . . with bayonet cams
39/12 . expansible, e.g. inflatable
39/14 . extending through lateral openings in necks
39/16 . with handles or other special means facilitating manual actuation
39/18 . with anti-friction or wear-resistant coatings or coverings

41/00 Caps, e.g. crown caps, crown seals, i.e. members having parts arranged for engagement with the external periphery of a neck or wall defining a pouring opening or discharge aperture; **Protective cap-like covers for closure members, e.g. decorative covers of metal foil or paper** (B65D 45/00 takes precedence; combinations of caps and protective cap-like covers B65D 51/18; making closures by working metal sheet B21D 51/44)
41/01 . specially adapted for accommodating plural sizes **[6]**
41/02 . Caps or cap-like covers without lines of weakness, tearing strips, tags, or like opening or removal devices
41/04 . . Threaded or like caps or cap-like covers secured by rotation
41/06 . . . with bayonet cams
41/08 . . . engaging a threaded ring clamped on the external periphery of the neck or wall
41/10 . . Caps or cap-like covers adapted to be secured in position by permanent deformation of the wall-engaging parts
41/12 . . . made of relatively-stiff metallic materials, e.g. crown caps
41/14 . . . made of metallic foil or like thin flexible material
41/16 . . Snap-on caps or cap-like covers
41/17 . . . push-on and twist-off **[6]**
41/18 . . . non-metallic, e.g. made of paper or plastics
41/20 . . Caps or cap-like covers with membranes, e.g. arranged to be pierced
41/22 . . Caps or cap-like covers with elastic parts adapted to be stretched over the container
41/24 . . Caps or cap-like covers made of shrinkable material or formed in situ by dipping, e.g. using gelatine or celluloid
41/26 . . Caps or cap-like covers serving as, or incorporating, drinking or measuring vessels
41/28 . . Caps combined with stoppers
41/30 . . . Deformable caps combined with resilient stoppers to permit re-use as temporary closures
41/32 . Caps or cap-like covers with lines of weakness, tearing-strips, tags, or like opening or removal devices, e.g. to facilitate formation of pouring openings
41/34 . . Threaded or like caps or cap-like covers
41/36 . . . with bayonet cams
41/38 . . . engaging a threaded ring clamped on the external periphery of the neck or wall
41/40 . . Caps or cap-like covers adapted to be secured in position by permanent deformation of the wall-engaging parts
41/42 . . . made of relatively-stiff metallic material, e.g. crown caps
41/44 . . . made of metallic foil or like thin flexible material
41/46 . . Snap-on caps or cap-like covers
41/47 . . . push-on and twist-off **[6]**
41/48 . . . non-metallic, e.g. made of paper, plastics
41/50 . . Caps or cap-like covers with membranes, e.g. arranged to be pierced
41/52 . . Caps or cap-like covers with elastic parts adapted to be stretched over the container
41/54 . . Caps or cap-like covers made of shrinkable material or formed in situ by dipping, e.g. using gelatine, celluloid
41/56 . . Caps or cap-like covers serving as, or incorporating, drinking or measuring vessels
41/58 . . Caps or cap-like covers combined with stoppers
41/60 . . . Deformable caps combined with resilient stoppers to permit re-use as temporary closures
41/62 . Secondary protective cap-like outer covers for closure members (arrangements of closures with protective outer cap-like covers or of two or more co-operating closures B65D 51/18)

43/00 Lids or covers for rigid or semi-rigid containers (for cooking vessels A47J 36/06; covers for pressure vessels in general F16J 13/00)
43/02 . Removable lids or covers (with means for piercing, cutting, or tearing a frangible inner closure B65D 51/22)
43/03 . . nestable or stackable (nestable or stackable containers B65D 21/00) **[3]**
43/04 . . having a part, or parts, engaging within the mouth of the container and retained by friction or gravity
43/06 . . having a peripheral channel embracing the rim of the container
43/08 . . having a peripheral flange fitting over the rim of the container
43/10 . . . and retained by snapping over beads or projections
43/12 . . guided for removal by sliding
43/14 . Non-removable lids or covers

43/16 . . hinged for upward or downward movement (hinges of door or similar type E05D)
43/18 . . pivoted for movement in plane of container mouth
43/20 . . linearly slidable
43/22 . . Devices for holding in closed position, e.g. clips **[4]**
43/24 . . Devices for retaining in open position
43/26 . Mechanisms for opening or closing, e.g. pedal-operated

45/00 Clamping or other pressure-applying devices for securing or retaining closure members (screw-threaded or bayonet connections between stoppers or caps and containers B65D 39/08, B65D 41/04, B65D 41/34; expansible stoppers B65D 39/12; for pressure vessels in general F16J 13/00)

45/02 . for applying axial pressure to engage closure with sealing surface
45/04 . . comprising U-shaped or bifurcated members coacting with containers, e.g. pivoted bails
45/06 . . . associated with toggle levers, e.g. swing stopper arrangements (forming levers or links by working wire B21F 45/04)
45/08 . . . incorporating springs
45/10 . . . incorporating tightening screws
45/12 . . . associated with locking levers engaging rack teeth for varying the applied pressure
45/14 . . . coacting with inclined grooves in container wall for varying the applied pressure
45/16 . . Clips, hooks, or clamps, e.g. C-shaped (U-shaped or bifurcated members B65D 45/04)
45/18 . . . of snap-over type
45/20 . . . pivoted
45/22 . . . . resilient
45/24 . . . . incorporating pressure-applying means, e.g. screws, toggles
45/26 . . . . incorporating tensioning chains
45/28 . . Elongated members, e.g. leaf springs, located substantially at right angles to closure axis and acting between the face of the closure and abutments on container
45/30 . . Annular members, e.g. with snap-over action, screw-threaded
45/32 . for applying radial pressure, e.g. contractible bands encircling closure member
45/34 . . lever-operated

47/00 Closures with filling and discharging, or with discharging, devices (dispensers for liquid soap A47K 5/12; desk equipment for applying liquid by contact with surfaces B43M 11/00)

47/02 . for initially filling and for preventing subsequent refilling
47/04 . Closures with discharging devices other than pumps
47/06 . . with pouring spouts or tubes; with discharge nozzles or passages (with slidable spouts B65D 47/26)
47/08 . . . having articulated or hinged closures
47/10 . . . having frangible closures
47/12 . . . having removable closures
47/14 . . . . and closure-retaining means
47/16 . . . with closures operating automatically when spout is immersed in discharged liquid
47/18 . . . for discharging drops; Droppers
47/20 . . comprising hand-operated members for controlling discharge (B65D 47/34 takes precedence)
47/22 . . . operating with pinching action on flexible tubes
47/24 . . . with poppet valves
47/26 . . . with slide valves, e.g. formed with slidable spouts
47/28 . . . . having linear movement
47/30 . . . with plug valves
47/32 . . with means for venting **[3]**
47/34 . Closures with discharge by pumping
47/36 . Closures with frangible parts adapted to be pierced, torn, or removed, to provide discharge openings (B65D 51/18 takes precedence; caps with pierceable membranes B65D 41/20, B65D 41/50)
47/38 . . with piercing means arranged to act subsequently as a valve to control the opening
47/40 . with drip catchers or drip-preventing means
47/42 . with pads or like contents-applying means (brushes combined or associated with containers A46B 11/00; swabs for applying media to the human body from an integral supply A61F 13/40)
47/44 . . combined with slits opening when container is deformed or when pad is pressed against surface to which contents are to be applied (pliable tubular containers with valves opening when closure is pressed against surface B65D 35/54)

49/00 Arrangements or devices for preventing refilling of containers (integral, or permanently secured, closures for containers specially adapted to be opened by cutting, piercing, or tearing of wall portions B65D 17/00; for initial filling and for preventing subsequent refilling B65D 47/02)

49/02 . One-way valves
49/04 . . Weighted valves
49/06 . . . with additional loading weights
49/08 . . Spring-loaded valves
49/10 . . Arrangements of several valves
49/12 . by destroying, in the act of opening the container, an integral portion thereof

50/00 Closures with means for discouraging unauthorised opening or removal thereof, with or without indicating means, e.g. child-proof closures (tamper-indicating closures without means for discouraging, see the relevant groups, e.g. B65D 41/32, B65D 51/20; means per se for discouraging or indicating unauthorised opening or removal of closure B65D 55/02) **[5]**

50/02 . openable or removable by the combination of plural actions **[5]**
50/04 . . requiring the combination of simultaneous actions, e.g. depress and turn, lift and turn, maintain a part and turn another one (B65D 50/10 takes precedence; caps or covers secured by rotation with bayonet cams B65D 41/06, B65D 41/36) **[5]**
50/06 . . requiring the combination of different actions in succession (B65D 50/10 takes precedence) **[5]**
50/08 . . openable or removable by closure or container deformation **[5]**
50/10 . . disengageable only after alignment of closure parts with container **[5]**
50/12 . Disguised or hidden forms of closures, e.g. dummy closure in association with removable closure forming container base (bottles or similar containers with closable apertures at bottom B65D 1/06) **[5]**
50/14 . openable or removable only by means of special opening member (containers with cutting, punching, or cutter accommodating means B65D 17/42; key-actuated closure locks B65D 55/14) **[5]**

51/00 **Closures not otherwise provided for** (covers or similar closures as engineering elements for pressure vessels in general F16J 13/00)

51/02 . Loosely-engaging lids or covers for jars, cans, or like containers for liquids without means for effecting sealing of container (for cooking-vessels A47J 36/06)

51/04 . . hinged (B65D 51/10 takes precedence)

51/06 . . collapsible

51/08 . . with axial projections fitting within, or around, the walls defining the container openings, e.g. for milk churns

51/10 . . opening automatically when container is tilted for pouring

51/12 . . Flexible non-elastic covers

51/14 . Rigid discs or spherical members adapted to be held in sealing engagement with mouth of container, e.g. closure plates for preserving jars

51/16 . with means for venting air or gas

51/18 . Arrangements of closures with protective outer cap-like covers or of two or more co-operating closures (secondary protective cap-like outer covers for caps B65D 41/62)

51/20 . . Caps, lids, or covers co-operating with an inner closure arranged to be opened by piercing, cutting, or tearing

51/22 . . . having means for piercing, cutting, or tearing the inner closure

51/24 . combined with auxiliary devices for non-closing purposes

51/26 . . with means for keeping contents in position, e.g. resilient means

51/28 . . with auxiliary containers for additional articles or materials

51/30 . . . for desiccators

51/32 . . with brushes or rods for applying or stirring contents (droppers B65D 47/18)

53/00 **Sealing or packing elements**; **Sealings formed by liquid or plastic material**

53/02 . Collars or rings

53/04 . Discs

53/06 . Sealings formed by liquid or plastic material

53/08 . Flexible adhesive strips adapted to seal filling or discharging apertures

53/10 . characterised by special adaptation to acid-proof vessels

55/00 **Accessories for container closures not otherwise provided for**

55/02 . Locking devices; Means for discouraging or indicating unauthorised opening or removal of closure (protective covers for bottles B65D 23/08; protective cap-like outer covers for bottle or jar closures B65D 41/28; pressure-applying means B65D 45/00; closures with means for discouraging unauthorised opening or removal of closures B65D 50/00) **[5]**

55/04 . . Spring clips, e.g. of wire, of sheet metal

55/06 . . Deformable or tearable wires, strings, or strips (containers specially constructed to be opened by tear-strips, strings or the like B65D 17/00; caps or cap-like closures with tear-strips B65D 41/32); Use of seals (applying labels to bottles B65C 3/06, B65C 9/00)

55/08 . . . Annular elements encircling container necks

55/10 . . Locking pins

55/12 . . Devices or means with relatively-moving parts co-operating with abutments on bottle or jar (applications of locks B65D 55/14)

55/14 . . Applications of locks, e.g. of permutation or key-controlled locks

55/16 . Devices preventing loss of removable closure members

Kinds or types of packaging elements

57/00 **Internal frames or supports for flexible articles, e.g. stiffeners**; **Separators for articles packaged in stacks or groups, e.g. for preventing adhesion of sticky articles**

59/00 **Plugs, sleeves, caps, or like rigid or semi-rigid elements for protecting parts of articles or for bundling articles, e.g. protectors for screw-threads, corner protectors, end caps for tubes or for bundling rod-shaped articles**

59/02 . Plugs

59/04 . Sleeves, e.g. postal tubes

59/06 . Caps

59/08 . . of polygonal cross-section

61/00 **External frames or supports adapted to be assembled around, or applied to, articles** (collapsible containers B65D 5/00, B65D 6/16, B65D 6/24, B65D 8/14)

61/02 . Tubular frames with resilient joints

63/00 **Flexible elongated elements, e.g. straps, for bundling or supporting articles**

63/02 . Metallic straps, tapes, or bands; Joints between ends thereof

63/04 . . Joints produced by deformation of ends of elements

63/06 . . Joints produced by application of separate securing members, e.g. by deformation thereof

63/08 . . . Joints using buckles, wedges, or like locking members attached to the ends of the elements

63/10 . Non-metallic straps, tapes, or bands; Filamentary elements, e.g. strings, threads, wires; Joints between ends thereof

63/12 . . Joints produced by deformation or tying of ends of elements

63/14 . . Joints produced by application of separate securing members

63/16 . . . Joints using buckles, wedges, or like locking members attached to the end of the element

63/18 . Elements provided with handles or other suspension means

65/00 **Wrappers or flexible covers**; **Packaging materials of special type or form** (wrappers or envelopes with shock-absorbing properties B65D 81/03)

Note

Attention is drawn to the definition of "packaging elements" in Note (5) following the title of this subclass.

65/02 . Wrappers or flexible covers

65/04 . . non-rectangular

65/06 . . . formed with foldable flaps, e.g. interlocking flaps

65/08 . . . with fastening elements, e.g. slide fasteners

65/10 . . rectangular

65/12 . . . formed with crease lines to facilitate folding

65/14 . . with areas coated with adhesive

65/16 . . with provision for excluding or admitting light
65/18 . . . with some areas transparent and others opaque
65/20 . . . with provision for excluding light of a particular wavelength
65/22 . . Details
65/24 . . . Tabs or other projections for locating contents
65/26 . . . Opening devices
65/28 . . . . Perforations or lines of weakness
65/30 . . . . Slits, slots, or cuts
65/32 . . . . Tabs or like projections for gripping by the fingers
65/34 . . . . Attached tearing-strings or like flexible elements
65/36 . . . . Reinforcements to guide tearing
65/38 . Packaging materials of special type or form
65/40 . . Applications of laminates for particular packaging purposes
65/42 . . Applications of coated or impregnated materials
65/46 . . Applications of disintegrable, dissolvable or edible materials **[3]**

67/00 Kinds or types of packaging elements not otherwise provided for
67/02 . Clips or clamps for holding articles together for convenience of storage or transport

Kinds or types of packages

69/00 Articles joined together for convenience of storage or transport without the use of packaging elements (joining articles for convenience of packaging B65B 17/02)

71/00 Bundles of articles held together by packaging elements for convenience of storage or transport, e.g. portable segregating carrier for plural receptacles such as beer cans, pop bottles; **Bales of material** (binding of hay or straw A01D, A01F 1/00; bundling or baling B65B, e.g. B65B 13/00, B65B 27/00)
71/02 . Arrangements of flexible binders
71/04 . . with protecting or supporting elements arranged between binder and articles or materials, e.g. for preventing chafing of binder
71/06 . comprising a plurality of articles completely or mainly held together by packaging elements, e.g. under tension **[3]**
71/08 . . Wrappers shrunk by heat **[3]**
71/10 . . . and provided with inserts **[5]**
71/12 . . the packaging elements being formed by folding a single blank **[5]**
71/14 . . . having the shape of a tube, without, or not being characterised by, end walls (sleeves B65D 59/04) **[5]**
71/16 . . . . with article-locating elements (B65D 71/24 takes precedence) **[5]**
71/18 . . . . . Tabs inwardly folded from upper or lower wall **[5]**
71/20 . . . . . Slits or openings along the foldline of the tubular body **[5]**
71/22 . . . . . Openings formed in the sidewall **[5]**
71/24 . . . . with partitions **[5]**
71/26 . . . . . extending from upper or lower wall **[5]**
71/28 . . . . characterised by the handle **[5]**
71/30 . . . . . unitary with the tubular packaging elements (B65D 71/32 takes precedence) **[5]**
71/32 . . . . . formed by finger-holes **[5]**
71/34 . . . . . characterised by lines of weakness or the like **[5]**
71/36 . . . characterised by having end walls **[5]**
71/38 . . the packaging elements being formed by folding and interconnecting two or more blanks **[5]**
71/40 . comprising a plurality of articles held together only partially by packaging elements formed by folding a blank **[5]**
71/42 . . formed by folding a single blank into a single layer element **[5]**
71/44 . . . characterised by the handle **[5]**
71/46 . . formed by folding a single blank into a tubular element **[5]**
71/48 . . . characterised by the handle **[5]**
71/50 . comprising a plurality of articles held together only partially by packaging elements formed otherwise than by folding a blank **[5]**
71/52 . Tray-like packaging elements provided with handles for storage or transport of a plurality of articles (B65D 71/12, B65D 71/38, B65D 71/40, B65D 71/50 take precedence) **[5]**
71/54 . . without partitions (B65D 71/60, B65D 71/68 take precedence) **[5]**
71/56 . . with a single longitudinal partition (B65D 71/60, B65D 71/68 take precedence) **[5]**
71/58 . . formed by folding one blank and having vertical partitions (B65D 71/60 takes precedence) **[5]**
71/60 . . formed by folding one blank into a tubular element, having upper wall portions provided with openings, through which the articles extend **[5]**
71/62 . . . with parts of the walls bent against one another to form a longitudinal partition between two rows of articles (B65D 71/64, B65D 71/66 take precedence) **[5]**
71/64 . . . with walls enclosing the articles almost completely (B65D 71/66 takes precedence) **[5]**
71/66 . . . for holding only one row of articles **[5]**
71/68 . . formed by folding and interconnecting two or more blanks (B65D 71/72 takes precedence) **[5]**
71/70 . Trays provided with projections or recesses in order to assemble multiple articles, e.g. intermediate elements for stacking **[5]**
71/72 . . formed by folding one or more blanks, the articles being inserted in openings in a wall **[5]**

73/00 Packages comprising articles attached to cards, sheets, or webs (cards for buttons, collar-studs, or sleeve-links A44B 7/00; attaching articles to cards, sheets, or webs B65B 15/00)
73/02 . Articles, e.g. small electrical components, attached to webs

75/00 Packages comprising articles or materials partially or wholly enclosed in strips, sheets, blanks, tubes, or webs of flexible sheet material, e.g. in folded wrappers (B65D 71/00 takes precedence; wrapping B65B 11/00) **[5]**
75/02 . Articles partially enclosed in folded or wound strips or sheets, e.g. wrapped newspapers
75/04 . Articles or materials wholly enclosed in single sheets or wrapper blanks
75/06 . . in sheets or blanks initially folded to form tubes
75/08 . . . with the ends of the tube closed by folding
75/10 . . . with the ends of the tube closed by twisting
75/12 . . . with the ends of the tube closed by flattening and heat-sealing

75/14 . . in sheets or blanks folded-up around all sides of the contents from a portion on which the contents are placed
75/16 . . . the upstanding portion of the wrapper being closed by twisting
75/18 . . . the upstanding portion of the wrapper being closed by regular or irregular folds or pleats, e.g. bunch-wrapped packages
75/20 . . in sheets or blanks doubled around contents and having their opposed free margins united, e.g. by pressure-sensitive adhesive, crimping, heat-sealing, or welding
75/22 . . . the sheet or blank being recessed to accommodate contents
75/24 . . . . and formed with several recesses to accommodate a series of articles or quantities of material
75/26 . Articles or materials wholly enclosed in laminated sheets or wrapper blanks
75/28 . Articles or materials wholly enclosed in composite wrappers, i.e. wrappers formed by associating or interconnecting two or more sheets or blanks
75/30 . . Articles or materials enclosed between two opposed sheets or blanks having their margins united, e.g. by pressure-sensitive adhesive, crimping, heat-sealing, or welding
75/32 . . . one or both sheets or blanks being recessed to accommodate contents
75/34 . . . . and having several recesses to accommodate a series of articles or quantities of material
75/36 . . . . one sheet or blank being recessed and the other formed of relatively stiff flat sheet material, e.g. blister packages
75/38 . Articles or materials enclosed in two or more wrappers disposed one inside the other
75/40 . Packages formed by enclosing successive articles, or increments of material, in webs, e.g. folded or tubular webs, or by subdividing tubes filled with liquid, semi-liquid, or plastic materials
75/42 . . Chains of interconnected packages
75/44 . . Individual packages cut from webs or tubes
75/46 . . . containing articles
75/48 . . . containing liquids, semiliquids, or pastes, e.g. cushion-shaped packages
75/50 . . . . Tetrahedral packages
75/52 . Details
75/54 . . Cards, coupons, or other inserts or accessories (opening devices B65D 75/70)
75/56 . . . Handles or other suspension means
75/58 . . Opening or contents-removing devices added or incorporated during package manufacture
75/60 . . . Weakened closure seams
75/62 . . . Cuts or perforations, e.g. in closure seams
75/64 . . . Tabs formed by unsecured portion of wrapper
75/66 . . . Inserted or applied tearing-strings or like flexible elements
75/68 . . . . extending through wrapper closure or between wrapper layers
75/70 . . . Rigid cutting or tearing devices

77/00 Packages formed by enclosing articles or materials in preformed containers, e.g. boxes, cartons, sacks, bags

77/02 . Wrapped articles enclosed in rigid or semi-rigid containers
77/04 . Articles or materials enclosed in two or more containers disposed one within another
77/06 . . Liquids or semiliquids enclosed in flexible containers disposed within rigid containers
77/08 . Materials, e.g. different materials, enclosed in separate compartments formed during filling of a single container
77/10 . Container closures formed after filling (closing filled containers in association with packaging B65B 7/00, B65B 51/00)
77/12 . . by collapsing and flattening the mouth portion of the container and securing without folding, e.g. by pressure-sensitive adhesive, heat-sealing, welding, applying a separate securing member
77/14 . . by flattening and subsequently folding or rolling the mouth portion
77/16 . . by collapsing and twisting mouth portion
77/18 . . . and securing by a deformable clip or binder
77/20 . . by applying separate lids or covers
77/22 . Details
77/24 . . Inserts or accessories added or incorporated during filling of containers (opening devices B65D 77/30)
77/26 . . . Elements or devices for locating or protecting articles
77/28 . . . Cards, coupons, or drinking straws
77/30 . . Opening or contents-removing devices added or incorporated during filling or closing of containers
77/32 . . . Tearing-strings or like flexible elements
77/34 . . . . enclosed in a mouth seal
77/36 . . . . disposed beneath a wrapper, label, or other element of sheet material securing a lid, cover, or container mouth
77/38 . . . Weakened closure seams
77/40 . . . Rigid cutting or tearing devices

79/00 Kinds or details of packages, not otherwise provided for

79/02 . Arrangements or devices for indicating incorrect storage or transport

Containers, packaging elements, or packages, of special types or forms or specially adapted for organisms, articles, or materials presenting particular transport, storage, or dispensing problems

81/00 Containers, packaging elements, or packages, for contents presenting particular transport or storage problems, or adapted to be used for non-packaging purposes after removal of contents

81/02 . specially adapted to protect contents from mechanical damage **[6]**
81/03 . . Wrappers or envelopes with shock-absorbing properties, e.g. bubble films **[6]**
81/05 . . maintaining contents at spaced relation from package walls, or from other contents (B65D 81/03 takes precedence) **[6]**
81/07 . . . using resilient suspension means **[6]**
81/09 . . . using flowable discrete elements of shock-absorbing material, e.g. pellets, popcorn **[6]**
81/107 . . . using blocks of shock-absorbing material **[6]**
81/113 . . . . of a shape specially adapted to accommodate contents **[6]**
81/127 . . . using rigid or semi-rigid sheets of shock-absorbing material **[6]**
81/133 . . . . of a shape specially adapted to accommodate contents, e.g. trays **[6]**
81/15 . . . using liquids **[6]**

81/17 . . specially adapted to crumple without damage to contents **[6]**

81/18 . providing specific environment for contents, e.g. temperature above or below ambient (with thermal insulation B65D 81/38; ice-boxes with cooling means F25D) **[6]**

81/20 . . under vacuum or superatmospheric pressure, or in a special atmosphere, e.g. of inert gas

81/22 . . in moist conditions or immersed in liquids

81/24 . Adaptations for preventing deterioration or decay of contents; Applications to the container or packaging material of food preservatives, fungicides, pesticides or animal repellants (with thermal insulation B65D 81/38) **[6]**

81/26 . . with provision for draining away, or absorbing, fluids, e.g. exuded by contents; Applications of corrosion inhibitors or desiccators

81/28 . . Applications of food preservatives, fungicides, pesticides, or animal repellents

81/30 . . by excluding light or other outside radiation (wrappers B65D 65/16)

81/32 . for packaging two or more different materials which must be maintained separate prior to use in admixture (containers with removable or destructible partitions B65D 25/08)

81/34 . for packaging foodstuffs intended to be cooked or heated within the package **[6]**

81/36 . adapted to be used for non-packaging purposes after removal of contents

81/38 . with thermal insulation (vacuum bottles or the like A47J 41/00)

83/00 **Containers or packages with special means for dispensing contents** (dispensing means incorporated in removable or non-permanently secured container closures B65D 47/00; for shops, stores, offices, bars, or the like A47F 1/04; showcases or show cabinets with dispensing arrangements A47F 3/02; magazines for screws or nuts in combination with spanners, wrenches or screwdrivers B25B 23/06; nail dispensers B25C 3/00; for use in connection with the handling of sheets, webs, or filamentary material B65H; coin deliverers G07D 1/00)

83/02 . for dispensing rod-shaped articles, e.g. needles (cigar or cigarette receptacles or boxes A24F 15/00)

83/04 . for dispensing annular, disc-shaped, or spherical or like small articles, e.g. tablets, pills

83/06 . for dispensing powdered or granular material

83/08 . for dispensing thin flat articles in succession (dispensers for surgical scalpel blades A61B 17/3215)

83/10 . . for dispensing razor-blades

83/12 . . for dispensing tickets or tokens

83/14 . for delivery of liquid or semi-liquid contents by internal gaseous pressure, i.e. aerosol containers

83/16 . . characterised by the actuating means **[5]**

83/18 . . . Container-carried hand lever **[5]**

83/20 . . . Actuator cap **[5]**

83/22 . . . with means to disable actuation (B65D 50/00 takes precedence) **[5]**

83/24 . . . with means to hold valve open **[5]**

83/26 . . . operating automatically, e.g. periodically **[5]**

83/28 . . Nozzles, nozzle fittings or accessories specially adapted therefor **[5]**

83/30 . . . for guiding the flow of spray **[5]**

83/32 . . Dip-tubes **[5]**

83/34 . . Cleaning or preventing clogging of the discharge passage **[5]**

83/36 . . allowing operation in any orientation **[5]**

83/38 . . Details of container body (pressure relief devices B65D 83/70) **[5]**

83/40 . . Closure caps (actuator caps B65D 83/20) **[5]**

83/42 . . Filling or charging means **[5]**

83/44 . . Valves specially adapted therefor; Regulating devices (filling or discharging means B65D 83/42; pressure relief devices B65D 83/70) **[5]**

83/46 . . . Tilt valves (B65D 83/50 takes precedence) **[5]**

83/48 . . . Lift valves, e.g. operated by push action (B65D 83/50 takes precedence) **[5]**

83/50 . . . Non-reclosable valves **[5]**

83/52 . . . for metering **[5]**

83/54 . . . . Metering valves **[5]**

83/56 . . shut-off when inverted **[5]**

83/58 . . Separate inlets for gas and material in duct to valve (B65D 83/60 takes precedence) **[5]**

83/60 . . Product and propellant separated **[5]**

83/62 . . . by membrane, bag, or the like **[5]**

83/64 . . . by piston **[5]**

83/66 . . . first separated, but finally mixed **[5]**

83/68 . . Dispensing two or more products **[5]**

83/70 . . Pressure relief devices **[5]**

83/72 . . with heating or cooling devices **[5]**

83/74 . . . heating by exothermic reaction **[5]**

83/76 . for dispensing fluent material by means of a piston or the like (hand tools for discharging fluent material through an outlet orifice by pressure B05C 17/005) **[5]**

85/00 **Containers, packaging elements or packages, specially adapted for particular articles or materials** (B65D 71/00, B65D 83/00 take precedence; hand implements, travelling equipment A45C; cosmetic or toilet equipment A45D; packages for surgical knives, scalpels or blades therefor A61B 17/3215; containers specially adapted for medical or pharmaceutical purposes A61J 1/00; paint cans B44D 3/12; oil cans F16N 3/04; containers for carrying smallarms F41C 33/06; packaging of ammunition or explosive charges F42B 39/00; containers for record carriers, specially adapted for cooperation with the recording or reproducing apparatus G11B 23/00) **[5,6]**

Note

Containers, packaging elements or packages classified in this group, are also classified according to the constructional or functional features, if such features are of interest. **[6]**

85/02 . for annular articles (for web or tape-like material wound in flat spiral form B65D 85/671)

85/04 . . for coils of wire, rope, or hose

85/06 . . for tyres

85/08 . for compressible or flexible rod-shaped or tubular articles

85/10 . . for cigarettes

85/12 . . for cigars

85/14 . . for collapsible tubes

85/16 . for compressible or flexible articles of other shapes (for wearing apparel B65D 85/18)

85/18 . for wearing apparel, i.e. clothes, headgear, shoes

85/20 . for incompressible or rigid rod-shaped or tubular articles

85/22 . . for macaroni, spaghetti, or like flour products
85/24 . . for needles, nails, or other like elongated small articles
85/26 . . for welding electrodes
85/28 . . for pencils or pens (pencil boxes A45C 11/34)
85/30 . for articles particularly sensitive to damage by shock or pressure
85/32 . . for eggs
85/34 . . for fruit, e.g. apples, oranges, tomatoes
85/36 . . for biscuits or other bakery products
85/38 . . for optical or other delicate measuring, calculating, or control apparatus
85/40 . . . for watches or clocks or components thereof
85/42 . . for ampoules; for lamp bulbs; for electronic valves or tubes
85/44 . . for crockery
85/46 . . for bricks, tiles, or building blocks
85/48 . . for glass sheets
85/50 . for living organisms, articles, or materials sensitive to changes of environment or atmospheric conditions, e.g. land animals, birds, fish, water plants, non-aquatic plants, flower bulbs, cut flowers, foliage (devices for transporting live fish A01K 63/02)
85/52 . . for living plants; for growing bulbs
85/57 . for recording discs **[3]**
85/575 . for recording-tape cassettes **[5]**
85/58 . for ball bearings, washers, buttons, or like spherical or disc-shaped articles (cards for buttons, collar-studs, sleeve-links A44B 7/00) **[3]**
85/60 . for sweets or like confectionery products **[3]**
85/62 . for stacks of articles; for special arrangements of groups of articles **[3]**
85/64 . for bulky articles **[3]**
85/66 . for jumbo rolls; for rolls of floor covering **[3]**
85/67 . for other web or tape-like material (for recording-tape cassettes B65D 85/575) **[3,5]**
85/671 . . wound in flat spiral form **[3]**
85/672 . . . on cores **[3]**
85/675 . . wound in helical form **[3]**
85/676 . . . on cores **[3]**
85/677 . . . . on flat cards **[3]**
85/68 . for machines, engines, or vehicles in assembled or dismantled form **[3]**
85/72 . for edible or potable liquids, semiliquids, or plastic or pasty materials **[3]**
85/73 . . with means specially adapted for effervescing the liquids, e.g. for forming bubbles or beer head **[7]**
85/74 . . for butter, margarine or lard **[3]**
85/76 . . for cheese **[3]**
85/78 . . for ice-cream **[3]**
85/80 . . for milk **[3]**
85/804 . Disposable containers or packages with contents which are infused or dissolved in situ **[7]**
85/808 . . for immersion in the liquid, e.g. tea bags **[7]**
85/812 . . . with features facilitating their suspension **[7]**
85/816 . . into which liquid is added, e.g. cups preloaded with powder or dehydrated food **[7]**
85/82 . for poisons **[3]**
85/84 . for corrosive chemicals **[3]**
85/86 . for electrical components (small electrical components attached to cards, sheets or webs B65D 73/02; for articles particularly sensitive to damage by shock or pressure B65D 85/30; for ampoules, lamp bulbs, electronic valves or tubes B65D 85/42) **[6]**
85/88 . . Batteries **[6]**
85/90 . . Integrated circuits **[6]**

88/00 **Large containers** (component parts, details or accessories B65D 90/00; construction or assembling of bulk storage containers employing civil engineering techniques in situ or off the site E04H 7/00; gas holders of variable capacity F17B; vessels for containing or storing compressed, liquefied or solidified gases F17C) **[3]**
88/02 . rigid (B65D 88/34 to B65D 88/78 take precedence; hoppers B65D 88/26) **[3]**
88/04 . . spherical (B65D 88/12 takes precedence) **[3]**
88/06 . . cylindrical (B65D 88/12 takes precedence) **[3]**
88/08 . . . with a vertical axis **[3]**
88/10 . . parallelepipedic (B65D 88/12 takes precedence) **[3]**
88/12 . . specially adapted for transport (associated with vehicles, see the relevant subclasses of B60 to B64) **[3]**
88/14 . . . by air **[3]**
88/16 . flexible (B65D 88/34 to B65D 88/78 take precedence; hoppers B65D 88/26) **[3]**
88/18 . . bellows-shaped (B65D 88/22 takes precedence; connection of valves to inflatable elastic bodies B60C 29/00) **[3]**
88/20 . . with rigid end-walls (B65D 88/18, B65D 88/22 take precedence) **[3]**
88/22 . . specially adapted for transport (associated with vehicles, see the relevant subclasses of B60 to B64) **[3]**
88/24 . . . by air **[3]**
88/26 . Hoppers, i.e. containers having funnel-shaped discharge sections (B65D 88/34 to B65D 88/78 take precedence) **[3]**
88/28 . . Construction or shape of discharge section **[3]**
88/30 . . specially adapted to facilitate transportation from one utilisation site to another (collapsible hoppers B65D 88/52) **[3]**
88/32 . . in multiple arrangement **[3]**
88/34 . having floating covers, e.g. floating roofs or blankets (venting means B65D 90/34) **[3]**
88/36 . . with relatively movable sections **[3]**
88/38 . . with surface water receiver, e.g. drain **[3]**
88/40 . . with support for aground cover **[3]**
88/42 . . with sealing means between cover rim and receptacle **[3]**
88/44 . . . with magnetic means acting on the seal **[3]**
88/46 . . . with mechanical means acting on the seal **[3]**
88/48 . . . with fluid means acting on the seal **[3]**
88/50 . . . with resilient foam or stuffed seal **[3]**
88/52 . collapsible, i.e. with walls hinged together or detachably connected **[3]**
88/54 . characterised by means facilitating filling or emptying (construction or shape of discharge section of hoppers B65D 88/28; gates or closures B65D 90/54; filling or emptying bunkers, hoppers, or like containers B65G 65/30) **[3]**
88/56 . . by tilting **[3]**
88/58 . . by displacement of walls **[3]**
88/60 . . . of internal walls **[3]**
88/62 . . . . the walls being deformable **[3]**
88/64 . . preventing bridge formation **[3]**
88/66 . . . using vibrating or knocking devices **[3]**
88/68 . . . using rotating devices **[3]**

88/70 . . . using fluid jets (B65D 88/72 takes precedence) **[3]**
88/72 . . Fluidising devices **[3]**
88/74 . having means for heating, cooling, aerating or other conditioning of contents **[3]**
88/76 . for use underground (manholes, inspection openings, covers therefor B65D 90/10) **[3]**
88/78 . for use in or under water (manholes, inspection openings, covers therefor B65D 90/10) **[3]**

90/00 Component parts, details or accessories for large containers (B65D 88/34 to B65D 88/78 take precedence) **[3]**
90/02 . Wall construction **[3]**
90/04 . . Linings **[3]**
90/06 . . Coverings, e.g. for insulating purposes **[3]**
90/08 . . Interconnections of wall parts; Sealing means therefor **[3]**
90/10 . Manholes; Inspection openings; Covers therefor (safety features B65D 90/22; covers or similar closure members, for pressure vessels in general F16J 13/00) **[3]**
90/12 . Supports **[3]**
90/14 . . Legs, e.g. detachable **[3]**
90/16 . . Skids **[3]**
90/18 . . Castors, rolls, or the like, e.g. detachable **[3]**
90/20 . . Frames or nets, e.g. for flexible containers **[3]**
90/22 . Safety features (floating covers B65D 88/34; arrangements of indicating or measuring devices B65D 90/48; fire-fighting A62C) **[3]**
90/24 . . Spillage-retaining means, e.g. recovery ponds **[3]**
90/26 . . Overfill prevention (spillage retaining means B65D 90/24; arrangements of indicating or measuring devices B65D 90/48) **[3]**
90/28 . . Means for preventing or minimising the escape of vapours **[3]**
90/30 . . Recovery of escaped vapours **[3]**
90/32 . . Arrangements for preventing, or minimising the effect of, excessive or insufficient pressure **[3]**
90/34 . . . Venting means (vehicle fuel tanks characterised by venting means B60K 15/035) **[3,5]**
90/36 . . . Weakened parts **[3]**
90/38 . . Means for reducing the vapour space or for reducing the formation of vapour within containers **[3]**
90/40 . . . by use of fillings of porous materials **[3]**
90/42 . . . by use of particular materials for covering surface of liquids **[3]**
90/44 . . . by use of inert gas for filling space above liquid or between contents **[3]**
90/46 . . Arrangements for carrying off, or preventing the formation of electrostatic charges **[3]**
90/48 . Arrangements of indicating or measuring devices **[3]**
90/50 . . of leakage-indicating devices (investigating fluid-tightness of structures G01M 3/00) **[3]**
90/52 . Anti-slosh devices (vehicle fuel tanks with means modifying or controlling distribution or motion of fuel, e.g. to prevent noise, surge, splash or fuel starvation, B60K 15/077) **[3]**
90/54 . Gates or closures (for manholes B65D 90/10) **[3]**
90/56 . . operating by deformation of flexible walls **[3]**
90/58 . . having closure members sliding in the plane of the opening **[3]**
90/60 . . . and having one or more openings **[3]**
90/62 . . having closure members movable out of the plane of the opening **[3]**
90/64 . . having multipart closure members, the parts being brought into closing position one by one according to need **[3]**
90/66 . . Operating devices therefor **[3]**

B65F GATHERING OR REMOVAL OF DOMESTIC OR LIKE REFUSE (disinfecting refuse A61L; refuse disintegrators B02C; sorting refuse B03B, B07B; handcarts for transporting refuse receptacles B62B; sack holders B65B 67/00; converting refuse into fertilisers C05F; converting refuse into solid fuels C10L; sewers, cesspools E03F; arrangements in buildings for the disposal of refuse E04F 17/10; refuse-consuming furnaces F23G)

1/00 Refuse receptacles (containers not specially adapted for refuse, features of refuse receptacles of general interest B65D)
1/02 . without removable inserts
1/04 . with removable inserts
1/06 . . with flexible inserts, e.g. bags or sacks
1/08 . . with rigid inserts
1/10 . with refuse filling means, e.g. air-locks
1/12 . with devices facilitating emptying
1/14 . Other constructional features (holders or carriers for hand articles A45F 5/00; fastening devices for wings E05C; hinges E05D)
1/16 . . Lids or covers (pedal or hand-lever operated B65D)

3/00 Vehicles particularly adapted for collecting refuse (vehicles in general B60; driving vehicle equipment or auxiliaries B60K; discharging contents by tilting entire vehicles B65G; wheeled apparatus for emptying sewers or cesspools E03F 7/10)
3/02 . with means for discharging refuse receptacles thereinto (conveyer construction B65G; loaders separate from vehicles B66F; fluid power control systems in general F15B)
3/04 . . Linkages, pivoted arms, or pivoted carriers for raising and subsequently tipping receptacles
3/06 . . . Arrangement or disposition of fluid actuators
3/08 . . Platform elevators or hoists with guides or runways for raising or tipping receptacles
3/10 . . . Arrangement or disposition of fluid actuators
3/12 . . Conjoint motion of lids, flaps, and shutters on vehicle and on receptacle; Operation of closures on vehicle conjointly with tipping of receptacle
3/14 . with devices for charging, distributing, or compressing refuse in the interior of the tank of a refuse vehicle (B65F 3/02 takes precedence) **[2]**

3/16 . . with conveyer wheels (with screw conveyers B65F 3/22) **[2]**
3/18 . . with endless conveyers, e.g. elevators **[2]**
3/20 . . with charging pistons, plates, or the like (for discharging B65F 3/28) **[2]**
3/22 . . with screw conveyers, rotary tanks **[2]**
3/24 . with devices for unloading the tank of a refuse vehicle **[2]**
3/26 . . by tipping the tank **[2]**
3/28 . . by a lengthwise movement of a wall, e.g. a plate, a piston, or the like (for charging B65F 3/20) **[2]**

5/00 **Gathering or removal of refuse otherwise than by receptacles or vehicles** (storage silos, charging or discharging thereof B65G)

7/00 **Cleaning or disinfecting devices combined with refuse receptacles or refuse vehicles** (such devices per se A61L, B08B)

9/00 **Transferring of refuse between vehicles or containers with intermediate storage or pressing** (presses for baling per se B30B 9/30) **[4]**

B65G **TRANSPORT OR STORAGE DEVICES, E.G. CONVEYERS FOR LOADING OR TIPPING**; **SHOP CONVEYER SYSTEMS**; **PNEUMATIC TUBE CONVEYERS** (transport or storage devices used in a particular handling or treatment of articles or materials, see the relevant subclass, e.g. in metal-working B21D 43/00, B23Q 7/00, B23Q 41/02; vehicle, railway, sea or aircraft aspects B60 to B64; transportation, conveyor or haulage systems specially adapted for motor vehicle or trailer assembly lines B62D 65/18; in packaging B65B; handling thin or filamentary materials B65H; hoisting, lifting, hauling, e.g. truck loaders B66; handling liquids B67; specially adapted to underground conditions E21F 13/00; storing or distributing gases or liquids F17; in handling radioactive materials G21C 19/00)

Subclass index

Storing; **Storage devices**

1/00 **Storing articles, individually or in orderly arrangement, in warehouses or magazines** (conveyer combinations in warehouses, magazines, or workshops B65G 37/00; stacking of articles B65G 57/00; removing articles from stacks B65G 59/00; loading machines B65G 65/02; arrangements of articles for drying or baking in kilns or ovens F26, F27)
1/02 . Storage devices (furniture, shop fittings, table equipment A47B, A47F, A47G; mechanical garages E04H; for data record cards in association with machines for marking or sensing data G06K; coin changers or sorters G07D; coin-freed apparatus G07F)
1/04 . . mechanical
1/06 . . . with means for presenting articles for removal at predetermined position or level (B65G 1/12 takes precedence) **[3]**
1/07 . . . . the upper article of a pile being always presented at the same predetermined level **[3]**
1/08 . . . . the articles being fed by gravity
1/10 . . . with relatively-movable racks to facilitate insertion or removal of articles
1/12 . . . with article supports or holders movable in a closed circuit to facilitate insertion or removal of articles
1/127 . . . . the circuit being confined in a vertical plane **[3]**
1/133 . . . . the circuit being confined in a horizontal plane **[3]**
1/137 . . . with arrangements or automatic control means for selecting which articles are to be removed (devices for feeding articles to conveyers from several groups of articles B65G 47/10) **[4]**
1/14 . . Stack holders or separators
1/16 . Special arrangements of articles in storage spaces
1/18 . . Articles inclined so as to be mutually self-supporting
1/20 . . Articles arranged in layers with spaces between articles

3/00 **Storing bulk material or loose, i.e. disorderly, articles** (filling or emptying storage spaces or containers, spreading-out or piling-up bulk material or loose articles B65G 65/28, B65G 65/30, B65G 69/04; storing agricultural or horticultural produce A01F 25/00)

3/02 . in the open air (B65G 3/04 takes precedence)

3/04 . in bunkers, hoppers or like large containers (such containers per se B65D 88/00)

5/00 **Storing fluids in natural or artificial cavities or chambers in the earth** (modification of mine passages or chambers for storage purposes, especially for fluids E21F 17/16)

Devices assisting manual conveyance of articles over short distances, e.g. in storage depots, warehouses or factories

7/00 **Devices for assisting manual moving or tilting heavy loads** (chutes B65G 11/00; roller-ways B65G 13/00; for tilting and emptying barrels or casks B65G 65/24)

7/02 . Devices adapted to be interposed between loads and the ground or floor, e.g. crowbars with means for assisting conveyance of loads (crowbars per se B66F 15/00)

7/04 . . Rollers

7/06 . . using fluid at high pressure supplied from an independent source to provide a cushion between load and ground

7/08 . . for tilting the loads

7/10 . . for rolling cylindrical loads

7/12 . Load-carriers, e.g. hooks, slings, harness, gloves, modified for load-carrying

9/00 **Apparatus for assisting manual handling having suspended load-carriers movable by hand or gravity** (manually-operated endless-rope or chain conveyers B65G 17/00; railway systems B61B)

Chutes; **Kinds or types of conveyers**; **Constructional features, details, or auxiliary devices peculiar to conveyers of particular types [4]**

11/00 **Chutes** (used as storage devices B65G 1/02, B65D 88/26; feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; for sports, games, or amusements A63G 21/00; for refuse disposal in buildings E04F 17/12)

11/02 . of straight form

11/04 . for mail in buildings

11/06 . of helical or spiral form

11/08 . with discontinuous guiding surfaces, e.g. arranged in zig-zag or cascade formation

11/10 . flexible

11/12 . pivotable

11/14 . extensible, e.g. telescopic

11/16 . Interior surfaces; Linings

11/18 . Supports or mountings

11/20 . Auxiliary devices, e.g. for deflecting, controlling speed of, or agitating, articles or solids

13/00 **Roller-ways** (storage devices comprising roller-ways B65G 1/02; endless-chain conveyers comprising load-supporting rollers B65G 17/00; rollers, or arrangements thereof B65G 39/00; feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; in metal-rolling equipment B21B 39/00, B21B 41/00)

13/02 . having driven rollers

13/04 . . all rollers driven

13/06 . . Roller driving means **[3]**

13/07 . . . having endless driving elements

13/071 . . . with frictional engagement

13/073 . . . comprising free-wheel gearing

13/075 . Braking means **[3]**

13/08 . of curved form; with branch-offs

13/10 . . Switching arrangements

13/11 . Roller frames

13/12 . . adjustable

15/00 **Conveyers having endless load-conveying surfaces, i.e. belts and like continuous members, to which tractive effort is transmitted by means other than endless driving elements of similar configuration** (having load-conveying surfaces formed by interconnected longitudinal links B65G 17/06; feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00)

15/02 . for conveying in a circular arc

15/04 . the load being carried on the lower run of the endless surface

15/06 . with oppositely-moving parts of the endless surface located in the same plane and parallel to one another

15/08 . the load-carrying surface being formed by a concave or tubular belt, e.g. a belt forming a trough

15/10 . comprising two or more co-operating endless surfaces with parallel longitudinal axes, or a multiplicity of parallel elements, e.g. ropes defining an endless surface

15/12 . . with two or more endless belts

15/14 . . . the load being conveyed between the belts

15/16 . . . . between an auxiliary belt and a main belt

15/18 . . . the belts being sealed at their edges (endless-surface conveyers having a single belt with sealed edges B65G 15/08)

15/20 . . . arranged side by side, e.g. for conveyance of flat articles in vertical position (for conveying sheets or like thin flat articles B65H)

15/22 . comprising a series of co-operating units

15/24 . . in tandem

15/26 . . extensible, e.g. telescopic

15/28 . Conveyers with a load-conveying surface formed by a single flat belt, not otherwise provided for

15/30 . Belts or like endless load-carriers (co-operating with rails or the like B65G 21/22; with rollers B65G 39/20; belts in general F16G)

15/32 . . made of rubber or plastics

15/34 . . . with reinforcing layers, e.g. of fabric

15/36 . . . . the layers incorporating ropes, chains, or rolled steel sections

15/38 . . . with flame-resistant layers, e.g. of asbestos, glass

15/40 . . . troughed or tubular; formed with joints facilitating troughing

15/42 . . . having ribs, ridges, or other surface projections

15/44 . . . . for impelling the loads

15/46 . . . formed with guides

15/48 . . metallic

15/50 . . Endless load-carriers consisting of a series of parallel ropes or belt strips

15/52 . . . interconnected by transverse slats

15/54 . . Endless load-carriers made of interwoven ropes or wires

15/56 . . with edge-protecting or reinforcing means

15/58 . . with means for holding or retaining the loads in fixed position, e.g. magnetic

15/60 . Arrangements for supporting or guiding belts, e.g. by fluid jets (construction of rollers or supports therefor B65G 39/00, F16G)

15/62 . . Guides for sliding belts

15/64 . . for automatically maintaining the position of the belts

17/00 Conveyers having an endless traction element, e.g. a chain, transmitting movement to a continuous or substantially-continuous load-carrying surface or to a series of individual load-carriers; **Endless-chain conveyers in which the chains form the load-carrying surface** (feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; railway systems, detachable load-carriers on rails B61B; escalators or paternosters neither combined nor associated with loading or unloading apparatus B66B 9/00)

17/02 . comprising a load-carrying belt attached to, or resting on, the traction element

17/04 . . the belt having loops forming load-receiving pockets

17/06 . having a load-carrying surface formed by a series of interconnected, e.g. longitudinal, links, plates, or platforms

17/08 . . the surface being formed by the traction element

17/10 . . the surface forming a longitudinal trough

17/12 . comprising a series of individual load-carriers fixed, or normally fixed, relative to traction element

17/14 . . with two spaced connections to traction element

17/16 . comprising individual load-carriers which are pivotally mounted, e.g. for free-swinging movement (guides inverting or tilting load-carriers for emptying B65G 47/34)

17/18 . . and move in contact with a guiding surface

17/20 . comprising load-carriers suspended from overhead traction chains

17/22 . with oppositely-moving parts of the conveyer located in a common plane

17/24 . comprising a series of rollers which are moved over a supporting surface by the traction element to effect conveyance of loads or load-carriers

17/26 . comprising a series of co-operating units, e.g. interconnected by pivots

17/28 . . extensible, e.g. telescopic

17/30 . Details; Auxiliary devices (belts B65G 15/30; framework B65G 21/00)

17/32 . . Individual load-carriers (control B65G 17/48)

17/34 . . . having flat surfaces, e.g. platforms, grids, forks

17/36 . . . having concave surfaces, e.g. buckets

17/38 . . Chains or like traction elements (chains in general F16G); Connections between traction elements and load-carriers

17/40 . . . Chains acting as load-carriers

17/42 . . . Attaching load-carriers to traction elements

17/44 . . . . by means excluding relative movements

17/46 . . Means for holding or retaining the loads in fixed position on the load-carriers, e.g. magnetic

17/48 . . Controlling attitudes of load-carriers during movement (guides B65G 21/20; inverting or tilting load-carriers to discharge contents B65G 47/38)

19/00 Conveyers comprising an impeller or a series of impellers carried by an endless traction element and arranged to move articles or materials over a supporting surface or underlying material, e.g. endless scraper conveyers (feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00)

19/02 . for articles, e.g. for containers

19/04 . for moving bulk material in open troughs or channels

19/06 . . the impellers being scrapers similar in size and shape to the cross-section of the trough or channel

19/08 . . . and attached to a single belt, rope, or chain

19/10 . . . and attached to a pair of belts, ropes, or chains

19/12 . . the impellers being plates having an area substantially smaller than that of the trough or channel cross-section

19/14 . for moving bulk material in closed conduits, e.g. tubes

19/16 . . the impellers being elements having an area substantially smaller than that of the conduit cross-section

19/18 . Details

19/20 . . Traction chains, ropes, or cables

19/22 . . Impellers, e.g. push-plates, scrapers; Guiding means therefor

19/24 . . . Attachment of impellers to traction element

19/26 . . . . pivotal

19/28 . . Troughs, channels, or conduits

19/30 . . . with supporting surface modified to facilitate movement of loads, e.g. friction-reducing devices

21/00 Supporting or protective framework or housings for endless load-carriers or traction elements of belt or chain conveyers (supporting framework or bases for conveyers as a whole B65G 41/00)

21/02 . consisting essentially of struts, ties, or like structural elements

21/04 . . the ties being formed by longitudinal cables or ropes

21/06 . . constructed to facilitate rapid assembly or dismantling

21/08 . Protective roofs or arch supports therefor

21/10 . movable, or having interchangeable or relatively-movable parts; Devices for moving framework or parts thereof

21/12 . . to allow adjustment of position of load-carrier or traction element as a whole

21/14 . . to allow adjustment of length or configuration of load-carrier or traction element (tensioning arrangements for belt or chain B65G 23/44)

21/16 . for conveyers having endless load-carriers movable in curved paths

21/18 . . in three-dimensionally curved paths

21/20 . Means incorporated in, or attached to, framework or housings for guiding load-carriers, traction elements, or loads supported on moving surfaces (arrangements for supporting belts B65G 15/60; rollers or roller arrangements B65G 39/00, F16G)

21/22 . . Rails or the like engaging sliding elements or rollers attached to load-carriers or traction elements

23/00 Driving gear for endless conveyers (control devices for conveyers in general B65G 43/00); **Belt- or chain-tensioning arrangements**

23/02 . Belt- or chain-engaging elements

23/04 . . Drums, rollers, or wheels

23/06 . . . with projections engaging abutments on belts or chains, e.g. sprocket wheels
23/08 . . . with self-contained driving mechanisms, e.g. motors and associated gearing
23/10 . . . arranged intermediate the ends of the conveyers
23/12 . . . Arrangements of co-operating drums or rollers to augment tractive effort applied to the belts
23/14 . . Endless driving elements extending parallel to belt or chain
23/16 . . . with dogs engaging abutments on belts or chains
23/18 . . Suction or magnetic elements
23/19 . . . Suction elements **[3]**
23/20 . . Screws
23/22 . Arrangements or mountings of driving motors
23/23 . . of electric linear motors **[3]**
23/24 . Gearing between driving motor and belt- or chain-engaging elements (contained in drums, rollers, or wheels B65G 23/08)
23/26 . . Applications of clutches or brakes
23/28 . . Arrangements for equalising the drive to several elements
23/30 . . Variable-speed gearing
23/32 . for effecting drive at two or more points spaced along the length of the conveyers
23/34 . . comprising a single motor coupled to spaced driving elements
23/36 . . comprising two or more driving motors each coupled to a separate driving element, e.g. at either end of the conveyers
23/38 . for effecting intermittent movement of belts or chains
23/40 . . Applications of pawl-and-ratchet mechanisms or Geneva wheels
23/42 . . Reciprocating members engaging successive abutments on belts or chains
23/44 . Belt- or chain-tensioning arrangements

25/00 **Conveyers comprising a cyclically-moving, e.g. reciprocating, carrier or impeller which is disengaged from the load during the return part of its movement** (jigging B65G 27/00; feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; pumps F04)
25/02 . the carrier or impeller having different forward and return paths of movement, e.g. walking-beam conveyers
25/04 . the carrier or impeller having identical forward and return paths of movement, e.g. reciprocating conveyers
25/06 . . having carriers, e.g. belts
25/08 . . having impellers, e.g. pushers
25/10 . . . with impeller pivotally mounted on a reciprocating bar
25/12 . . . with impeller fixed to a reciprocating bar and the bar being rotated about its longitudinal axis on its return stroke

27/00 **Jigging conveyers** (feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; jigs for wet separation B03B; generating or transmitting mechanical vibrations B06; jiggers for screening, sifting, or sorting B07B 1/28)
27/02 . comprising helical or spiral channels or conduits for elevation of materials (helical or spiral chutes in general B65G 11/06)
27/04 . Load-carriers other than helical or spiral channels or conduits
27/06 . . Joints connecting load-carrier sections
27/08 . Supports or mountings for load-carriers, e.g. framework, bases, spring arrangements
27/10 . Applications of devices for generating or transmitting jigging movements
27/12 . . of shaking devices, i.e. devices for producing movements of low frequency and large amplitude
27/14 . . . hydraulic
27/16 . . of vibrators, i.e. devices for producing movements of high frequency and small amplitude
27/18 . . . Mechanical devices
27/20 . . . . rotating unbalanced masses
27/22 . . . Hydraulic or pneumatic devices
27/24 . . . Electromagnetic devices
27/26 . . . with elastic coupling between vibrator and load-carrier
27/28 . . with provision for dynamic balancing
27/30 . . . by means of an oppositely-moving mass, e.g. a second conveyer
27/32 . . with means for controlling direction, frequency, or amplitude of vibration or shaking movement
27/34 . comprising a series of co-operating units

29/00 **Rotary conveyers, e.g. rotating discs, arms, star-wheels or cones** (mechanical projectors B65G 31/00; screw or rotary spiral conveyers B65G 33/00; feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00)
29/02 . for inclined or vertical transit (B65G 15/00, B65G 17/00 take precedence)

31/00 **Mechanical throwing machines for articles or solid materials** (feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; distributors for fertilisers A01C; moulding machines B22C; sandblasting devices B24C; implements for applying plaster E04F 21/06)
31/02 . comprising belts
31/04 . comprising discs, drums, or like rotary impellers

33/00 **Screw or rotary spiral conveyers** (feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; screws for extruding, compressing, kneading, mixing, pumping, or other special operations, see the relevant classes)
33/02 . for articles
33/04 . . conveyed between a single screw and guiding means
33/06 . . conveyed and guided by parallel screws
33/08 . for fluent solid materials
33/10 . . with non-enclosed screws
33/12 . . with screws formed by straight tubes or drums having internal threads, or by spiral or helical tubes
33/14 . . comprising a screw or screws enclosed in a tubular housing
33/16 . . . with flexible screws operating in flexible tubes
33/18 . . . with multiple screws in parallel arrangements
33/20 . . . the housing being rotatable relative to the screw
33/22 . . . with means for retarding material flow at the delivery end of the housing
33/24 . Details
33/26 . . Screws (as gearing elements F16H 25/20)
33/30 . . . with a discontinuous helical surface
33/32 . . Adaptations of bearings or couplings for supporting or connecting screws (B65G 33/16 takes precedence)

33/34 . . Applications of driving gear
33/36 . . . for rotating housing and screw at different speeds
33/38 . . . for effecting simultaneous rotation and reciprocation of screw

35/00 Mechanical conveyers not otherwise provided for (feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00)
35/02 . comprising an endless traction element, e.g. a belt, arranged to roll cylindrical articles over a supporting surface
35/04 . comprising a flexible load-carrier, e.g. a belt, which is wound-up at one end and paid-out at the other (reciprocating belt conveyers B65G 25/06)
35/06 . comprising a load-carrier moving along a path, e.g. a closed path, and adapted to be engaged by any one of a series of traction elements spaced along the path (effecting drive at two or more points spaced along the length of an endless conveyer B65G 23/32)
35/08 . comprising trains of unconnected load-carriers, e.g. belt sections, movable in a path, e.g. a closed path, adapted to contact each other and to be propelled by means arranged to engage each load-carrier in turn

37/00 Combinations of mechanical conveyers of the same kind, or of different kinds, of interest apart from their application in particular machines or use in particular manufacturing processes (mechanical storage devices B65G 1/04; series of co-operating belt conveyer units B65G 15/22; series of co-operating chain conveyer units B65G 17/26; sequence control of combined conveyers B65G 43/10; feeding or discharging conveyers by devices incorporated in, or operatively associated with, conveyers B65G 47/00; specially adapted for handling radioactive materials G21)
37/02 . Flow sheets for conveyer combinations in warehouses, magazines, or workshops

Common features or details of, or auxiliary devices applicable to, conveyers of different kinds or types; **Feeding or discharging devices incorporated in, or operatively associated with, conveyers**

39/00 Rollers, e.g. drive rollers, or arrangements thereof incorporated in roller-ways or other types of mechanical conveyers (driving gear for rollers of roller-ways B65G 13/06; drive rollers of endless conveyers B65G 23/04; arrangement of rollers in metal-rolling equipment B21B 39/10; friction members F16H 55/32)
39/02 . Adaptations of individual rollers and supports therefor
39/04 . . the rollers comprising a number of roller- forming elements mounted on a single axle
39/06 . . the roller sleeves being shock-absorbing, e.g. formed by helically-wound wires
39/07 . . Other adaptations of sleeves
39/071 . . . for aligning belts or sheets
39/073 . . . for cleaning belts
39/08 . . the rollers being magnetic (in magnetic belt separators B03C 1/00)
39/09 . . Arrangements of bearing or sealing means
39/10 . Arrangements of rollers (on a single axle B65G 39/04)
39/12 . . mounted on framework
39/14 . . . Spring-supported sets, e.g. permitting troughing of a load-carrying belt
39/16 . . . for aligning belts or chains (for aligning tapes or webs B65H)
39/18 . . . for guiding loads
39/20 . . attached to moving belts or chains (belts B65G 15/30; chains B65G 17/44)

41/00 Supporting frames or bases for conveyers as a whole, e.g. transportable conveyer frames
41/02 . Frames mounted on wheels for movement on rail tracks

43/00 Control, e.g. safety, warning, fault-correcting, devices (for elevators, escalators or moving walkways B66B; in general F16P, G08B)
43/02 . detecting dangerous physical condition of load-carriers, e.g. for interrupting the drive in the event of overheating
43/04 . detecting slip between driving element and load-carrier, e.g. for interrupting the drive
43/06 . interrupting the drive in case of driving-element breakage; Braking or stopping loose load-carriers
43/08 . Control devices operated by article or material being fed, conveyed, or discharged
43/10 . Sequence control of conveyers operating in combination

45/00 Lubricating, cleaning, or clearing devices
45/02 . Lubricating devices
45/04 . . for rollers **[5]**
45/06 . . . forming belt troughing structure **[5]**
45/08 . . for chains **[5]**
45/10 . Cleaning devices (adaptations of roller sleeves for cleaning belts B65G 39/073) **[5]**
45/12 . . comprising scrapers **[5]**
45/14 . . . Moving scrapers **[5]**
45/16 . . . with scraper biasing means **[5]**
45/18 . . comprising brushes **[5]**
45/20 . . comprising screws **[5]**
45/22 . . comprising fluid applying means **[5]**
45/24 . . comprising plural diverse cleaning devices **[5]**
45/26 . . for gathering residue after cleaning **[5]**

47/00 Article or material-handling devices associated with conveyers; **Methods employing such devices** (for sorting, e.g. postal, B07C)
47/02 . Devices for feeding articles or materials to conveyers
47/04 . . for feeding articles
47/06 . . . from a single group of articles arranged in orderly pattern, e.g. workpieces in magazines (de-stacking devices B65G 59/00; picking-up flat workpieces B65H)
47/08 . . . . spacing or grouping the articles during feeding (during transit by conveyer B65G 47/28)
47/10 . . . from several groups of articles
47/12 . . . from disorderly-arranged article piles or from loose assemblages of articles
47/14 . . . . arranging or orientating the articles by mechanical or pneumatic means during feeding (during transit by conveyer B65G 47/24, B65G 47/26)
47/16 . . for feeding materials in bulk
47/18 . . . Arrangements or applications of hoppers or chutes

47/19 . . . . having means for controlling material flow, e.g. to prevent overloading (controlling feed or discharge by weighing a continuous stream of material G01G 11/08)
47/20 . . . . the hoppers or chutes being movable
47/22 . Devices influencing the relative position or the attitude of articles during transit by conveyers (during feeding B65G 47/14)
47/24 . . orientating the articles
47/244 . . . by turning them about an axis substantially perpendicular to the conveying plane **[5]**
47/248 . . . by turning over or inverting them (B65G 47/244 takes precedence) **[5]**
47/252 . . . . about an axis substantially perpendicular to the conveying direction **[5]**
47/256 . . . removing incorrectly orientated articles **[5]**
47/26 . . arranging the articles, e.g. varying spacing between individual articles (stacking or de-stacking B65G 57/00, B65G 59/00, B65G 61/00)
47/28 . . . during transit by a single conveyer
47/29 . . . . by temporarily stopping movement
47/30 . . . during transit by a series of conveyers
47/31 . . . . by varying the relative speeds of the conveyers forming the series
47/32 . . . . Applications of transfer devices
47/34 . Devices for discharging articles or materials from conveyers (B65G 47/256 takes precedence; sorting in general B07)
47/36 . . by detaching suspended articles
47/38 . . by dumping, tripping, or releasing load-carriers
47/40 . . . by tilting conveyer buckets
47/42 . . operated by article or material being conveyed and discharged
47/44 . . Arrangements or applications of hoppers or chutes
47/46 . . with distribution, e.g. automatically, to desired points (in tube mail systems B65G 51/36; postal or like sorting B07C)
47/48 . . . according to bodily destination marks on either articles or load-carriers (marking data records G06K)
47/49 . . . . without bodily contact between article or load-carrier and automatic control device
47/50 . . . according to destination signals stored in separate systems (control by programme G05B 19/00)
47/51 . . . according to unprogrammed signals, e.g. influenced by supply situation at destination (volume, flow, or liquid level meters G01F; scales or weighing machines G01G; remote controls G05G)
47/52 . Devices for transferring articles or materials between conveyers, i.e. discharging or feeding devices (loading or unloading by means not incorporated in, or not operatively associated with, conveyers B65G 65/00; transfer of workpieces during metal rolling B21B 41/00)
47/53 . . between conveyers which cross one another **[3]**
47/54 . . . at least one of which is a roller-way **[3]**
47/56 . . to or from inclined or vertical conveyer sections
47/57 . . . for articles
47/58 . . . for materials in bulk
47/60 . . to or from conveyers of the suspended, e.g. trolley, type
47/61 . . . for articles
47/62 . . . for materials in bulk
47/64 . . Switching conveyers
47/66 . . Fixed platforms or combs, e.g. bridges between conveyers
47/68 . . adapted to receive articles arriving in one layer from one conveyer and to transfer them in individual layers to more than one conveyer, or vice versa, e.g. combining the flows of articles conveyed by more than one conveyer
47/69 . . . the articles being accumulated temporarily
47/70 . . . with precedence controls among incoming article flows
47/71 . . . the articles being discharged to several conveyers
47/72 . . transferring materials in bulk from one conveyer to several conveyers, or vice versa
47/74 . Feeding, transfer, or discharging devices of particular kinds or types
47/76 . . Fixed or adjustable ploughs or transverse scrapers
47/78 . . Troughs having discharge openings and closures
47/80 . . Turntables carrying articles or materials to be transferred, e.g. combined with ploughs or scrapers
47/82 . . Rotary or reciprocating members for direct action on articles or materials, e.g. pushers, rakes, shovels
47/84 . . Star-shaped wheels or devices having endless travelling belts or chains, the wheels or devices being equipped with article-engaging elements
47/86 . . . the article-engaging elements being grippers
47/88 . . Separating or stopping elements, e.g. fingers (attached to star-shaped wheels B65G 47/84)
47/90 . . Devices for picking-up and depositing articles or materials
47/91 . . . incorporating pneumatic, e.g. suction, grippers
47/92 . . . incorporating electrostatic or magnetic grippers
47/94 . . Devices for flexing or tilting travelling structures; Throw-off carriages
47/95 . . . adapted for longitudinal delivery
47/96 . . . Devices for tilting links or platforms

49/00 **Conveying systems characterised by their application for specified purposes not otherwise provided for** (for conveying sheet material B65H)
49/02 . for conveying workpieces through baths of liquid
49/04 . . the workpieces being immersed and withdrawn by movement in a vertical direction
49/05 . for fragile or damageable materials or articles **[4]**
49/06 . . for fragile sheets, e.g. glass (transporting of glass products during their manufacture C03B 35/00) **[4]**
49/07 . . for semiconductor wafers (specially adapted for conveying of semiconductor wafers during manufacture or treatment of semiconductor or electric solid state devices or components H01L 21/677) **[5,8]**
49/08 . . for ceramic mouldings (charging, discharging, manipulation with charge in kilns F27D 3/00) **[4]**

Non-mechanical conveying through pipes or tubes; **Floating in troughs**

51/00 **Conveying articles through pipes or tubes by fluid flow or pressure** (water roundabouts A63G 3/00; pneumatic railways B61B); **Conveying articles over a flat surface, e.g. the base of a trough, by jets located in the surface** (pumps F04; fluid dynamics F15D; valves, taps, cocks F16K; pipes, pipe joints, or associated devices F16L)

51/01 . Hydraulic transport of articles (B65G 51/04 takes precedence) **[6]**

51/02 . Directly conveying the articles, e.g. slips, sheets, stockings, containers or workpieces, by flowing gases

51/03 . . over a flat surface or in troughs **[4]**

51/04 . Conveying the articles in carriers having a cross-section approximating that of the pipe or tube; Tube mail systems

51/06 . . Despatch carriers for tube mail

51/08 . . Controlling or conditioning the operating medium (in compressors F04; air-conditioning, e.g. de-watering, in pneumatic systems F16L 55/09)

51/10 . . . at section junctions of pneumatic systems

51/12 . . . . Pneumatic gates

51/14 . . . . Pneumatic sluices

51/16 . . . varying, e.g. starting or stopping, gas pressure or flow

51/18 . . Adaptations of pipes or tubes; Pipe or tube joints

51/20 . . Braking arrangements

51/22 . . Arrangements for stopping the carriers en route in order to control carrier sequence; Blocking or separating devices

51/24 . . Switches

51/26 . . Stations

51/28 . . . for despatch

51/30 . . . for delivery

51/32 . . . for despatch, delivery, and transit

51/34 . . Two-way operation

51/36 . . Other devices for indicating or controlling movements of carriers, e.g. for supervising individual tube sections, for counting carriers, for reporting jams or other operating difficulties

51/38 . . . Contact devices on interior of tubes for detecting passage of carriers

51/40 . . . Automatically distributing the carriers to desired stations

51/42 . . . . according to indications on carriers

51/44 . . . . . without mechanical contact between carriers and controllers

51/46 . . . . according to separate signal systems

53/00 **Conveying materials in bulk through troughs, pipes, or tubes by floating the materials, or by flow of gas, liquid, or foam** (fluidising in connection with loading or unloading B65G 69/06; loaders for hay or like field crops A01D 87/00; fluidising devices facilitating filling or emptying of large containers B65D 88/72; dredging E02F; winning materials out of alluvial deposits E21C 45/00; hydraulic or pneumatic mine-filling-up machines E21F 15/00; fluid dynamics F15D; pipe-line systems F17D)

53/02 . Floating material troughs (air slides B65G 53/04)

53/04 . Conveying materials in bulk pneumatically through pipes or tubes; Air slides

53/06 . . Gas pressure systems operating without fluidisation of the materials

53/08 . . . with mechanical injection of the materials, e.g. by screw

53/10 . . . with pneumatic injection of the materials by the propelling gas

53/12 . . . . the gas flow acting directly on the materials in a reservoir

53/14 . . . . the gas flow inducing feed of the materials by suction effect

53/16 . . Gas pressure systems operating with fluidisation of the materials

53/18 . . . through a porous wall

53/20 . . . . of an air slide, e.g. a trough

53/22 . . . . the systems comprising a reservoir, e.g. a bunker

53/24 . . Gas suction systems

53/26 . . . operating with fluidisation of the materials

53/28 . . Systems utilising a combination of gas pressure and suction (inducing feed of the materials by suction in gas pressure systems B65G 53/14)

53/30 . Conveying materials in bulk through pipes or tubes by liquid pressure

53/32 . Conveying concrete, e.g. for distributing same at building sites (mixing concrete on or by conveyers B28C 5/34)

53/34 . Details

53/36 . . Arrangements of containers

53/38 . . Modification of material containing walls to facilitate fluidisation

53/40 . . Feeding or discharging devices

53/42 . . . Nozzles (in general B05B)

53/44 . . . Endless conveyers

53/46 . . . Gates or sluices, e.g. rotary wheels

53/48 . . . Screws or like rotary conveyers

53/50 . . . Pneumatic devices (incorporated in nozzles B65G 53/42)

53/52 . . Adaptations of pipes or tubes

53/54 . . . Flexible pipes or tubes

53/56 . . . Switches

53/58 . . Devices for accelerating or decelerating flow of the materials; Use of pressure generators (controlling pressure of propelling gas B65G 53/66)

53/60 . . Devices for separating the materials from propellant gas

53/62 . . . using liquid

53/64 . . . in discrete amounts

53/66 . . Use of indicator or control devices, e.g. for controlling gas pressure, for controlling proportions of material and gas, for indicating or preventing jamming of material

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54/00 **Non-mechanical conveyers not otherwise provided for [3]**

54/02 . electrostatic, electric, or magnetic **[3]**

Stacking or de-stacking; **Loading or unloading**

Note

In groups B65G 57/00 to B65G 61/00, the following term is used with the meaning indicated:
– "stacking" means disposing articles individually or in layers one above each other.

57/00 **Stacking of articles** (B65G 60/00 takes precedence; stacking of jumbo rolls B41F; stackable containers B65D; feeding, piling, or stacking sheets B65H; stacked delivery of machined products, see the relevant classes for the machines)
57/02 . by adding to the top of the stack
57/03 . . from above
57/04 . . . by suction or magnetic devices
57/06 . . . Gates for releasing articles
57/08 . . articles being tilted or inverted prior to depositing
57/081 . . . alternate articles being inverted
57/09 . . from alongside
57/10 . . . by devices, e.g. reciprocating, acting directly on articles for horizontal transport to the top of stack
57/11 . . the articles being stacked by direct action of the feeding conveyer
57/112 . . . the conveyer being adjustable in height
57/14 . . . the articles being transferred from carriers moving in an endless path adjacent to the stacks (conveyer constructions B65G 15/00 to B65G 35/00; combinations of conveyers B65G 37/00)
57/16 . . Stacking of articles of particular shape
57/18 . . . elongated, e.g. sticks, rods, bars
57/20 . . . three-dimensional, e.g. cubiform, cylindrical
57/22 . . . . in layers, each of predetermined arrangement
57/24 . . . . . the layers being transferred as a whole, e.g. on pallets
57/26 . . . . . the arrangement providing for spaces between the articles
57/28 . by assembling the articles and tilting the assembled articles to a stacked position
57/30 . by adding to the bottom of the stack
57/32 . characterised by stacking during transit

59/00 **De-stacking of articles** (B65G 60/00 takes precedence)
59/02 . De-stacking from the top of the stack
59/04 . . by suction or magnetic devices
59/06 . De-stacking from the bottom of the stack
59/08 . De-stacking after preliminary tilting of the stack
59/10 . De-stacking nested articles
59/12 . characterised by de-stacking during transit

60/00 **Simultaneously or alternatively stacking and de-stacking of articles**

61/00 **Use of pick-up or transfer devices or of manipulators for stacking or de-stacking articles not otherwise provided for** (manipulators B25J)

63/00 **Transferring or trans-shipping at storage areas, railway yards or harbours**; **Marshalling yard installations** (transferring of refuse between vehicles or containers B65F 9/00; dredging, soil shifting E02F; conveyers used in co-operation with coal or like winning apparatus E21C 47/00)
63/02 . with essentially-horizontal transit otherwise than by bridge
63/04 . with essentially-horizontal transit by bridges equipped with conveyers
63/06 . with essentially-vertical transit (hoppers B65D 88/26)

65/00 **Loading or unloading** (by means incorporated in, or operatively associated with, conveyers B65G 47/00; of vehicles B65G 67/00)
65/02 . Loading or unloading machines comprising essentially a conveyer for moving the loads associated with a device for picking-up the loads
65/04 . . with pick-up shovels (construction of shovels E02F)
65/06 . . with endless scraping or elevating pick-up conveyers
65/08 . . with reciprocating pick-up conveyers
65/10 . . . Raking or scraping devices
65/12 . . . . operations at positions off-set from the conveyer centreline
65/14 . . with jigging pick-up conveyers, e.g. duck-bills
65/16 . . with rotary pick-up conveyers
65/18 . . . Discs
65/20 . . . Paddle wheels
65/22 . . . Screws
65/23 . Devices for tilting and emptying of containers **[3]**
65/24 . . for manual tilting of barrels or casks **[3]**
65/28 . Piling or unpiling loose materials in bulk, e.g. coal, manure, timber, not otherwise provided for (by soil-shifting or like equipment E02F)
65/30 . Methods or devices for filling or emptying bunkers, hoppers, tanks, or like containers, of interest apart from their use in particular chemical or physical processes or their application in particular machines, e.g. not covered by a single other subclass (devices for tilting and emptying containers B65G 65/23; such containers having means facilitating filling or emptying B65D 88/54) **[3]**

Note

Methods or devices for filling bunkers, hoppers, or containers are only classified in group B65G 65/30 if they are of general application apart from their use in particular processes or their application in particular machines or if they are not covered by a single other subclass. **[5]**

65/32 . . Filling devices (pneumatic conveyers B65G 51/00, B65G 53/00)
65/34 . . Emptying devices (conveyer construction B65G 15/00 to B65G 35/00; devices similar to vehicle tipplers B65G 67/48)
65/36 . . . Devices for emptying from the top
65/38 . . . . Mechanical devices
65/40 . . . Devices for emptying otherwise than from the top
65/42 . . . . using belt or chain conveyers
65/44 . . . . using reciprocating conveyers, e.g. jigging conveyers

65/46 . . . . using screw conveyers
65/48 . . . . using other rotating means, e.g. rotating pressure sluices in pneumatic systems

67/00 Loading or unloading vehicles (by means incorporated in, or operatively associated with, conveyers B65G 47/00; by means incorporated in the vehicles B60 to B64; ground or aircraft-carrier-deck installations B64F; transferring of refuse between vehicles or containers B65F 9/00)
67/02 . Loading or unloading land vehicles
67/04 . . Loading land vehicles
67/06 . . . Feeding articles or materials from bunkers or funnels
67/08 . . . using endless conveyers
67/10 . . . using conveyers covering the whole length of vehicle trains
67/12 . . . Loading elongated articles, e.g. rails, logs
67/14 . . . Loading hardened bricks, briquettes, or the like
67/16 . . . Loading coke-oven products (discharging coke ovens C10B 33/00)
67/18 . . . Refuelling locomotives with solid fuels (servicing locomotives B61K 11/02)
67/20 . . . Loading covered vehicles
67/22 . . . Loading moving vehicles
67/24 . . Unloading land vehicles
67/26 . . . using rakes or scrapers
67/28 . . . . External transverse blades attached to endless conveyers
67/30 . . . using transportable tipping apparatus
67/32 . . . using fixed tipping installations
67/34 . . . . Apparatus for tipping wagons or mine cars (inverting wagons B65G 67/48; platform-lifts with tiltable platforms B66F 7/22)
67/36 . . . . . endwise
67/38 . . . . . comprising a turntable
67/40 . . . . . toward one end only
67/42 . . . . . sideways
67/44 . . . . . by passing the vehicles over a stretch of transversely-inclined rails
67/46 . . . . . Apparatus for lifting and tilting
67/48 . . . . Vehicle tipplers (devices for washing or cleaning railroad vehicles B60S)
67/50 . . . . . Rotary vehicle tipplers, i.e. rotating through 360°
67/52 . . . . . having several decks
67/54 . . . . . Vehicle-locking means
67/56 . . . . . Vehicle and tippler interlocking controls
67/60 . Loading or unloading ships (B65G 67/02 takes precedence; arrangement of ship-based loading or unloading equipment for cargo or passengers B63B 27/00) **[3]**
67/62 . . using devices influenced by the tide or by the movements of the ship, e.g. devices on pontoons (horizontal loading or unloading platforms B65G 69/22; loading ramps B65G 69/28) **[3]**

69/00 Auxiliary measures taken, or devices used, in connection with loading or unloading (by means incorporated in, or operatively associated with, conveyers B65G 47/00; preventing, minimising, or fighting fire A62C; in vehicles, see the relevant subclasses)
69/02 . Filling storage spaces as completely as possible, e.g. application of vibrators
69/04 . Spreading-out the materials conveyed over the whole surface to be loaded; Trimming heaps of loose materials
69/06 . Fluidising
69/08 . Devices for emptying storage spaces as completely as possible (devices preventing the formation of bridges B65D 88/64)
69/10 . Obtaining an average product from stored bulk material (for measuring or testing G01)
69/12 . Sieving bulk materials during loading or unloading
69/14 . Pulverising loaded or unloaded materials
69/16 . Preventing pulverisation, deformation, breakage, or other mechanical damage to the goods or materials
69/18 . Preventing escape of dust
69/20 . Auxiliary treatments, e.g. aerating, heating, humidifying, de-aerating, cooling, de-watering, or drying, during loading or unloading; Loading or unloading in a fluid medium other than air
69/22 . Horizontal loading or unloading platforms (pile tables B65H; as road or railway equipment E01F 1/00)
69/24 . . having platform-level adjusting means
69/26 . . Rotatable platforms
69/28 . Loading ramps; Loading docks (as road or railway equipment E01F 1/00) **[1,8]**
69/30 . . Non-permanently installed loading ramps, e.g. transportable **[8]**
69/32 . . Shelters, surrounds or sealing arrangements for loading docks **[8]**
69/34 . . Accessories, e.g. vehicle restrainers, wheel blockers, positioners or bumpers **[8]**

B65H HANDLING THIN OR FILAMENTARY MATERIAL, E.G. SHEETS, WEBS, CABLES

(1) This subclass does not cover methods or devices intimately associated with other operations on thin or filamentary material, e.g. sheets, webs, cables or means for performing such operations, which are classified in the relevant subclasses for these operations, e.g.:

B07C		Postal sorting, similar sorting of documents, e.g. cheques
B08B	1/02	Cleaning travelling work, e.g. webs, by methods involving the use of tools, brushes or like members
B21B	41/00	Metal rolling involving guiding, conveying or accumulating easily-flexible work, e.g. wire, sheet metal bands, in loops or curves
B21C	47/00,	Winding-up, coiling, winding-off or temporarily accumulating metal wire, metal band or other
B21C	49/00	flexible metal material, characterised by features relevant to metal processing only, other than by rolling

B21D	43/00		Feeding, positioning or storing devices, combined with, or arranged in, or specially adapted for use in connection with, apparatus for working or processing sheet metal without essentially removing material
B23K	9/12		Means for automatic feeding of electrodes for spot or seam welding or cutting
B29C	31/00		Handling for shaping or joining of plastics, for shaping of substances in a plastic state in general or for after-treatment of shaped products, e.g. feeding the material to be shaped
B41B	15/32,		Film-handling mechanisms in photographic composing machines
B41B	21/32		
B41F	13/02		Conveying or guiding webs through rotary-printing presses or machines
B41J	11/00	to	Handling of copy- or impression-transfer material in typewriters or selective printing mechanisms
B41J	17/00		
B41K	3/44		Means for handling copy matter in stamping or numbering apparatus or devices
B41L			Handling sheets or webs in apparatus or devices for manifolding, duplicating or printing for office or other commercial purposes, or on addressing machines or like series-printing machines
B42B			Handling relating to permanently attaching together sheets, quires, or signatures
B42C			Handling sheets in book-binding
B65B			Handling of sheets or webs in apparatus for, or methods of, packaging articles, not of interest apart from their application in packaging machines
B65C			Handling of labels in labelling or tagging apparatus
C14B	1/62		Winding or stacking hides or leather in machines or devices for manufacturing leather
D01	to		Spinning, weaving, braiding, lace-making, knitting, sewing, making ropes or cables
D07			
D21F	2/00		Transferring webs from wet ends to press sections in paper-making
F26B	13/00		Handling fabrics, fibres, yarns or other material in long lengths in drying apparatus
G03B			Film-strip handling or handling of pictures in apparatus for taking photographs or for projecting or viewing them
G06K	13/00		Conveying record carriers from one station to another
G06M	7/00		Counting of flat articles, e.g. sheets, carried by a conveyer
G11B	15/00	to	Information storage based on relative movement between record carrier and transducer, involving
G11B	19/00,		handling record carriers for recording or reproducing
G11B	23/00,		
G11B	25/00		
H01F	41/06		Manufacturing coils for magnets, inductances, transformers, by winding
H01G	13/02		Machines for winding capacitors
H04N	1/00		Sheet handling not of interest apart from its use in systems for transmission or reproduction of pictures or patterns not varying in time, e.g. facsimile transmission.

(2) In this subclass:
- the groups relating to thin material, as defined under (i) of Note (3) below, are primarily intended to cover the handling of articles made of paper or cardboard, but also include the handling of articles made of other materials which have similar characteristics or present similar handling problems, e.g. articles made of sheet-plastics or leather;
- the groups relating to filamentary material (groups B65H 49/00 onwards), as defined in Note (3) below, cover only methods or devices of general application or interest.

(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "handling" includes feeding, folding (other than in the manufacture of products), guiding, orientating, storing, unwinding, and winding;
- "thin material" includes:
  (i) sheets, signatures, envelopes, blanks, and thin piles thereof (hereinafter referred to as "articles"), and
  (ii) webs, tapes, and films, e.g. of paper, fabric, metal foil, or plastics;
- "filamentary material" includes thread, wires, ropes, cables, and hoses;
- "package" means a mass of filamentary material, formed by coiling, depositing, or winding, with or without a supporting core or former or an enclosing container or receptacle.

Subclass index

Feeding articles to machines; **Separating articles from piles**; **Pile supports**

1/00 **Supports or magazines for piles from which articles are to be separated** (carriers used for associating, collating, or gathering articles B65H 39/00; combinations of piling and depiling operations, of interest apart from the single operation of piling or depiling B65H 83/00)

1/02 . adapted to support articles on edge

1/04 . adapted to support articles substantially horizontally, e.g. for separation from top of pile

1/06 . . for separation from bottom of pile

1/08 . with means for advancing the pile to present the articles to a separating device (pressing on piles from which articles are separated from the bottom B65H 1/06)

1/10 . . comprising weights

1/12 . . comprising springs

1/14 . . comprising positively-acting mechanical devices

1/16 . . comprising pneumatic or hydraulic means

1/18 . . controlled by height of pile

1/20 . . controlled by weight of pile; Floating arrangements

1/22 . . moving in direction of plane of articles, e.g. for bodily advancement of fanned-out piles

1/24 . . with means for relieving or controlling pressure of the pile

1/26 . with auxiliary supports to facilitate introduction or renewal of the pile

1/28 . compartmented to receive piles side by side

1/30 . with means for replenishing the pile during continuous separation of articles therefrom

3/00 **Separating articles from piles** (associating, collating, or gathering articles B65H 39/00; machines for separating superposed webs B65H 41/00; unpiling thin material combined with folding B65H 45/26; combinations of piling and depiling operations, of interest apart from the single operation of piling or depiling B65H 83/00)

3/02 . using friction forces between articles and separator

3/04 . . Endless-belt separators

3/06 . . Rollers or like rotary separators

3/08 . using pneumatic force

3/10 . . Suction rollers

3/12 . . Suction bands, belts, or tables moving relatively to the pile

3/14 . . Air blasts producing partial vacuum

3/16 . using magnetic force

3/18 . using electrostatic force

3/20 . using adhesives

3/22 . by needles or the like engaging the articles

3/24 . by pushers engaging the edges of the articles

3/26 . by separators engaging folds, flaps, or projections of articles

3/28 . by screw or like separators

3/30 . by escapement devices (screw or like separators B65H 3/28); from staggered piles; from piles of articles having staggered formations, e.g. cuts or perforations

3/32 . by elements, e.g. fingers, plates, rollers, inserted or traversed between articles to be separated and remainder of the pile (such elements acting only as supplementary devices to assist separation or prevent double feed B65H 3/50)

3/34 . Article-retaining devices controlling the release of the articles to the separators

3/36 . by separators moved in special paths, e.g. enclosing an area

3/38 . . the paths not enclosing an area

3/40 . by two or more separators acting alternately on the same pile (rotary or oscillating bodies carrying two or more separators B65H 3/42)

3/42 . by two or more separators mounted for movement with, or relative to, rotary or oscillating bodies

3/44 . Simultaneously, alternately, or selectively separating articles from two or more piles

3/46 . Supplementary devices or measures to assist separation or prevent double feed (control means comprising detectors responsive to double feed B65H 7/12)

3/48 . . Air blast acting on edges of, or under, articles

3/50 . . Elements, e.g. fingers, plates, rollers, inserted or traversed between articles to be separated and remainder of the pile

3/52 . . Friction retainers acting on under or rear side of article being separated

3/54 . . Pressing or holding devices

3/56 . . Elements, e.g. scrapers, fingers, needles, brushes, acting on separated article or on edge of the pile
3/58 . . Articles spiked, threaded, cemented, or gummed together, to prevent double feed, e.g. piles with gummed edges
3/60 . . Loosening articles in piles
3/62 . . . by swinging, agitating, or knocking the pile
3/64 . . . by vacuum apparatus
3/66 . Article guides or smoothers, e.g. movable in operation
3/68 . . immovable in operation

5/00 Feeding articles separated from piles; **Feeding articles to machines** (identical mechanisms or parts for delivering or advancing articles from machines B65H 29/00; recirculating articles B65H 85/00)
5/02 . by belts or chains
5/04 . by movable tables or carriages (rotary tables B65H 5/18)
5/06 . by rollers
5/08 . by grippers, e.g. suction grippers
5/10 . . Reciprocating or oscillating grippers
5/12 . . Revolving grippers, e.g. mounted on arms, frames, or cylinders
5/14 . . Details of grippers; Actuating mechanisms therefor
5/16 . by pusher, needles, friction, or like devices adapted to feed single articles along a surface or table
5/18 . by rotary dials or tables
5/20 . by dropping-roller or like device
5/22 . by air-blast or suction device (suction grippers B65H 5/08)
5/24 . Feeding streams of overlapping articles
5/26 . Duplicate, alternate, selective, or coacting feeds
5/28 . Feeding articles stored in rolled or folded bands
5/30 . Opening devices for folded sheets or signatures
5/32 . Saddle-like members over which partially-unfolded sheets or signatures are fed to signature-gathering, stitching, or like machines
5/34 . Varying the phase of feed relative to the receiving machine
5/36 . Article guides or smoothers, e.g. movable in operation
5/38 . . immovable in operation

7/00 Controlling article feeding, separating, pile-advancing, or associated apparatus, to take account of incorrect feeding, absence of articles, or presence of faulty articles
7/02 . by feelers or detectors
7/04 . . responsive to absence of articles, e.g. exhaustion of pile (B65H 7/14 takes precedence)
7/06 . . responsive to presence of faulty articles or incorrect separation or feed (B65H 7/14 takes precedence)
7/08 . . . responsive to incorrect front register
7/10 . . . responsive to incorrect side register (controlling transverse register of webs B65H 23/032)
7/12 . . . responsive to double feed or separation
7/14 . . by photoelectric feelers or detectors
7/16 . Controlling air-supply to pneumatic separators
7/18 . Modifying or stopping actuation of separators
7/20 . Controlling associated apparatus

9/00 Registering, e.g. orientating, articles; **Devices therefor**
9/02 . Gauge pins
9/04 . Fixed or adjustable stops or gauges (gauge pins B65H 9/02)
9/06 . Movable stops or gauges, e.g. rising and falling front stops
9/08 . Holding devices, e.g. finger, needle, suction, for retaining articles in registered position
9/10 . Pusher or like movable registers; Pusher or gripper devices which move articles into registered position
9/12 . carried by article grippers
9/14 . Retarding or controlling the forward movement of articles as they approach stops
9/16 . Inclined tape, roller, or like article-forwarding side registers
9/18 . Assisting by devices such as reflectors, lenses, transparent sheets, or mechanical indicators
9/20 . Assisting by photoelectric, sonic, or pneumatic indicators

11/00 Feed tables
11/02 . angularly adjustable in plane of articles

13/00 Lifting the ends of piles to facilitate the formation of overlapped piles

15/00 Overturning articles [4]
15/02 . Overturning piles **[4]**

Feeding webs to or from machines; **Winding or unwinding webs**; **Splicing webs**

16/00 Unwinding, paying-out webs [4]
16/02 . Supporting web roll **[4]**
16/04 . . cantilever type **[4]**
16/06 . . both-ends type **[4]**
16/08 . . parallel rollers type **[4]**
16/10 . Arrangements for effecting positive rotation of web roll **[4]**

18/00 Winding webs [4]
18/02 . Supporting web roll **[4]**
18/04 . . Interior-supporting **[4]**
18/06 . . Lateral-supporting **[4]**
18/08 . Web-winding mechanisms **[4]**
18/10 . . Mechanisms in which power is applied to web-roll spindle **[4]**
18/12 . . . to effect step-by-step advancement of web **[4]**
18/14 . . Mechanisms in which power is applied to web roll, e.g. to effect continuous advancement of web **[4]**
18/16 . . . by friction roller **[4]**
18/18 . . . . to effect step-by-step advancement of web **[4]**
18/20 . . . the web roll being supported on two parallel rollers at least one of which is driven **[4]**
18/22 . . . by friction band **[4]**
18/24 . . . . to effect step-by-step advancement of web **[4]**
18/26 . . Mechanisms for controlling contact pressure on winding-web package, e.g. for regulating the quantity of air between web layers **[4]**
18/28 . Wound package of webs **[4]**

19/00 Changing the web roll [4]
19/10 . in unwinding mechanisms or in connection with unwinding operations **[4]**
19/12 . . Lifting, transporting, or inserting the web roll; Removing empty core **[4]**

19/14 . . Accumulating surplus web for advancing to machine while changing the web roll **[4]**
19/16 . . Driving, e.g. accelerating, the replacement web roll in association with web-splicing operation **[4]**
19/18 . . Attaching, e.g. pasting, the replacement web to the expiring web **[4]**
19/20 . . Cutting-off the expiring web **[4]**
19/22 . in winding mechanisms or in connection with winding operations **[4]**
19/24 . . Accumulating surplus web delivered while changing the web roll **[4]**
19/26 . . Cutting-off the web running to the wound web roll **[4]**
19/28 . . Attaching the leading end of the web to the replacement web-roll core or spindle (cores, formers, supports or holders, e.g. reels, with arrangements for securing ends of material B65H 75/28) **[4]**
19/29 . . Securing the trailing end of the wound web to the web roll (cores, formers, supports or holders, e.g. reels, with arrangements for securing ends of material B65H 75/28) **[4]**
19/30 . . Lifting, transporting, or removing the web roll; Inserting core **[4]**

20/00 **Advancing webs** (web-delivering apparatus incorporating devices for performing auxiliary operations B65H 35/00, B65H 37/00) **[4]**
20/02 . by friction roller **[4]**
20/04 . . to effect step-by-step advancement of web **[4]**
20/06 . by friction band **[4]**
20/08 . . to effect step-by-step advancement of web **[4]**
20/10 . by a feed band against which web is held by fluid pressure, e.g. suction or air blast **[4]**
20/12 . by suction roller **[4]**
20/14 . by direct action on web of moving fluid **[4]**
20/16 . by web-gripping means, e.g. grippers, clips **[4]**
20/18 . . to effect step-by-step advancement of web **[4]**
20/20 . by web-penetrating means, e.g. pins **[4]**
20/22 . . to effect step-by-step advancement of web **[4]**
20/24 . by looping or like devices **[4]**
20/26 . Mechanisms for advancing webs to or from the inside of web rolls **[4]**
20/28 . Mechanisms for delivering webs in superposed folds and refeeding them from the lower end of the folded assemblies **[4]**
20/30 . Arrangements for accumulating surplus web (while changing the web roll B65H 19/14, B65H 19/24) **[4]**
20/32 . . by making loops **[4]**
20/34 . . . with rollers **[4]**
20/36 . having means to optionally advance the web either in one longitudinal direction or in the opposite longitudinal direction **[4]**
20/38 . . by changing the direction of mechanism driving the web-roll spindle **[4]**
20/40 . . by changing the direction of mechanism driving the pinch roller **[4]**

21/00 **Apparatus for splicing webs** (during web-roll changing B65H 19/00; associating two or more webs B65H 39/16)
21/02 . for premarked, e.g. preprinted, webs

23/00 **Registering, tensioning, smoothing, or guiding webs** (registering articles B65H 9/00; in connection with splicing B65H 21/00; tensioning devices of general interest in connection with the handling of webs, tapes, or filamentary materials B65H 77/00)
23/02 . transversely (by tentering, gripper, or like apparatus operating on fabric webs D06C)
23/022 . . by tentering devices **[4]**
23/025 . . . by rollers **[4]**
23/028 . . . by clips **[4]**
23/032 . . Controlling transverse register of web **[4]**
23/035 . . . by guide bars **[4]**
23/038 . . . by rollers **[4]**
23/04 . longitudinally
23/06 . . by retarding devices, e.g. acting on web-roll spindle
23/08 . . . acting on web roll being unwound
23/10 . . . acting on running web (by fluid action B65H 23/24)
23/12 . . . . and causing parts thereof to move in opposite directions and in frictional engagement
23/14 . . . . Tensioning rollers applying braking forces
23/16 . . by weighted or spring-pressed movable bars or rollers
23/18 . . by controlling or regulating the web-advancing mechanism, e.g. mechanism acting on the running web
23/182 . . . in unwinding mechanisms or in connection with unwinding operations **[4]**
23/185 . . . . motor-controlled **[4]**
23/188 . . . in connection with running-web **[4]**
23/192 . . . . motor-controlled **[4]**
23/195 . . . in winding mechanisms or in connection with winding operations **[4]**
23/198 . . . . motor-controlled **[4]**
23/24 . . by fluid action, e.g. to retard the running web **[4]**
23/26 . . by transverse stationary or adjustable bars or rollers
23/28 . . by longitudinally-extending strips, tubes, plates, or wires (flexible tapes or bands B65H 23/30)
23/30 . . by longitudinally-extending flexible tapes or bands
23/32 . . Arrangements for turning or reversing webs
23/34 . . Apparatus for taking-out curl from webs

26/00 **Warning or safety devices, e.g. automatic fault detectors, stop-motions, for web-advancing mechanisms** (safety devices in general F16P; investigating chemical or physical properties of materials in general G01N; indicating devices in general G08B) **[4]**
26/02 . responsive to presence of irregularities in running webs **[4]**
26/04 . . for variation in tension **[4]**
26/06 . responsive to predetermined lengths of webs **[4]**
26/08 . responsive to a predetermined diameter **[4]**

27/00 **Special constructions, e.g. surface features, of feed or guide rollers for webs** (rollers in general F16C 13/00)

Delivering articles from machines; **Piling articles**; **Article or web delivery apparatus incorporating devices for performing specified auxiliary operations**; **Associating or gathering articles or webs**; **Machines for separating superposed webs**

29/00 **Delivering or advancing articles from machines**; **Advancing articles to or into piles** (associating, collating or gathering articles B65H 39/00; combinations of piling and depiling operations, of interest apart from the single operation of piling or depiling B65H 83/00; recirculating articles B65H 85/00; for articles other than those defined by Note (3) (i) of this subclass, see B65G)

29/02 . by mechanical grippers engaging the leading edge only of the articles

29/04 . . the grippers being carried by endless chains or bands

29/06 . . the grippers being carried by rotating members

29/08 . . the grippers being oscillated in arcuate paths

29/10 . . the grippers being reciprocated in rectilinear paths

29/12 . by means of the nip between two, or between two sets of, moving tapes or bands

29/14 . . and introducing into a pile

29/16 . by contact of one face only with moving tapes, bands, or chains

29/18 . . and introducing into a pile

29/20 . by contact with rotating friction members, e.g. rollers, brushes, or cylinders

29/22 . . and introducing into a pile

29/24 . by air-blast or suction apparatus (dropping articles from suction carriers B65H 29/32)

29/26 . by dropping

29/28 . . from mechanical grippers (grippers engaging the leading edge only B65H 29/02)

29/30 . . from magnetic holders

29/32 . . from pneumatic, e.g. suction, carriers

29/34 . . from supports slid from under the articles

29/36 . . from tapes, bands, or rollers rolled from under the articles

29/38 . by movable piling or advancing arms, frames, plates, or like members with which the articles are maintained in face contact

29/40 . . Members rotated about an axis perpendicular to direction of article movement, e.g. star-wheels formed by S-shaped members

29/42 . . Members rotated about an axis parallel to direction of article movement, e.g. helices

29/44 . . Members oscillated in arcuate paths

29/46 . . Members reciprocated in rectilinear path

29/48 . by tables arranged to be tilted to cause sliding of articles

29/50 . Piling apparatus of which the discharge point moves in accordance with the height of the pile

29/51 . . piling by collecting on the periphery of cylinders **[3]**

29/52 . Stationary guides or smoothers

29/54 . Article strippers, e.g. for stripping from advancing elements

29/56 . . for stripping from elements of machines

29/58 . Article switches or diverters

29/60 . . diverting the stream into alternative paths (B65H 29/62 takes precedence)

29/62 . . diverting faulty articles from the main stream (control devices detecting faulty articles B65H 43/04)

29/64 . . directing the components of composite articles into separate paths

29/66 . Advancing in streams of overlapping articles

29/68 . Reducing the speed of articles as they advance (web retarding devices B65H 23/06)

29/70 . Article-bending or stiffening arrangements

31/00 **Pile receivers** (carriers used for associating, collating, or gathering articles B65H 39/00; combinations of piling and depiling operations, of interest apart from the single operation of piling or depiling B65H 83/00)

31/02 . with stationary end support against which pile accumulates

31/04 . with movable end support arranged to recede as pile accumulates

31/06 . . the articles being piled on edge

31/08 . . the articles being piled one above another

31/10 . . . and applied at the top of the pile

31/12 . . Devices relieving the weight of the pile or permitting or effecting movement of the pile end support during piling

31/14 . . . Springs (fluid springs B65H 31/16)

31/16 . . . Fluid-pressure devices

31/18 . . . Positively-acting mechanical devices

31/20 . adjustable for different article sizes

31/22 . removable or interchangeable

31/24 . multiple or compartmented, e.g. for alternate, programmed, or selective filling

31/26 . Auxiliary devices for retaining articles in the pile

31/28 . Bands, chains, or like moving receivers (for articles piled on edge B65H 31/06)

31/30 . Arrangements for removing completed piles (bands, chains, or like moving receivers B65H 31/28)

31/32 . Auxiliary devices for receiving articles during removal of a completed pile

31/34 . Apparatus for squaring-up piled articles

31/36 . . Auxiliary devices for contacting each article with a front stop as it is piled

31/38 . . Apparatus for vibrating or knocking the pile during piling

31/40 . . Separate receivers, troughs, and like apparatus for knocking-up completed piles

33/00 **Forming counted batches in delivery pile or stream of articles**

33/02 . by moving a blade or like member into the pile

33/04 . by inserting marker slips in pile or stream

33/06 . by displacing articles to define batches

33/08 . . Displacing whole batches, e.g. forming stepped piles

33/10 . . Displacing the end articles of a batch

33/12 . by creating gaps in the stream

33/14 . by diverting batches to separate receivers

33/16 . by depositing articles in batches on moving supports

33/18 . . with separators between adjacent batches

35/00 **Delivering articles from cutting or line-perforating machines**; **Article or web delivery apparatus incorporating cutting or line-perforating devices, e.g. adhesive tape dispensers** (cutting or perforating machines or devices in general B26D, B26F)

35/02 . from or with longitudinal slitters or perforators

35/04 . from or with transverse cutters or perforators

35/06 . . from or with blade, e.g. shear-blade, cutters or perforators (from or with revolving blade B65H 35/08)

35/07 . . . Adhesive-tape dispensers **[3]**

35/08 . . from or with revolving, e.g. cylinder, cutters or perforators

35/10 . from or with devices for breaking partially-cut or perforated webs, e.g. bursters

37/00 Article or web delivery apparatus incorporating devices for performing specified auxiliary operations (incorporating cutting or line-perforating devices B65H 35/00)

37/02 . for applying adhesive (and securing together B65H 37/04)

37/04 . for securing together articles or webs, e.g. by adhesive, stitching, or stapling (adhering replacement to expiring web during change of web roll B65H 19/18) **[2]**

37/06 . for folding

39/00 Associating, collating, or gathering articles or webs (combinations of piling and depiling operations, of interest apart from the single operation of piling or depiling B65H 83/00; machines for both collating or gathering and permanently attaching together sheets or signatures B42C 1/00)

39/02 . Associating, collating, or gathering articles from several sources

39/04 . . from piles

39/041 . . . the piles being disposed in rotary carriers **[3]**

39/042 . . . the piles being disposed in superposed carriers **[3]**

39/043 . . . the piles being disposed in juxtaposed carriers **[3]**

39/045 . . . by collecting in rotary carriers **[2]**

39/05 . . . by collecting in superposed carriers **[2]**

39/055 . . . by collecting in juxtaposed carriers **[2]**

39/06 . . from delivery streams

39/065 . . . by collecting in rotary carriers **[2]**

39/07 . . . by collecting in superposed carriers **[2]**

39/075 . . . by collecting in juxtaposed carriers **[2]**

39/10 . Associating articles from a single source, e.g. to form a writing pad

39/105 . . in rotary carriers **[3]**

39/11 . . in superposed carriers **[3]**

39/115 . . in juxtaposed carriers **[3]**

39/14 . Associating sheets with webs

39/16 . Associating two or more webs

41/00 Machines for separating superposed webs

43/00 Use of control, checking, or safety devices, e.g. automatic devices comprising an element for sensing a variable

43/02 . detecting, or responding to, absence of articles (B65H 43/08 takes precedence)

43/04 . detecting, or responding to, presence of faulty articles (B65H 43/08 takes precedence; diverting faulty articles from main streams B65H 29/62)

43/06 . detecting, or responding to, completion of pile (B65H 43/08 takes precedence)

43/08 . Photoelectric devices

Folding or unfolding thin material

45/00 Folding thin material (specially adapted for the manufacture or treatment of particular products, see the relevant places, e.g. D06F 89/00) **[4]**

45/02 . Folding limp material without application of pressure to define or form crease lines (winding or unwinding fabrics for feeding to or from machines B65H 16/00 to B65H 27/00; folding garments for packaging purposes B65B; folding fabrics in sewing machines D05B)

45/04 . . Folding sheets

45/06 . . Folding webs (B65H 20/28 takes precedence)

45/08 . . . longitudinally

45/09 . . . . Doubling, i.e. folding into half of width

45/10 . . . transversely

45/101 . . . . in combination with laying, i.e. forming a zig-zag pile

45/103 . . . . . by a carriage which reciprocates above the laying station

45/105 . . . . . coacting with fold holders

45/107 . . . . . by means of swinging or reciprocating guide bars

45/109 . . . . Registering or counting the folds; Detecting irregularities in the zig-zag pile

45/12 . Folding articles or webs with application of pressure to define or form crease lines (B65H 20/28 takes precedence; pleating, kilting, or goffering textile fabrics D06J)

45/14 . . Buckling folders

45/16 . . Rotary folders

45/18 . . Oscillating or reciprocating blade folders (carried on rotary members B65H 45/16)

45/20 . . Zig-zag folders

45/22 . . Longitudinal folders, i.e. for folding moving sheet material parallel to the direction of movement

45/24 . . Interfolding sheets, e.g. cigarette or toilet papers

45/26 . . Folding in combination with unpiling (unpiling B65H 3/00)

45/28 . . Folding in combination with cutting (cutting machines B26D)

45/30 . . Folding in combination with creasing, smoothing, or application of adhesive (folding or adhesive-application in article or web delivering B65H 37/00)

47/00 Unfolding thin limp material (B65H 20/28 takes precedence; opening devices for sheets or signatures B65H 5/30)

Unwinding, paying-out, forwarding, winding, coiling, or depositing filamentary material

49/00 Unwinding or paying-out filamentary material; **Supporting, storing, or transporting packages from which filamentary material is to be withdrawn or paid-out** (winding B65H 54/00; flyers or other guides assisting paying-out B65H 57/00; bobbins, tubes, or other cores for packages B65H 75/00)

49/02 . Methods or apparatus in which packages do not rotate

49/04 . . Package-supporting devices

49/06 . . . for a single operative package

49/08 . . . . enclosing the package

49/10 . . . for one operative package and one or more reserve packages

49/12 . . . . the reserve packages being mounted to permit manual or automatic transfer to operating position
49/14 . . . for several operative packages
49/16 . . . . Stands for frameworks
49/18 . Methods or apparatus in which packages rotate (supports or holders, for storing and repeatedly paying-out and rewinding lengths of material provided for particular purposes B65H 75/34)
49/20 . . Package-supporting devices
49/22 . . . Overhead suspension devices
49/24 . . . Rollers
49/26 . . . Axial shafts or spigots
49/28 . . . Turntables
49/30 . . . Swifts or skein holders
49/32 . . . Stands or frameworks
49/34 . . Arrangements for effecting positive rotation of packages
49/36 . Securing packages to supporting devices (replacing or removing cores, receptacles, or completed packages at paying-out, winding, or depositing stations B65H 67/00)
49/38 . Skips, cages, racks, or containers, adapted solely for the transport or storage of bobbins, cops, or the like

51/00 Forwarding filamentary material (stretch-spinning methods D01D 5/12; drawing or drafting rovings or the like D01H 5/00)
51/005 . Separating a bundle of forwarding filamentary materials into a plurality of groups **[4]**
51/01 . . by means of static electricity **[4]**
51/015 . Gathering a plurality of forwarding filamentary materials into a bundle **[4]**
51/02 . Rotary devices, e.g. with helical forwarding surfaces (devices for temporarily storing filamentary material during forwarding B65H 51/20; driven rotary devices for controlling tension B65H 59/18)
51/04 . . Rollers, pulleys, capstans, or intermeshing rotary elements
51/06 . . . arranged to operate singly
51/08 . . . arranged to operate in groups or in co-operation with other elements
51/10 . . . . with opposed coacting surfaces, e.g. providing nips
51/12 . . . . in spaced relation to provide a series of independent forwarding surfaces around which material is passed or wound
51/14 . Aprons, endless belts, lattices, or like driven elements
51/16 . Devices for entraining material by flow of liquids or gases, e.g. air-blast devices (blowing slag wool in molten state C03B 37/06)
51/18 . Gripping devices with linear motion
51/20 . Devices for temporarily storing filamentary material during forwarding, e.g. for buffer storage
51/22 . . Reels or cages, e.g. cylindrical, with storing and forwarding surfaces provided by rollers or bars
51/24 . . . with interdigitating bars
51/26 . . Rollers or bars mounted askew to facilitate movement of filamentary material along them, e.g. pairs of canted rollers
51/28 . Arrangements for initating a forwarding operation
51/30 . Devices controlling the forwarding speed to synchronise with supply, treatment, or take-up apparatus (B65H 59/10, B65H 59/38 take precedence)
51/32 . Supporting or driving arrangements for forwarding devices

54/00 Winding, coiling, or depositing filamentary material (cores, formers, holders, cans, or receptacles B65H 75/02; devices specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34)
54/02 . Winding and traversing material on to reels, bobbins, tubes, or like package cores or formers
54/04 . . for making packages with closely-wound convolutions
54/06 . . for making cross-wound packages
54/08 . . . Precision winding arrangements
54/10 . . for making packages of specified shapes or on specified types of bobbins, tubes, cores, or formers
54/12 . . . on flanged bobbins or spools (B65H 54/20 takes precedence)
54/14 . . . on tubes, cores, or formers having generally-parallel sides, e.g. cops or packages to be loaded into loom shuttles
54/16 . . . forming bottle bobbin packages
54/18 . . . forming spools to be loaded into sewing, lace, embroidery, or like machines
54/20 . . . forming multiple packages
54/22 . . Automatic winding machines, i.e. machines with servicing units for automatically performing end-finding, interconnecting of successive lengths of material, controlling or fault-detecting of the running material, and replacing or removing of full or empty cores
54/24 . . . having a plurality of winding units moving along an endless path past one or more fixed servicing units
54/26 . . . having one or more servicing units moving along a plurality of fixed winding units
54/28 . . Traversing devices; Package-shaping arrangements (arrangements for preventing ribbon winding B65H 54/38; grooved, slotted, or split drums for driving of packages B65H 54/46)
54/30 . . . with thread guides reciprocating or oscillating with fixed stroke
54/32 . . . with thread guides reciprocating or oscillating with variable stroke
54/34 . . . for laying subsidiary winding, e.g. transfer tails
54/36 . . . Yarn-guide advancing or raising mechanisms, e.g. cop-building arrangements
54/38 . . Arrangements for preventing ribbon winding
54/40 . . Arrangements for rotating packages
54/42 . . . in which the package, core, or former is rotated by frictional contact of its periphery with a driving surface
54/44 . . . in which the package, core, or former is engaged with, or secured to, a driven member rotatable about the axis of the package
54/46 . . . Package drive drums
54/48 . . . . Grooved drums
54/50 . . . . Slotted or split drums
54/52 . . . Drive contact pressure control, e.g. pressing arrangements
54/54 . . . Arrangements for supporting cores or formers at winding stations; Securing cores or formers to driving members
54/547 . . . . Cantilever supporting arrangements **[4]**
54/553 . . . . Both-ends supporting arrangements **[4]**
54/56 . Winding of hanks or skeins
54/58 . . Swifts or reels adapted solely for the formation of hanks or skeins (B65H 49/30 takes precedence)
54/60 . . Devices for domestic use
54/62 . . Binding of skeins

54/64 . Winding of balls; Forming hollow objects by winding on to fusible or soluble cores, e.g. forming pressure vessels
54/66 . . Winding yarns into balls
54/68 . Winding on to cards or other flat cores, e.g. of star form
54/70 . Other constructional features of yarn-winding machines
54/71 . . Arrangements for severing filamentary materials **[4]**
54/72 . . Framework; Casings; Coverings
54/74 . . Driving arrangements (arrangements for preventing ribbon winding B65H 54/38; arrangements for rotating packages B65H 54/40)
54/76 . Depositing materials in cans or receptacles
54/78 . . Apparatus in which the depositing device or the receptacle is reciprocated
54/80 . . Apparatus in which the depositing device or the receptacle is rotated
54/82 . . . and in which coils are formed before deposition
54/84 . . Arrangements for compacting materials in receptacles
54/86 . Arrangements for taking-up waste material before or after winding or depositing
54/88 . . by means of pneumatic arrangements, e.g. suction guns **[4]**

55/00 Wound packages of filamentary material
55/02 . Self-supporting packages
55/04 . characterised by method of winding

57/00 Guides for filamentary materials; **Supports therefor**
57/02 . Stationary rods or plates
57/04 . Guiding surfaces within slots or grooves
57/06 . Annular guiding surfaces; Eyes, e.g. pigtails
57/08 . . formed of wire or the like
57/10 . . with flared apertures
57/12 . Tubes
57/14 . Pulleys, rollers, or rotary bars
57/16 . formed to maintain a plurality of filaments in spaced relation
57/18 . mounted to facilitate unwinding of material from packages
57/20 . . Flyers (for inserting twist D01H)
57/22 . adapted to prevent excessive ballooning of material
57/24 . with wear-resistant surfaces
57/26 . Supports for guides
57/28 . Reciprocating or oscillating guides (traversing devices for winding, coiling, or depositing filamentary material B65H 54/28)

59/00 Adjusting or controlling tension in filamentary material, e.g. for preventing snarling; **Applications of tension indicators** (tensioning devices of general interest in connection with the handling of webs, tapes, or filamentary material B65H 77/00)
59/02 . by regulating delivery of material from supply package (by contact of package with support B65H 49/02; by controlling speed of driving mechanism of unwinding or paying-out devices B65H 59/38)
59/04 . . by devices acting on package or support
59/06 . . by devices acting on material leaving the package
59/08 . by contact of running length of material with supply package
59/10 . by devices acting on running material and not associated with supply or take-up devices (by controlling speed of driving mechanism of material-forwarding devices B65H 59/38)
59/12 . . Stationary elements arranged to deflect material from straight path
59/14 . . . and provided with surfaces imposing additional retarding forces on material
59/16 . . Braked elements rotated by material
59/18 . . Driven rotary elements (material-forwarding devices B65H 51/00)
59/20 . . Co-operating surfaces mounted for relative movement
59/22 . . . and arranged to apply pressure to material
59/24 . . . . Surfaces movable automatically to compensate for variation in tension
59/26 . . . and arranged to deflect material from straight path
59/28 . . . . the surfaces being urged towards each other
59/30 . . . . . Surfaces movable automatically to compensate for variation in tension
59/32 . . . . the surfaces being urged away from each other
59/34 . . . . . Surfaces movable automatically to compensate for variation in tension
59/36 . . Floating elements compensating for irregularities in supply or take-up of material (buffer storage devices B65H 51/20)
59/38 . by regulating speed of driving mechanism of unwinding, paying-out, forwarding, winding, or depositing devices, e.g. automatically in response to variations in tension
59/40 . Applications of tension indicators

61/00 Applications of devices for metering predetermined lengths of running material (of general application G01B)

63/00 Warning or safety devices for use when unwinding, paying-out, forwarding, winding, coiling, or depositing filamentary material, e.g. automatic fault detectors or stop-motions (safety devices in general F16P; indicating devices in general G08B)
63/02 . responsive to reduction in tension, failure of supply, or breakage, of material
63/024 . . responsive to breakage of materials **[4]**
63/028 . . . characterised by the detecting or sensing element **[4]**
63/032 . . . . electrical or pneumatic **[4]**
63/036 . . . characterised by the combination of the detecting or sensing elements with other devices, e.g. stopping devices for material advancing or winding mechanism **[4]**
63/04 . responsive to excessive tension or irregular operation of apparatus
63/06 . responsive to presence of irregularities in running material, e.g. for severing the material at irregularities
63/08 . responsive to delivery of a measured length of material, completion of winding of a package, or filling of a receptacle

65/00 Securing material to cores or formers (arrangements for securing ends of material to cores, formers, supports or holders, e.g. reels, B65H 75/28) **[3]**

67/00 Replacing or removing cores, receptacles, or completed packages at paying-out, winding, or depositing stations

67/02 . Arrangements for removing spent cores or receptacles and replacing by supply packages at paying-out stations (supports for packages B65H 49/04, B65H 49/20)

67/04 . Arrangements for removing completed take-up packages and replacing by cores, formers, or empty receptacles at winding or depositing stations; Transferring material between adjacent full and empty take-up elements

67/044 . . Continuous winding apparatus for winding on two or more winding heads in succession **[4]**

67/048 . . . having winding heads arranged on rotary capstan head **[4]**

67/052 . . . having two or more winding heads arranged in parallel to each other **[4]**

67/056 . . . having two or more winding heads arranged in series with each other **[4]**

67/06 . Supplying cores, receptacles, or packages to, or transporting from, winding or depositing stations

67/08 . Automatic end-finding and material-interconnecting arrangements (knot-tying devices B65H 69/00)

69/00 Methods of, or devices for, interconnecting successive lengths of material; **Knot-tying devices**

69/02 . by means of adhesives

69/04 . by knotting

69/06 . by splicing

69/08 . by welding

71/00 Moistening, sizing, oiling, waxing, colouring, or drying filamentary material as additional measures during package formation (applying liquids or other fluent materials to surfaces in general B05)

73/00 Stripping waste material from cores or formers, e.g. to permit their re-use

Methods, apparatus or devices of general interest or not otherwise provided for in connection with the handling of webs, tapes or filamentary materials

75/00 Storing webs, tapes, or filamentary material, e.g. on reels (fishing reels A01K 89/00; storing means for record carriers, specially adapted for co-operation with the recording or reproducing apparatus G11B 23/02)

75/02 . Cores, formers, supports, or holders for coiled, wound, or folded material, e.g. reels, spindles, bobbins, cop tubes, cans (packaging aspects B65D 85/67)

75/04 . . Kinds or types (B65H 75/18 takes precedence)

75/06 . . . Flat cores, e.g. cards

75/08 . . . of circular or polygonal cross-section (cans or receptacles B65H 75/16)

75/10 . . . . without flanges, e.g. cop tubes

75/12 . . . . with a single end flange; formed with one end of greater diameter than the barrel

75/14 . . . . with two end flanges

75/16 . . . Cans or receptacles, e.g. sliver cans

75/18 . . Constructional details

75/20 . . . Skeleton construction, e.g. formed of wire

75/22 . . . collapsible; with removable parts

75/24 . . . adjustable in configuration, e.g. expansible

75/26 . . . Arrangements for preventing slipping of winding

75/28 . . . Arrangements for securing ends of material **[3]**

75/30 . . . Arrangements to facilitate driving or braking

75/32 . . . Arrangements to facilitate severing of material

75/34 . . specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material provided for particular purposes, e.g. anchored hoses, power cables (retractors for storing flexible hoses as accessories of dental work stands A61G 15/18; vehicle safety belt retractors B60R 22/34; hose-storing devices in apparatus or devices for transferring liquids from bulk storage containers or reservoirs into vehicles or portable containers B67D 7/40; clothes-line supports D06F 53/00; spring drums for liftable blinds with horizontal lamellae E06B 9/322; spring drums or tape drums for roll-type closures or roller blinds E06B 9/56; hauling- or hoisting-chains with arrangements for holding electric cables, hoses or the like F16G 13/16; devices for guiding pipes, cables or protective tubing, between relatively movable points, e.g. movable channels, F16L 3/01; flexible rulers or tapes with scales G01B 3/10; electrical features of stored material, see the relevant subclasses, e.g. H02G) **[2,5]**

75/36 . . . without essentially involving the use of a core or former internal to a stored package of material, e.g. with stored material housed within casing or container, or intermittently engaging a plurality of supports as in sinuous or serpentine fashion **[2]**

75/38 . . . involving the use of a core or former internal to, and supporting, a stored package of material **[2]**

75/40 . . . . mobile or transportable

75/42 . . . . . attached to, or forming part of, mobile tools or machines

75/44 . . . . Constructional details

75/48 . . . . . Automatic re-storing devices **[2]**

75/50 . Methods of making reels, bobbins, cop tubes, or the like by working an unspecified material, or several materials

77/00 Adjusting or controlling tension in material

79/00 Driving gear for devices for forwarding, winding, unwinding, or depositing material, not otherwise provided for

81/00 Methods, apparatus, or devices for covering or wrapping cores by winding webs, tapes, or filamentary material, not otherwise provided for (forming hollow objects by winding filamentary material on to fusible or soluble cores B65H 54/64; wrapping for the purpose of packaging B65B 11/00; making wound articles of paper B31C)

81/02 . Covering or wrapping annular or like cores forming a closed or substantially-closed figure

81/04 . . by feeding material obliquely to the axis of the core

81/06 . Covering or wrapping elongated cores

81/08 . . by feeding material obliquely to the axis of the core

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83/00 Combinations of piling and depiling operations, e.g. performed simultaneously, of interest apart from the single operation of piling or depiling (B65H 85/00 takes precedence) **[5]**

83/02 . performed on the same pile **[5]**

85/00 **Recirculating articles, i.e. feeding each article to, and delivering it from, the same machine work-station more than once [5]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

B66 HOISTING; LIFTING; HAULING

B66B **ELEVATORS**; **ESCALATORS OR MOVING WALKWAYS** (funicular railbound systems with rigid ground-supported tracks and cable traction, e.g. cliff railways, B61B 9/00; arrangements of ammunition handlers in vessels B63G 3/00; hoists, lifts, or conveyers for loading or unloading in general B65G; braking or detent devices controlling normal movements of winding drums or barrels B66D; ship-lifting devices E02C; garages for many vehicles with mechanical means for lifting vehicles E04H 6/12; hoists for feeding ammunition or projectiles to launching apparatus or to loading mechanisms F41A 9/00) **[4]**

Note

In this subclass, the following term is used with the meaning indicated: **[6]**
– "elevator" covers the term "lift", and the two terms are interchangeable. **[6]**

Subclass index

Common features of elevators

1/00 **Control systems of elevators in general** (safety devices B66B 5/00; controlling door or gate operation B66B 13/00; systems of general application G05)
1/02 . Control systems without regulation, i.e. without retroactive action
1/04 . . hydraulic
1/06 . . electric
1/08 . . . with devices, e.g. handles or levers, in the cars or cages for direct control of movements
1/10 . . . . specially adapted for mining hoists
1/12 . . . with devices, e.g. handles or levers, located at a control station for direct control of movements, e.g. electric mining-hoist control systems
1/14 . . . with devices, e.g. push-buttons, for indirect control of movements
1/16 . . . . with means for storing pulses controlling the movements of a single car or cage
1/18 . . . . with means for storing pulses controlling the movements of several cars or cages
1/20 . . . . . and for varying the manner of operation to suit particular traffic conditions, e.g. "one-way rush-hour traffic"
1/22 . . . . with means for taking account of delayed calls
1/24 . Control systems with regulation, i.e. with retroactive action, for influencing travelling speed, acceleration, or deceleration
1/26 . . mechanical
1/28 . . electrical (detecting excessive speed B66B 5/04)
1/30 . . . effective on driving gear
1/32 . . . effective on braking devices
1/34 . Details
1/36 . . Means for stopping the cars, cages, or skips at predetermined levels
1/38 . . . and for returning the controlling handle or lever to its neutral position
1/40 . . . and for correct levelling at landings
1/42 . . . . separate from the main drive
1/44 . . . and for taking account of disturbance factors, e.g. variation of load weight
1/46 . . Adaptations of switches or switchgear (switches or switchgear in general, applications of switches or switchgear for floor-levelling purpose H01H; panels for boards or switching arrangements H02B 1/015)
1/48 . . . Adaptations of mechanically-operated limit switches (for cranes B66C 13/50; for winding mechanisms B66D 1/56)
1/50 . . . with operating or control mechanisms mounted in the car or cage or in the lift well or hoistway
1/52 . . . Floor selectors

3/00 **Applications of devices for indicating or signalling operating conditions of elevators**
3/02 . Position or depth indicators

5/00 **Applications of checking, fault-correcting or safety devices in elevators**
5/02 . responsive to abnormal operating conditions
5/04 . . for detecting excessive speed
5/06 . . . electrical
5/08 . . for preventing overwinding
5/10 . . . electrical
5/12 . . in case of rope or cable slack
5/14 . . in case of excessive loads
5/16 . . Braking or catch devices operating between cars, cages, or skips and fixed guide elements or surfaces in hoistway or well
5/18 . . . and applying frictional retarding forces
5/20 . . . . by means of rotatable eccentrically- mounted members (B66B 5/24 takes precedence)

5/22 . . . . by means of linearly-movable wedges (B66B 5/24 takes precedence)
5/24 . . . . by acting on guide ropes or cables
5/26 . . . Positively-acting devices, e.g. latches, knives
5/28 . Buffer-stops for cars, cages, or skips

7/00 Other common features of elevators
7/02 . Guideways; Guides (arrangements in mine shafts E21D 7/02)
7/04 . . Shoes; Rollers
7/06 . Arrangements of ropes or cables
7/08 . . for connection to the cars or cages, e.g. couplings
7/10 . . for equalising rope or cable tension
7/12 . Checking, lubricating, or cleaning means for ropes, cables, or guides

Lifts in, or associated with, buildings

9/00 Kinds or types of lift in, or associated with, buildings or other structures (characterised by control systems B66B 1/00; apparatus for raising or lowering persons on stages of theatres A63J 5/12)
9/02 . actuated mechanically otherwise than by rope or cable
9/04 . actuated pneumatically or hydraulically (platforms for lifting or lowering through short distances B66F 7/00)
9/06 . inclined, e.g. serving blast furnaces
9/08 . . associated with stairways, e.g. for transporting disabled persons
9/10 . paternoster type (with devices for transferring goods into, or out of, the compartments B65G 17/00)
9/16 . Mobile or transportable lifts specially adapted to be shifted from one part of a building or other structure to another part or to another building or structure (devices for lifting or lowering bulky or heavy goods for loading or unloading purposes B66F 9/00, e.g. fork-lift trucks B66F 9/06)
9/187 . . with liftway specially adapted for temporary connection to a building or other structure (B66B 9/193 takes precedence) **[6]**
9/193 . . with inclined liftways **[6]**

11/00 Main component parts of lifts in, or associated with, buildings or other structures
11/02 . Cages (doors, gates, or other apparatus controlling access to, or exit from, cages B66B 13/00)
11/04 . Driving gear
11/06 . . with hoisting rope or cable positively attached to a winding drum
11/08 . . with hoisting rope or cable operated by frictional engagement with a winding drum or sheave

13/00 Doors, gates, or other apparatus controlling access to, or exit from, cages or lift-well landings (door fittings, locks E05)
13/02 . Door or gate operation (of general application E05F)
13/04 . . of swinging doors
13/06 . . of sliding doors
13/08 . . . guided for horizontal movement
13/10 . . . by car or cage movement
13/12 . . Arrangements for effecting simultaneous opening or closing of cage and landing doors
13/14 . . Control systems or devices
13/16 . . . Door or gate locking devices controlled or primarily controlled by condition of cage, e.g. movement or position
13/18 . . . . without manually-operable devices for completing locking or unlocking of doors
13/20 . . . . . Lock mechanisms actuated mechanically by abutments or projections on the cages
13/22 . Operation of door or gate contacts
13/24 . Safety devices in passenger lifts, not otherwise provided for, for preventing trapping of passengers
13/26 . . between closing doors
13/28 . . between car or cage and wells
13/30 . Constructional features of doors or gates (of interest apart from this application E06B)

Lifts in hoistways of mines

15/00 Main component parts of mining-hoist winding devices
15/02 . Rope or cable carriers
15/04 . . Friction sheaves; "Koepe" pulleys
15/06 . . Drums
15/08 . Driving gear

17/00 Hoistway equipment
17/02 . mounted in head-frames (winding towers for mines E04H 12/26)
17/04 . Mining-hoist cars or cages
17/06 . . with tiltable platforms
17/08 . Mining skips
17/10 . . adapted for passenger transport
17/12 . Counterpoises
17/14 . Applications of loading and unloading equipment (of general application B65G)
17/16 . . for loading and unloading mining-hoist cars or cages
17/18 . . . Swinging bridges, e.g. for compensating for differences in level between car or cage and landing
17/20 . . . by moving vehicles into, or out of, the cars or cages
17/22 . . . Securing vehicles in cars or cages
17/24 . . . . mounted on the car or cage
17/26 . . for loading or unloading mining-hoist skips
17/28 . . electrically controlled (for elevators in general B66B 1/06)
17/30 . . . for cars or cages
17/32 . . . for skips
17/34 . Safe lift clips; Keps
17/36 . Gates or other apparatus controlling access to, or exit from, cars, cages, or hoistway landings

19/00 Mining-hoist operation
19/02 . Installing or exchanging ropes or cables
19/04 . Installing or removing mining-hoist cars, cages, or skips
19/06 . Applications of signalling devices (depth indicators B66B 3/02; order telegraphs G08B)

20/00 Elevators not provided for in groups B66B 1/00 to B66B 19/00 [8]

Escalators or moving walkways [4]

21/00 Kinds or types of escalators or moving walkways [4]
21/02 . Escalators **[4]**
21/04 . . linear type **[4]**
21/06 . . spiral type **[4]**

21/08 . . paternoster type, i.e. the escalator being used simultaneously for climbing and descending (B66B 21/06 takes precedence) **[4]**
21/10 . Moving walkways **[4]**
21/12 . . of variable speed type **[4]**

23/00 Component parts of escalators or moving walkways [4]
23/02 . Driving gear **[4]**
23/04 . . for handrails **[4]**
23/06 . . . with means synchronising the operation of the steps or the carrying belts and the handrails **[4]**
23/08 . Carrying surfaces **[4]**
23/10 . . Carrying belts **[4]**
23/12 . . Steps **[4]**
23/14 . Guiding means for carrying surfaces **[4]**
23/16 . Means allowing tensioning of the endless member **[4]**
23/18 . . for carrying surfaces **[4]**
23/20 . . for handrails **[4]**
23/22 . Balustrades **[4]**
23/24 . . Handrails (driving gear therefor B66B 23/02; tensioning means therefor B66B 23/16; preventing jamming thereof by foreign objects B66B 29/04; accessories therefor B66B 31/02) **[4]**
23/26 . . . of variable speed type **[4]**

25/00 Control of escalators or moving walkways (walkways of variable speed type B66B 21/12; handrails of variable speed type B66B 23/26; of general application G05) **[4]**

27/00 Indicating operating conditions of escalators or moving walkways (of general application G08) **[4]**

29/00 Safety devices of escalators or moving walkways (walkways of variable speed type B66B 21/12; handrails of variable speed type B66B 23/26) **[4]**
29/02 . responsive to, or preventing, jamming by foreign objects **[4]**
29/04 . . for balustrades or handrails **[4]**
29/06 . . Combplates **[4]**
29/08 . Means to facilitate passenger entry or exit (moving handrails B66B 23/24) **[4]**

31/00 Accessories for escalators, or moving walkways, e.g. for sterilising or cleaning (for safety B66B 29/00) **[4]**
31/02 . for handrails **[4]**

B66C CRANES; **LOAD-ENGAGING ELEMENTS OR DEVICES FOR CRANES, CAPSTANS, WINCHES, OR TACKLES** (rope, cable, or chain winding mechanisms, braking or detent devices therefor B66D; specially adapted for nuclear reactors G21)

Subclass index

Load-engaging elements or devices attached to lifting, lowering, or hauling gear of cranes or adapted for connection therewith

Note

In groups B66C 1/00 or B66C 3/00, the following term is used with the meaning indicated:
– "cranes" also covers capstans, winches, or tackles.

1/00 Load-engaging elements or devices attached to lifting, lowering, or hauling gear of cranes, or adapted for connection therewith for transmitting forces to articles or groups of articles (fastening to cables or ropes F16G 11/00)
1/02 . by suction means
1/04 . by magnetic means
1/06 . . electromagnetic
1/08 . . . Circuits therefor (for electromagnets in general H01F 7/18)
1/10 . by mechanical means
1/12 . . Slings comprising chains, wires, ropes, or bands; Nets (article side grippers suspended by ropes or chains from crane hooks B66C 1/42)
1/14 . . . Slings with hooks
1/16 . . . Slings with load-engaging platforms or frameworks
1/18 . . . Band-type slings
1/20 . . . specially adapted for handling vehicles
1/22 . . Rigid members, e.g. L-shaped members, with parts engaging the under surface of the loads; Crane hooks
1/24 . . . Single members engaging the loads from one side only
1/26 . . . . with means for releasing the loads
1/28 . . . Duplicate, e.g. pivoted, members engaging the loads from two sides
1/30 . . . . and also arranged to grip the sides of the loads
1/32 . . . . . of piled or stacked articles
1/34 . . . Crane hooks
1/36 . . . . with means, e.g. spring-biased detents, for preventing inadvertent disengagement of loads
1/38 . . . . adapted for automatic disengagement from loads on release of cable tensions (for parachutes B64D)

1/40 . . . . formed or fitted with load-measuring or indicating devices
1/42 . . Gripping members engaging only the external or internal surface of the articles (for handling or stripping castings or ingots during manufacture B22D 29/00)
1/44 . . . and applying frictional forces
1/46 . . . . by inflatable elements
1/48 . . . . to vertical edge portions of sheets, tubes, or like thin or thin-walled articles (internally-expanding grippers B66C 1/54)
1/54 . . . . Internally-expanding grippers for handling hollow articles (B66C 1/46 takes precedence) **[2]**
1/56 . . . . . for handling tubes
1/58 . . . and deforming the articles, e.g. by using gripping members such as tongs or grapples
1/59 . . . . Tongs for sacks **[3]**
1/62 . . comprising article-engaging members of a shape complementary to that of the articles to be handled
1/64 . . . for T- or I-section beams or girders
1/66 . . . for engaging holes, recesses, or abutments on articles specially provided for facilitating handling thereof
1/68 . mounted on, or guided by, jibs (jibs B66C 23/64)

3/00 Load-engaging elements or devices attached to lifting or lowering gear of cranes or adapted for connection therewith and intended primarily for transmitting lifting forces to loose materials; **Grabs** (buckets or other containers B65D, e.g. pallets B65D 19/00; dredges equipped with grabs E02F)

3/02 . Bucket grabs
3/04 . Tine grabs
3/06 . Grabs actuated by a single rope or chain
3/08 . . and having tipping rings
3/10 . . and having buckets opening automatically upon the grab being lowered on to the dump of material
3/12 . Grabs actuated by two or more ropes
3/14 . Grabs opened or closed by driving motors thereon
3/16 . . by fluid motors
3/18 . . by electric motors
3/20 . mounted on, or guided by, jibs (jibs B66C 23/64)

Other common features; **Details**

5/00 Base-supporting structures with legs

5/02 . Fixed or travelling bridges or gantries, i.e. elongated structures of inverted-L- or of inverted-U-shape
5/04 . . with runways or tracks supported for movements relative to bridge or gantry
5/06 . . with runways or tracks supported for lateral swinging movements
5/08 . . with vertically-inclinable runways or tracks
5/10 . Portals, i.e. essentially circular or square platforms with three or more legs specially adapted for supporting slewing jib cranes

6/00 Girders, or track-supporting structures, specially adapted for cranes (base-supporting structures with legs B66C 5/00; girders in general E04C 3/02)

7/00 Runways, tracks, or trackways for trolleys or cranes

7/02 . for underhung trolleys or cranes
7/04 . . Trackway suspension
7/06 . . . on supports constructed for easy erection, e.g. transportable
7/08 . Constructional features of runway rails or rail mountings (of general application E01B)
7/10 . Arrangements or devices for extending runways or tracks
7/12 . Devices for changing direction of travel or for transferring from one runway to another; Crossings; Combinations of tracks of different gauges (transfer devices of general application E01B)
7/14 . . Runway interlocking devices
7/16 . Devices specially adapted for limiting trolley or crane travel; Arrangements of buffer-stops (buffer-stops of interest apart from this application B61K 7/18; limit-switch arrangements, limit circuits B66D 1/56)

9/00 Travelling gear incorporated in, or fitted to, trolleys or cranes (for dredgers E02F)

9/02 . for underhung trolleys or cranes
9/04 . to facilitate negotiation of curves
9/06 . for more than one rail gauge
9/08 . Runners; Runner bearings (wheels for railbound vehicles B60B)
9/10 . Undercarriages or bogies, e.g. end carriages, end bogies
9/12 . . with load-distributing means for equalising wheel pressure
9/14 . Trolley or crane travel drives (rope, cable, or chain drives for loads or trolleys B66C 11/16; control B66C 13/18)
9/16 . with means for maintaining alignment between wheels and track
9/18 . with means for locking trolleys or cranes to runways or tracks to prevent inadvertent movements

11/00 Trolleys or crabs, e.g. operating above runways (runways, tracks, or trackways therefor B66C 7/00; winch mechanisms B66D)

11/02 . with operating gear or operator's cabin suspended, or laterally offset, from runway or track
11/04 . . Underhung trolleys (power-operated hoists with driving motor and drum or barrel contained in a common housing B66D 3/20)
11/06 . . . running on monorails (overhead railway systems B61B)
11/08 . with turntables
11/10 . . equipped with jibs (jib cranes B66C 23/00)
11/12 . having hoisting gear adapted to special load-engaging elements and not otherwise provided for
11/14 . adapted to operate on crane or bridge structure of particular configuration, e.g. on reinforced concrete girders of rectangular cross-section
11/16 . Rope, cable, or chain drives for trolleys; Combinations of such drives with hoisting gear
11/18 . . comprising endless ropes or cables
11/20 . . Arrangements, e.g. comprising differential gears, enabling simultaneous or selective operation of travelling and hoisting gear; Arrangements using the same rope or cable for both travelling and hoisting, e.g. in Temperley cranes (power transmissions between driving motors and winch drums B66D 1/14)
11/22 . . actuated pneumatically or hydraulically
11/24 . . with means for locating or sustaining the loads or trolleys in predetermined positions; Hay hoists
11/26 . . . Abutments; Stop blocks; End stops

13/00 Other constructional features or details

13/02 . Devices for facilitating retrieval of floating objects, e.g. for recovering craft from water (equipment for handling lifeboats or the like B63B 23/00; loading or unloading floating cargo using ship-based equipment B63B 27/36; salvaging, or hauling-out on slipways, waterborne vessels B63C; winding mechanism controls B66D 1/52)

13/04 . Auxiliary devices for controlling movements of suspended loads, or for preventing cable slack

13/06 . . for minimising or preventing longitudinal or transverse swinging of loads

13/08 . . for depositing loads in desired attitudes or positions

13/10 . . for preventing cable slack (control devices for rope, cable, or chain winding mechanisms, e.g. for controlling tension, B66D 1/40)

13/12 . Arrangements of means for transmitting pneumatic, hydraulic, or electric power to movable parts or devices (devices of general interest specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34)

13/14 . . to load-engaging elements or motors associated therewith

13/16 . Applications of indicating, registering, or weighing devices (in crane hooks B66C 1/40; in safety gear B66C 15/00; weighing-apparatus G01G; remote indicating in general G08)

13/18 . Control systems or devices (exclusively for rope, cable, or chain winding mechanisms B66D 1/40)

13/20 . . for non-electric drives (transmitting control pulses B66C 13/40)

13/22 . . for electric drives (transmitting control pulses B66C 13/40; systems or devices of general application H02P)

13/23 . . . Circuits for controlling the lowering of the load

13/24 . . . . by dc motors

13/26 . . . . by ac motors

13/28 . . . . . utilising regenerative braking for controlling descent of heavy loads and having means for preventing rotation of motor in the hoisting direction when load is released

13/30 . . . Circuits for braking, traversing, or slewing motors

13/32 . . . for operating grab-bucket hoists by means of one or more electric motors used both for hoisting and lowering the loads and for opening and closing the bucket jaws (other aspects of rope, cable, or chain winding mechanisms specially adapted for actuating grab buckets B66D 1/62)

13/34 . . . . through differential or planetary gearing

13/36 . . . . Single-motor-drive control systems

13/38 . . . . Systems controlling independent motors

13/40 . . Applications of devices for transmitting control pulses; Applications of remote control devices (control in general G05)

13/42 . . . Hydraulic transmitters

13/44 . . . Electrical transmitters

13/46 . . Position indicators for suspended loads or for crane elements

13/48 . . Automatic control of crane drives for producing a single or repeated working cycle; Programme control

13/50 . . Applications of limit circuits or of limit-switch arrangements (for winding mechanisms B66D 1/56)

13/52 . Details of compartments for driving engines or motors or of operator's stands or cabins

13/54 . . Operator's stands or cabins

13/56 . . . Arrangements of handles or pedals

15/00 Safety gear (for rope, cable, or chain winding mechanisms B66D 1/54)

15/02 . for retaining load-engaging elements in the event of rope or cable breakage

15/04 . for preventing collisions, e.g. between cranes or trolleys operating on the same track

15/06 . Arrangements or use of warning devices **[2]**

Kinds or types of cranes [2]

17/00 Overhead travelling cranes comprising one or more substantially-horizontal girders the ends of which are directly supported by wheels or rollers running on tracks carried by spaced supports (adaptations of girders or of track-supporting structures B66C 6/00)

17/04 . with lifting beams, e.g. slewable beams, carrying load-engaging elements, e.g. magnets, hooks (constructions of load-engaging elements B66C 1/00, B66C 3/00)

17/06 . specially adapted for particular purposes, e.g. in foundries, forges; combined with auxiliary apparatus serving particular purposes (B66C 17/04 takes precedence)

17/08 . . for charging treatment chambers, e.g. furnaces, kilns, ovens (charging furnaces in general F27D 3/00)

17/10 . . for transporting ladles

17/12 . . for handling workpieces, e.g. ingots, which require to be supported temporarily within, or withdrawn from, a treatment chamber, e.g. tong cranes, soaking-pit cranes, stripper cranes (for manipulating ingots during forging B66C 17/18; grippers for handling or stripping castings or ingots during manufacture B22D 29/00)

17/14 . . . Tong cranes with means for moving article-pushers relative to the tongs

17/16 . . . Tong cranes with means for turning the tongs about a vertical axis

17/18 . . for manipulating workpieces during forging operations (workpiece manipulators in forging machines B21J 13/10)

17/20 . . for hoisting or lowering heavy load carriers, e.g. freight containers, railway wagons

17/22 . . for hoisting or lowering locomotives

17/24 . . for building ships on slipways

17/26 . . combined with auxiliary apparatus, e.g. log saws, pushers for unloading vehicles, means for shunting railway vehicles

19/00 Cranes comprising trolleys or crabs running on fixed or movable bridges or gantries (B66C 17/00 takes precedence; base-supporting structures with legs B66C 5/00; adaptations of girders or of track-supporting structures B66C 6/00; jib cranes B66C 23/00)

19/02 . collapsible

21/00 **Cable cranes, i.e. comprising hoisting devices running on aerial cable-ways** (adaptations of girders or of track-supporting structures B66C 6/00; rope or cable drives for trolleys, combinations of such drives with hoisting gear B66C 11/16; railway systems B61B; rope or cable winding mechanisms B66D 1/00)

21/02 . with cable-ways supported on framework swingably connected to ground-engaging elements

21/04 . with cable-ways supported at one end or both ends on bodily-movable framework, e.g. framework mounted on rail track

21/06 . . with one end supported on a framework movable in a curved, e.g. circular, path and the other end by a column rotatable around a vertical axis

21/08 . Sag carriers or rope trolleys, suspended or not, e.g. fixed but offering clearance for travelling gear

21/10 . . travelling

23/00 **Cranes comprising essentially a beam, boom or triangular structure acting as a cantilever and mounted for translatory or swinging movements in vertical or horizontal planes or a combination of such movements, e.g. jib cranes, derricks or tower cranes** (base-supporting structures with legs B66C 5/00; adaptations of girders or of track-supporting structures B66C 6/00)

Note

Group B66C 23/64 takes precedence over groups B66C 23/02 to B66C 23/16. **[5]**

23/02 . with non-adjustable and non-inclinable jibs mounted solely for slewing movements

23/04 . with jibs the effective length of which is variable in operation, e.g. longitudinally displaceable, extensible

23/06 . with jibs mounted for jibbing or luffing movements

23/08 . . and adapted to move the loads in predetermined paths

23/10 . . . the paths being substantially horizontal; Level-luffing jib cranes

23/12 . . . . with means for automatically varying the effective length of the hoisting rope or cable

23/14 . . . . with means, e.g. pantograph arrangements, for varying jib configuration

23/16 . with jibs supported by columns, e.g. towers having their lower end mounted for slewing movements

23/18 . specially adapted for use in particular locations or for particular purposes (B66C 23/02 to B66C 23/16, B66C 23/58 to B66C 23/88 take precedence) **[5]**

23/20 . . with supporting couples provided by walls of buildings or like structures

23/22 . . . Window cranes, i.e. adapted to be supported in window openings

23/24 . . . Mobile wall cranes

23/26 . . for use on building sites; constructed, e.g. with separable parts, to facilitate rapid assembly or dismantling, for operation at successively higher levels, for transport by road or rail (with supporting couples provided by walls or buildings B66C 23/20; mounted on vehicles B66C 23/36) **[5]**

23/28 . . . constructed to operate at successively higher levels

23/30 . . . . with frameworks composed of telescopic elements

23/32 . . . . Self-hoisting cranes

23/34 . . . Self-erecting cranes, i.e. with hoisting gear adapted for crane erection purposes

23/36 . . mounted on road or rail vehicles; Manually-movable jib cranes for use in workshops; Floating cranes (vehicle or ship aspects B60 to B63)

23/38 . . . with separate prime movers for crane and vehicle

23/40 . . . with a single prime mover for both crane and vehicle

23/42 . . . with jibs of adjustable configuration, e.g. foldable

23/44 . . . Jib cranes adapted for attachment to standard vehicles, e.g. agricultural tractors

23/46 . . . Mobile jib cranes with non-slewable jibs

23/48 . . . Manually-movable jib cranes for use in workshops

23/50 . . . mounted on railway vehicles, e.g. breakdown cranes

23/52 . . . Floating cranes (floating dredgers E02F)

23/53 . . . . including counterweight or means to compensate for list, trim, or skew of the vessel or platform (counterweights or supports for balancing lifting couples B66C 23/72; equipment to decrease unwanted vessel movements B63B 39/00) **[4]**

23/58 . arranged to carry-out a desired sequence of operations automatically, e.g. hoisting followed by luffing and slewing

23/60 . Derricks **[3]**

23/61 . . with slewing force exerted at pivoted end **[3]**

23/62 . Constructional features or details (of dredgers E02F)

23/64 . . Jibs

23/66 . . . Outer or upper end constructions

23/68 . . . foldable or otherwise adjustable in configuration (B66C 23/687, B66C 23/70 take precedence) **[5]**

23/683 . . . . while in use **[5]**

23/687 . . . telescopic **[5]**

23/69 . . . . while in use **[5]**

23/693 . . . . . extensible by fluid pressure **[5]**

23/697 . . . . providing bearing means between sections **[5]**

23/70 . . . assembled from separate sections to form jibs of various discrete lengths

23/72 . . Counterweights or supports for balancing lifting couples

23/74 . . . separate from jib

23/76 . . . . and movable to take account of variations of load or of variations of length of jib

23/78 . . . Supports, e.g. outriggers, for mobile cranes

23/80 . . . . hydraulically actuated

23/82 . . Luffing gear

23/84 . . Slewing gear (anti-friction bearings F16C)

23/86 . . . hydraulically actuated

23/88 . Safety gear (for cranes in general B66C 15/00; for rope, cable, or chain winding mechanisms B66D 1/54)

23/90 . . Devices for indicating or limiting lifting movement

23/92 . . Snubbers or dash-pots for preventing backwards-swinging of jibs, e.g. in the event of cable or tackle breakage

23/94 . . for limiting slewing movements

25/00 Cranes not provided for in groups B66C 17/00 to B66C 23/00 [8]

B66D CAPSTANS; **WINCHES**; **TACKLES, E.G. PULLEY BLOCKS**; **HOISTS** (winding or unwinding ropes or cables for feeding or storage purposes B65H; rope or cable-winding or unwinding mechanisms for lifts B66B; hoisting devices specially adapted for suspended scaffolds E04G 3/32)

Note

This subclass covers:
– rope, cable, or chain winding or unwinding mechanisms for moving all loads except lift cages, e.g. winches for dredges;
– braking or detent devices characterised by their application for retarding, or preventing, rotary movement of a winding drum or barrel.

1/00 Rope, cable, or chain winding mechanisms; **Capstans** (portable or mobile lifting or hauling appliances B66D 3/00)

1/02 . Driving gear
1/04 . . manually operated
1/06 . . . Safety cranks for preventing unwanted crank rotation and subsequent lowering of the loads
1/08 . . incorporating fluid motors
1/10 . . . Steam driving gear
1/12 . . incorporating electric motors
1/14 . . Power transmissions between power sources and drums or barrels
1/16 . . . the drums or barrels being freely rotatable (B66D 1/24 takes precedence)
1/18 . . . . and the power being transmitted from a continuously-operating and irreversible prime mover
1/20 . . . Chain, belt, or friction drives, e.g. incorporating sheaves
1/22 . . . Planetary or differential gearings (for actuating grab buckets B66D 1/70)
1/24 . . . for varying speed, or reversing direction of rotation, of drums or barrels
1/26 . having several drums or barrels
1/28 . Other constructional details
1/30 . . Rope, cable, or chain drums or barrels
1/34 . . . Attachment of ropes or cables to drums or barrels
1/36 . . Guiding, or otherwise ensuring winding in an orderly manner, of ropes, cables, or chains
1/38 . . . by means of guides movable relative to drum or barrel (B66D 1/395 takes precedence) **[3]**
1/39 . . . by means of axially-movable drums or barrels (B66D 1/395 takes precedence) **[3]**
1/395 . . . by means effecting both guiding and tensioning of ropes, cables or chains **[3]**
1/40 . . Control devices
1/42 . . . non-automatic
1/44 . . . . pneumatic or hydraulic
1/46 . . . . electric
1/48 . . . automatic
1/50 . . . . for maintaining predetermined rope, cable, or chain tension, e.g. in ropes or cables for towing craft, in chains for anchors; Warping or mooring winch-cable tension control
1/52 . . . . for varying rope or cable tension, e.g. when recovering craft from water
1/54 . Safety gear
1/56 . . Adaptations of limit switches
1/58 . . responsive to excess of load
1/60 . adapted for special purposes
1/62 . . for actuating grab buckets (electrical control in cranes B66C 13/32)
1/64 . . . by means of a single rope or chain
1/66 . . . driven by a single motor
1/68 . . . driven by two motors
1/70 . . . driven through planetary or differential gearings
1/72 . . Anchor-chain sprockets; Anchor capstans
1/74 . . Capstans
1/76 . . . having auxiliary drums or barrels for storing the ropes or cables
1/78 . . . for shunting, e.g. in marshalling yards
1/80 . . for scrapers
1/82 . . for slewing and hoisting by means of derricks

3/00 Portable or mobile lifting or hauling appliances

3/02 . Manually-operated, e.g. lever-actuated, devices operating on ropes, cables, or chains for hauling in a mainly horizontal direction (B66D 3/04, B66D 3/12 take precedence)
3/04 . Pulley blocks or like devices in which force is applied to a rope, cable or chain, which passes over one or more pulleys, e.g. to obtain mechanical advantage (sheaves, chain wheels, pulleys F16H 55/00) **[4]**
3/06 . . with more than one pulley
3/08 . . . Arrangements of sheaves
3/10 . . . Applications of braking or detent devices
3/12 . Chain or like hand-operated tackles with or without power-transmission gearing between operating member and lifting rope, chain, or cable
3/14 . . lever-operated
3/16 . . operated by an endless chain passing over a pulley or a sprocket
3/18 . Power-operated hoists
3/20 . . with driving motor, e.g. electric motor, and drum or barrel contained in a common housing
3/22 . . . with variable-speed gearing between driving motor and drum or barrel
3/24 . . Applications of limit switches
3/26 . . Other details, e.g. housings

5/00 **Braking or detent devices characterised by their application to lifting or hoisting gear, e.g. for controlling the lowering of loads** (for pulley blocks B66D 3/10)
5/02 . Crane, lift, hoist, or winch brakes operating on drums, barrels, or ropes
5/04 . . actuated by centrifugal force
5/06 . . with radial effect (B66D 5/20 takes precedence)
5/08 . . . embodying blocks or shoes
5/10 . . . embodying bands
5/12 . . with axial effect (B66D 5/22 takes precedence)
5/14 . . . embodying discs
5/16 . . for action on ropes or cables
5/18 . . for generating braking forces which are proportional to the loads suspended; Load-actuated brakes
5/20 . . . with radial effect
5/22 . . . with axial effect
5/24 . . Operating devices
5/26 . . . pneumatic or hydraulic
5/28 . . . . specially adapted for winding gear, e.g. in mining hoists
5/30 . . . electrical
5/32 . Detent devices
5/34 . . having latches

B66F **HOISTING, LIFTING, HAULING, OR PUSHING, NOT OTHERWISE PROVIDED FOR, E.G. DEVICES WHICH APPLY A LIFTING OR PUSHING FORCE DIRECTLY TO THE SURFACE OF A LOAD** (mounting artificial islands on piles or like supports E02B 17/00; scaffolds combined with lifting devices E04G 1/22, E04G 3/28; lifting devices for sliding forms E04G 11/24; lifting of buildings E04G 23/06; shores or struts E04G 25/00; lifts or other hoisting devices on ladders E06C 7/12; props for mining E21D 15/00)

Subclass index

1/00 **Devices, e.g. jacks, for lifting loads in predetermined steps**
1/02 . with locking elements, e.g. washers, co-operating with posts
1/04 . . the posts being toothed
1/06 . . . and the devices being actuated mechanically
1/08 . . . and the devices being operated by fluid pressure

3/00 **Devices, e.g. jacks, adapted for uninterrupted lifting of loads** (mobile jacks of the garage type B66F 5/00)
3/02 . with racks actuated by pinions
3/04 . . with several racks
3/06 . . with racks comprising pivotable toothed sections or segments, e.g. arranged in pairs
3/08 . screw-operated (B66F 3/44 takes precedence; gearings F16H)
3/10 . . with telescopic sleeves
3/12 . . comprising toggle levers (lazy-tongs mechanisms B66F 3/22)
3/14 . . actuated through pawl-and-ratchet mechanisms
3/16 . . actuated through bevel-wheel gearings
3/18 . . actuated through worm gearings
3/20 . . actuated through multiple or change-speed gearings
3/22 . Lazy-tongs mechanisms
3/24 . fluid-pressure operated (water-pressure machines F03B; fluid-pressure servomotors F15B, e.g. pyrotechnical actuators F15B 15/19; hydraulic gearings F16H; cylinders, pistons F16J)
3/25 . . Constructional features **[3]**
3/26 . . . Adaptations or arrangements of pistons **[3]**
3/28 . . . . telescopic **[3]**
3/30 . . . Positive brakes or locks **[3]**
3/32 . . . Means for avoiding excessive shocks on completion movements **[3]**
3/35 . . . Inflatable flexible elements, e.g. bellows (inflatable load-engaging elements B66F 3/40; connection of valves to inflatable elastic bodies B60C 29/00) **[3]**
3/36 . . . Load-engaging elements **[3]**
3/38 . . . . adjustable relative to piston **[3]**
3/40 . . . . inflatable (connection of valves to inflatable elastic bodies B60C 29/00) **[3]**
3/42 . . . with self-contained pumps, e.g. actuated by hand **[3]**
3/43 . . Pyrotechnical jacks **[3]**
3/44 . with self-contained electric driving motors
3/46 . Combinations of several jacks with means for interrelating lifting or lowering movements

5/00 **Mobile jacks of the garage type mounted on wheels or rollers**
5/02 . with mechanical lifting gear
5/04 . with fluid-pressure-operated lifting gear

7/00 **Lifting frames, e.g. for lifting vehicles**; **Platform lifts** (for lift-truck platforms B66F 9/06)
7/02 . with platforms suspended from ropes, cables, or chains
7/04 . . hydraulically or pneumatically operated
7/06 . with platforms supported by levers for vertical movement
7/08 . . hydraulically or pneumatically operated
7/10 . with platforms supported directly by jacks
7/12 . . by mechanical jacks
7/14 . . . screw-operated

7/16 . . by one or more hydraulic or pneumatic jacks
7/18 . . . by a single central jack
7/20 . . . by several jacks with means for maintaining the platforms horizontal during movement
7/22 . with tiltable platforms (tilting vehicles for unloading B65G 67/34)
7/24 . for raising or lowering vehicles by their own power
7/26 . for selective lifting of parts of vehicles (mobile garage jacks B66F 5/00)
7/28 . Constructional details, e.g. end stops, pivoting supporting members, sliding runners adjustable to load dimensions

9/00 Devices for lifting or lowering bulky or heavy goods for loading or unloading purposes (mobile or transportable lifts in, or associated with, buildings and specially adapted to be shifted from one part of a building or other structure to another part or to another building or structure B66B 9/16; cranes B66C)

9/02 . Stationary loaders or unloaders, e.g. for sacks
9/04 . . hydraulically actuated or controlled
9/06 . movable, with their loads, on wheels or the like, e.g. fork-lift trucks (vehicle aspects B60 to B62; vehicles predominantly for transporting loads and modified to facilitate loading or unloading B60P 1/00; low-lift hand trucks for transporting goods B62B 3/06)
9/065 . . non-masted (mobile jacks of the garage type mounted on wheels or rollers B66F 5/00) **[3]**
9/07 . . Floor-to-roof stacking devices, e.g. stacker cranes, retrievers **[3]**
9/075 . . Constructional features or details **[3]**
9/08 . . . Masts; Guides; Chains **[3]**
9/10 . . . . movable in a horizontal direction relative to truck **[3]**
9/12 . . . Platforms; Forks; Other load-supporting or load-gripping members **[3]**
9/14 . . . . laterally movable, e.g. swingable, for slewing or transverse movements **[3]**
9/16 . . . . inclinable relative to mast **[3]**
9/18 . . . . Load gripping or retaining means **[3]**
9/19 . . . . Additional means for facilitating unloading **[3]**
9/20 . . . Means for actuating or controlling masts, platforms, or forks (power take-off from vehicle transmissions, combined with vehicle propulsion systems B60K) **[3]**
9/22 . . . . Hydraulic devices or systems **[3]**
9/24 . . . . Electrical devices or systems **[3]**

11/00 Lifting devices specially adapted for particular uses not otherwise provided for (ground-engaging vehicle fittings for supporting, lifting or manoeuvring the vehicle B60S 9/00)

11/04 . for movable platforms or cabins, e.g. on vehicles, permitting workmen to place themselves in any desired position for carrying out required operations (platforms for cleaning windows A47L 3/02; devices for rescuing persons from buildings A62B 1/02; vehicle aspects of service vehicles B60P 3/14; maintenance travellers for bridges E01D 19/10; scaffolds on an extensible substructure E04G 1/22; liftable or lowerable platforms for use on ladders E06C 7/16)

13/00 Common constructional features or accessories

15/00 Crowbars or levers

17/00 Safety devices, e.g. for limiting or indicating lifting force

19/00 Hoisting, lifting, hauling, or pushing, not otherwise provided for

19/02 . Hauling using anchors; Anchors therefor (marine anchors B63B 21/24; anchoring aircraft B64F 1/12; means for anchoring structural elements specially adapted to foundation engineering E02D 5/74) **[3]**

B67 OPENING OR CLOSING BOTTLES, JARS OR SIMILAR CONTAINERS; LIQUID HANDLING

B67B APPLYING CLOSURE MEMBERS TO BOTTLES, JARS, OR SIMILAR CONTAINERS; OPENING CLOSED CONTAINERS (opening or closing devices attached to, or incorporated in, containers or container closures B65D)

1/00 Closing bottles, jars, or similar containers by applying stoppers (stoppers per se B65D 39/00)

1/03 . Pretreatment of stoppers, e.g. cleaning, steaming, heating, impregnating or coating; Applying resilient rings to stoppers (mechanical working of cork B27J 5/00) **[5]**

1/04 . by inserting threadless stoppers, e.g. corks

1/06 . by inserting and rotating screw stoppers

1/08 . Securing stoppers, e.g. swing stoppers, which are held in position by associated pressure-applying means coacting with the bottle neck

1/10 . by inserting disc closures **[6]**

3/00 Closing bottles, jars, or similar containers by applying caps (caps per se B65D 41/00)

3/02 . by applying flanged caps, e.g. crown caps, and securing by deformation of flanges

3/04 . . Cutting caps from strip material in capping machines (devices for registering moving strip material B65H 23/00)

3/06 . . Feeding caps to capping heads

3/062 . . . from a magazine

3/064 . . . from a hopper

3/10 . . Capping heads for securing caps

3/12 . . . characterised by being movable axially relative to cap to deform flanges thereof, e.g. to press projecting flange rims inwardly

3/14 . . . characterised by having movable elements, e.g. hinged fingers, for applying radial pressure to the flange of the cap (B67B 3/16, B67B 3/18 take precedence) **[5]**

3/16 . . . characterised by having resilient deforming elements, e.g. resilient sleeves or collars (B67B 3/18 takes precedence) **[5]**

3/18 . . . characterised by being rotatable, e.g. for forming screw threads in situ **[5]**

3/20 . by applying and rotating preformed threaded caps (forming threads in situ by resilient deforming means B67B 3/16, by rotary capping heads B67B 3/18) **[5]**

3/22 . by applying snap-on caps

3/24 . Special measures for applying and securing caps under vacuum

3/26 . Applications of control, warning, or safety devices in capping machinery

3/28 . Mechanisms for causing relative movement between bottle or jar and capping head **[5]**

5/00 Applying protective or decorative covers to closures; Devices for securing bottle closures with wire (infant-feeding teats with means for fastening to bottles A61J 11/04) **[6]**

5/03 . Applying protective or decorative covers to closures, e.g. by forming in situ **[3]**

5/05 . . by applying liquids, e.g. by dipping **[3]**

5/06 . Devices for securing bottle closures with wire (B67B 1/08 takes precedence)

6/00 Closing bottles, jars or similar containers by applying closure members, not provided for in groups B67B 1/00 to B67B 5/00 [2009.01]

7/00 Hand- or power-operated devices for opening closed containers (nail pullers or extractors B25C 11/00; attached to, or incorporated in, containers or container closures B65D)

7/02 . for removing stoppers

7/04 . . Cork-screws

7/06 . . Other cork removers

7/08 . . . using air or gas pressure

7/10 . . with means for retrieving stoppers from the interior of the container

7/12 . for removing disc-closures

7/14 . for removing tightly-fitting lids or covers, e.g. of shoe-polish tins, by gripping and rotating

7/15 . . finger grapple type **[5]**

7/16 . for removing flanged caps, e.g. crown caps

7/18 . for removing threaded caps (B67B 7/14 takes precedence; wrenches B25B 13/00) **[2]**

7/20 . for breaking vacuum seals between lids or covers and bodies of preserving jars, e.g. by wedge action

7/22 . . incorporating loops, e.g. of wire, which are tightened around seal

7/40 . Devices for engaging tags, strips, or tongues for opening by tearing, e.g. slotted keys for opening sardine tins

7/42 . Devices for removing barrel bungs

7/44 . Combination tools, e.g. comprising cork-screws, can piercers, crown-cap removers (combinations of opening devices with cutting tools B26, with devices serving other purposes, see the appropriate places, e.g. B25F, B43K 29/00)

7/46 . Cutting devices, i.e. devices including at least one cutting element having one or more cutting edges for piercing through the wall of a closed container, e.g. can openers (B67B 7/44 takes precedence; machines for domestic use with a plurality of interchangeable units A47J 43/06, A47J 44/00; hand-held cutting tools, cutting, severing, in general B26) **[4]**

7/48 . . punch type, i.e. the cutting element including at least one sharp cutting edge adapted to pierce through the container wall in, ordinarily, a single operating stroke **[4]**

7/50 . . . with fulcrum, i.e. a lever-like actuating handle with provision to establish a pivot point **[4]**

7/52 . . . Plural spaced cutting edges adapted to pierce the container during a single operating stroke **[4]**

7/54 . . sweep cutter type, i.e. an opening device including means to establish a pivot point between the cutting element and the container and having means to move the cutting element about the pivot point **[4]**

7/56 . . . with container penetrating pivot and variable cutter radius, i.e. the distance between the cutting element and the penetrating pivot being changeable **[4]**

7/58 . . . . Freely slidable cutter **[4]**

7/60 . . having force multiplying means employed to relatively turn the container and cutting element about a fixed point to force the cutting element to traverse the container **[4]**

Note

In this group, a simple lever or handle to be manipulated by the operator to relatively rotate the container and opener is not considered to be a force multiplying means. **[4]**

7/62 . . Progressive fulcrum, i.e. having a lever-like actuating handle and provision to establish a pivot point which is progressively translated relative to the container during the opening operation **[4]**

Note

In this group, the pivot point may be established by (a) contact between the container and a portion of the handle engaging the container, or (b) contact between the handle and a reaction member engaging the container. **[4]**

7/64 . . . with guide means to engage container wall and guide the cutting element thereabout **[4]**

7/66 . . . cutter pivoted to reaction member **[4]**

7/68 . . shear type, i.e. including cutting elements co-operating with one another so that their respective cutting edges move pass and in substantial contact with each other to perform the cutting operation **[4]**

7/70 . . including an annular, driven, wheel-like roller member adapted to continuously engage a container chime during the opening operation **[4]**

7/72 . . . Cutter comprising rotatable disc **[4]**

7/74 . . . Roller drive means causes initial piercing, i.e. force applied to rotate the wheel-like member causes the cutting element to pierce the container wall **[4]**

7/76 . . . adapted to pierce container side wall **[4]**

7/78 . . including plural cutters **[4]**

7/80 . . with means to cover an opening in the container made by the cutting element **[4]**

7/82 . . with means to prevent the cut portion from dropping into the container or to raise the cut portion out of the container **[4]**

7/84 . . adapted for right or left-hand operation, i.e. the device is capable of being operated in either direction about the container **[4]**

Note

This group covers also a progressive fulcrum type container opener including a fulcrum extending from each side of the cutting blade. **[4]**

7/86 . . with spout or means to deform or bend the material of the container to form a spout **[4]**

7/88 . . with means to clean or sanitise the cutting element **[4]**

7/90 . . with sensor, activator and controller **[4]**

Note

In this group, the sensor, e.g. trip lever, push button, photo-cell system, or the like, detects a condition, such as the condition of the container, the container contents, the can opener itself or the environment of the opener which may affect the operation of the opener. The activator, e.g. circuit breaker, clutch, valve, or the like, causes a release of energy. The controller, e.g. motor, driver, or the like, changes or causes the operation of the opener. **[6]**

7/92 . by breaking, e.g. for ampoules **[5]**

B67C FILLING WITH LIQUIDS OR SEMILIQUIDS, OR EMPTYING, OF BOTTLES, JARS, CANS, CASKS, BARRELS, OR SIMILAR CONTAINERS, NOT OTHERWISE PROVIDED FOR; FUNNELS

Subclass index

3/00 Bottling liquids or semiliquids; Filling jars or cans with liquids or semiliquids using bottling or like apparatus; Filling casks or barrels with liquids or semiliquids (filling containers with liquids or semiliquids using apparatus other than bottling or like apparatus B65B 3/00)

3/02 . Bottling liquids or semiliquids; Filling jars or cans with liquids or semiliquids using bottling or like apparatus

3/04 . . without applying pressure

3/06 . . using counterpressure, i.e. filling while the container is under pressure

3/08 . . . and subsequently lowering the counterpressure

3/10 . . . preliminary filling with inert gases, e.g. carbon dioxide

3/12 . . . Pressure-control devices

3/14 . . . specially adapted for filling with hot liquids

3/16 . . using suction

3/18 . . using siphoning arrangements

3/20 . . with provision for metering the liquids to be introduced, e.g. when adding syrups (measuring volume, or volume flow, in general G01F)

3/22 . . Details

3/24 . . . Devices for supporting or handling bottles (transport or storing devices in general B65G)

3/26 . . . Filling-heads; Means for engaging filling-heads with bottle necks

3/28 . . . Flow-control devices, e.g. using valves (valves in general F16K)
3/30 . Filling of barrels or casks
3/32 . . using counterpressure, i.e. filling while the container is under pressure
3/34 . . Devices for engaging filling-heads with filling-apertures

7/00 Concurrent cleaning, filling, and closing of bottles; Processes or devices for at least two of these operations

9/00 Emptying bottles, jars, cans, casks, barrels, or similar containers, not otherwise provided for (devices for tilting and emptying containers B65G 65/23) **[3]**

11/00 Funnels, e.g. for liquids (filter funnels B01D 29/085; volume-flow meters G01F)
11/02 . without discharge valves
11/04 . with non-automatic discharge valves
11/06 . with automatic discharge valves

B67D DISPENSING, DELIVERING, OR TRANSFERRING LIQUIDS, NOT OTHERWISE PROVIDED FOR (cleaning pipes or tubes or systems of pipes or tubes B08B 9/02; emptying or filling of bottles, jars, cans, casks, barrels, or similar containers, not otherwise provided for B67C; water supply E03; pipe systems F17D; domestic hot-water supply systems F24D; measuring volume, volume flow, mass flow or liquid level, metering by volume G01F; coin-freed or like apparatus G07F) **[5]**

1/00 Apparatus or devices for dispensing beverages on draught (B67D 3/00 takes precedence; apparatus for making beverages A47J 31/00) **[3]**
1/02 . Beer engines or like manually-operable pumping apparatus
1/04 . Apparatus utilising compressed air or other gas acting directly or indirectly on beverages in storage containers
1/06 . Mountings or arrangements of dispensing apparatus in or on shop or bar counters (shop or bar counters per se A47F 9/00)
1/07 . Cleaning beverage-dispensing apparatus **[5]**
1/08 . Details
1/10 . . Pump mechanisms (in general F04)
1/12 . . Flow- or pressure-control devices or systems
1/14 . . . Reducing valves or control taps
1/16 . . Devices for collecting spilled beverages

3/00 Apparatus or devices for controlling flow of liquids under gravity from storage containers for dispensing purposes (separating and dispensing metered quantities of liquids G01F)
3/02 . Liquid-dispensing valves having operating members arranged to be pressed upwards, e.g. by the rims of receptacles held below the delivery orifice
3/04 . Liquid-dispensing taps or cocks adapted to seal and open tapping-holes of casks, e.g. for beer

7/00 Apparatus or devices for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers, e.g. for retail sale purposes (general disposition of plant in stations for supplying fuel to vehicles B60S 5/02; for filling or emptying locomotive water tanks, e.g. water columns, B61K 11/00; for refuelling aircraft during flight B64D 39/00; liquid-handling ground installations specially adapted for fuelling stationary aircraft B64F 1/28) **[2010.01]**
7/02 . for transferring liquids other than fuel or lubricants **[2010.01]**
7/04 . for transferring fuels, lubricants or mixed fuels and lubricants **[2010.01]**
7/06 . Details or accessories **[2010.01]**
7/08 . . Arrangements of devices for controlling, indicating, metering or registering quantity or price of liquid transferred (arrangement of flow- or pressure-control valves B67D 7/36; computing, calculating, counting G06; coin-freed apparatus for dispensing fluids G07F 13/00; prepayment devices for metering liquids G07F 15/00) **[2010.01]**
7/10 . . . operated by keys, push-buttons or cash registers **[2010.01]**
7/12 . . . operated by movement of delivery hose or nozzle or by devices associated therewith **[2010.01]**
7/14 . . . responsive to input of recorded programmed information, e.g. on punched cards **[2010.01]**
7/16 . . . Arrangements of liquid meters **[2010.01]**
7/18 . . . . of piston type **[2010.01]**
7/20 . . . . of rotary type **[2010.01]**
7/22 . . . Arrangements of indicators or registers (indicating or recording in fluid meters G01F 15/06) **[2010.01]**
7/24 . . . . with means for producing or issuing a receipt or record of sale **[2010.01]**
7/26 . . . . with resetting or zeroing means **[2010.01]**
7/28 . . . with automatic means for reducing or intermittently interrupting flow before completion of delivery, e.g. to produce dribble feed **[2010.01]**
7/30 . . . with means for predetermining quantity of liquid to be transferred (B67D 7/10, B67D 7/14 take precedence) **[2010.01]**
7/32 . . Arrangements of safety or warning devices; Means for preventing unauthorised delivery of liquid **[2010.01]**
7/34 . . . Means for preventing unauthorised delivery of liquid **[2010.01]**
7/36 . . Arrangements of flow- or pressure-control valves (associated with nozzles B67D 7/42) **[2010.01]**
7/38 . . Arrangements of hoses, e.g. operative connection with pump motor (hoses in general F16L 11/00) **[2010.01]**
7/40 . . . Suspending, reeling or storing devices (supports for storing lengths of hoses, in general B65H 75/34) **[2010.01]**
7/42 . . Filling nozzles **[2010.01]**
7/44 . . . automatically closing **[2010.01]**

7/46 . . . . when liquid in container to be filled reaches a predetermined level **[2010.01]**

7/48 . . . . . by making use of air suction through an opening closed by the rising liquid **[2010.01]**

7/50 . . . . and provided with an additional hand lever **[2010.01]**

7/52 . . . . and provided with additional flow-controlling valve means **[2010.01]**

7/54 . . . with means for preventing escape of liquid or vapour or for recovering escaped liquid or vapour (B67D 7/44 takes precedence) **[2010.01]**

7/56 . . Arrangements of flow-indicators, e.g. transparent compartments, windows, rotary vanes (indicating or recording presence, absence or direction of movement G01P 13/00) **[2010.01]**

7/58 . . Arrangements of pumps **[2010.01]**

7/60 . . . manually operable **[2010.01]**

7/62 . . . power operated **[2010.01]**

7/64 . . . . of piston type **[2010.01]**

7/66 . . . . of rotary type **[2010.01]**

7/68 . . . submerged in storage tank or reservoir **[2010.01]**

7/70 . . . of two or more pumps in series or parallel **[2010.01]**

7/72 . . Devices for applying air or other gas pressure for forcing liquid to delivery point **[2010.01]**

7/74 . . Devices for mixing two or more different liquids to be transferred (coin-freed apparatus G07F 13/06) **[2010.01]**

7/76 . . Arrangements of devices for purifying liquids to be transferred, e.g. of filters, of air or water separators **[2010.01]**

7/78 . . Arrangements of storage tanks, reservoirs or pipe-lines **[2010.01]**

7/80 . . Arrangements of heating or cooling devices for liquids to be transferred **[2010.01]**

7/82 . . . Heating only **[2010.01]**

7/84 . . Casings, cabinets or frameworks; Trolleys or like movable supports **[2010.01]**

7/86 . . Illuminating arrangements **[2010.01]**

9/00 **Apparatus or devices for transferring liquids when loading or unloading ships** (ship-based equipment B63B 27/00) **[2010.01]**

9/02 . using articulated pipes **[2010.01]**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

B68 SADDLERY; UPHOLSTERY

B68B HARNESS; DEVICES USED IN CONNECTION THEREWITH; WHIPS OR THE LIKE

1/00 **Devices in connection with harness, for hitching, reining, training, breaking, or quietening horses or other traction animals** (devices of this kind combined with traction harness B68B 3/00; stable equipment A01K 1/00; devices forming part of a vehicle B62C)

1/02 . Halters

1/04 . Bridles; Reins

1/06 . . Bits

1/08 . Curbs

1/10 . Blinkers

1/12 . . movable

1/13 . Devices for preventing bolting (for unhitching bolting traction animals B68B 5/08)

1/14 . Hobbling devices

3/00 **Traction harnesses**; **Traction harnesses combined with devices referred to in group B68B 1/00**

3/02 . Yokes

3/04 . Horse collars; Manufacturing same

3/06 . . Adjustable collars

3/08 . . with protective pads

3/10 . . . Pneumatic collars

3/12 . . Locks therefor

3/14 . Breast collars

3/16 . Cruppers

3/18 . Breechings

3/20 . Traces (manufacture of belts C14B, of ropes D07)

3/22 . . Trace holders (devices forming part of a vehicle B62C)

5/00 **Details or accessories** (haberdashery A44); **Fastening devices for bridles, reins, harnesses, or the like** (devices forming part of a vehicle B62C)

5/02 . Fastening devices for traces (resilient attachments B68B 7/00)

5/04 . Tail holders as part of harness

5/06 . Devices for fastening special articles on harnesses, bridles, or the like

5/08 . Devices for unhitching bolting traction animals

7/00 **Horse protectors, e.g. resilient attachments** (protective covers B68C 5/00)

9/00 **Devices specially adapted for supporting harnesses when not in use**

11/00 **Whips or the like**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

B68C SADDLES; STIRRUPS

1/00 **Saddling equipment for riding- or pack-animals**

1/02 . Saddles

1/04 . . Adjustable saddles

1/06 . . Side saddles

1/08 . . with pneumatic pads

1/10 . . with spring pads

1/12 . Bottom pads for saddles; Saddle cloths

1/14 . Belts or straps for saddles; Tighteners therefor

1/16 . Fastening stirrups to saddles; Stirrup-leathers (stirrups B68C 3/00)

1/18 . . with safety arrangements for loosening the connection between stirrup and saddle, e.g. in case of rider's fall

1/20 . Pockets, receptacles, or other supporting devices attached or attachable to saddle, e.g. for insertion of arms

3/00 **Stirrups**

3/02 . with side part or sole plate attached to other parts of the stirrup movably, e.g. pivotally

5/00 **Covers for animals when working, e.g. for protection**

B68F MAKING ARTICLES FROM LEATHER, CANVAS, OR THE LIKE

1/00 **Making articles from leather, canvas, or the like** (machines or equipment for saddle-making B68F 3/00; manufacturing footwear A43D; manufacture or treatment of leather in general, splitting leather, manufacture of driving or other belts C14)

3/00 **Machines or equipment specially adapted for saddle-making** (methods B68F 1/00)

3/02 . Machines

3/04 . Hand tools

B68G METHODS, EQUIPMENT, OR MACHINES FOR USE IN UPHOLSTERING; UPHOLSTERY NOT OTHERWISE PROVIDED FOR

Subclass index

1/00 **Loose filling materials for upholstery** (manufacture of the materials, see the relevant classes)

3/00 **Treating materials to adapt them specially as upholstery filling**

3/02 . Cleaning; Conditioning

3/04 . Teasing; Untwisting ropes or cords of filling materials

3/06 . Curling; Twisting filling materials into ropes or cords

3/08 . Preparation of bed feathers from natural feathers

3/10 . . Cleaning or conditioning of bed feathers (B68G 3/02 takes precedence)

3/12 . . Sorting of bed feathers

5/00 **Resilient upholstery pads** (finished upholstery B68G 11/00; waddings, fleeces, mats, or like products of fibrous structure, see the relevant classes)

5/02 . of cellular material, e.g. sponge rubber (shaping of plastics or substances in a plastic state for the production of porous or cellular articles B29C)

7/00 **Making upholstery** (manufacturing upholstered panels B68G 13/00; sewing-machines D05B)

7/02 . Making upholstery from waddings, fleeces, mats, or the like (filling methods B68G 7/06)

7/04 . . by conveyer-line methods

7/05 . Covering or enveloping cores of pads

7/052 . . with webs secured to the core, e.g. by stitching

7/054 . . Arrangements of sheathings between spring cores and overlying paddings

7/06 . Filling of cushions, mattresses, or the like

7/08 . Quilting (tools B68G 15/00); Elements therefor

7/10 . Finishing of edges

7/12 . Other elements specially adapted for fastening, fixing, or finishing, in upholstery work

9/00 **Placing upholstery springs in pockets**; **Fitting springs in upholstery**

11/00 **Finished upholstery not provided for in other classes**

11/02 . mainly composed of fibrous materials

11/03 . . with stitched or bonded fibre webs

11/04 . mainly composed of resilient materials, e.g. of foam rubber

11/06 . . with embedded springs, e.g. bonded

13/00 **Upholstered panels** (specially adapted for sound-absorption E04B, G10K)

13/02 . with indented pattern formed by stitching

13/04 . with indented pattern formed by bonding

15/00 **Auxiliary devices or tools specially for upholstery**

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

MICRO-STRUCTURAL TECHNOLOGY; NANO-TECHNOLOGY

B81 MICRO-STRUCTURAL TECHNOLOGY [7]

(1) This class covers micro-structural devices or systems, including at least one essential element or formation characterised by its very small size, typically within the range of 10-4 to 10-7 meters, i.e. its significant features can not, in at least one dimension, be completely discerned without the use of an optical microscope. **[7]**

(2) In this class, the following expressions are used with the meaning indicated: **[7]**
- "micro-structural devices" covers: **[7]**
  - (i) micro-mechanical devices comprising movable, flexible or deformable elements; and **[7]**
  - (ii) three-dimensional structures without movable, flexible or deformable elements, comprising microformations designed to accomplish an essential structural function for interacting with their environment, as opposed to purely electronic or chemical functions, regardless of whether the structures are combined with micro-electronic devices or formed from specific materials; **[7]**
- "micro-structural systems" covers: **[7]**
  - (i) systems of cooperating micro-structural devices; and **[7]**
  - (ii) micro-electro-mechanical or micro-opto-mechanical systems, which combine on a common substrate the specific features of micro-structural devices and electrical or optical components, e.g. for controlling, analysing or signalling the functioning of micro-structural devices. **[7]**

B81B MICRO-STRUCTURAL DEVICES OR SYSTEMS, E.G. MICRO-MECHANICAL DEVICES (piezo-electric, electrostrictive or magnetostrictive elements per se H01L 41/00) **[7]**

(1) This subclass does not cover: **[7]**
- purely electrical or electronic devices per se which are covered by section H, e.g. subclass H01L; **[7]**
- purely optical devices per se which are covered by subclasses G02B or G02F; **[7]**
- essentially two-dimensional structures, e.g. layered products which are covered by subclass B32B; **[7]**
- chemical or biological structures per se which are covered by section C; **[7]**
- structures in atomic scale produced by manipulation of single atoms or molecules, which are covered by group B82B 1/00. **[7]**

(2) Devices or systems classified in this subclass are also classified in appropriate subclasses providing for their structural or functional features, if such features are of interest. **[7]**

1/00 Devices without movable or flexible elements, e.g. micro-capillary devices [7]

3/00 Devices comprising flexible or deformable elements, e.g. comprising elastic tongues or membranes (B81B 5/00 takes precedence) **[7]**

5/00 Devices comprising elements which are movable in relation to each other, e.g. comprising slidable or rotatable elements [7]

7/00 Micro-structural systems [7]

7/02 . containing distinct electrical or optical devices of particular relevance for their function, e.g. micro-electro-mechanical systems (MEMS) (B81B 7/04 takes precedence) **[7]**

7/04 . Networks or arrays of similar micro-structural devices **[7]**

B81C PROCESSES OR APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OR TREATMENT OF MICRO-STRUCTURAL DEVICES OR SYSTEMS (making microcapsules or microballoons B01J 13/02; processes or apparatus specially adapted for the manufacture or treatment of piezo-electric, electrostrictive or magnetostrictive elements per se H01L 41/22) **[7]**

Note

This subclass does not cover: **[7]**
- processes or apparatus for the manufacture or treatment of purely electrical or electronic devices, which are covered by section H, e.g. group H01L 21/00; **[7]**
- processes or apparatus involving the manipulation of single atoms or molecules, which are covered by group B82B 3/00. **[7]**

1/00 Manufacture or treatment of devices or systems in or on a substrate (B81C 3/00 takes precedence) **[7]**

3/00 Assembling of devices or systems from individually processed components [7]

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

B82 NANO-TECHNOLOGY [7]

Note

In this class, the following terms are used with the meaning indicated:
- *"nano-size" or "nano-scale" relate to a controlled geometrical size below 100 nanometres (nm) in one or more dimensions;* **[2011.01]**
- *"nano-structure" means an entity having at least one nano-sized functional component that makes physical, chemical or biological properties or effects available, which are uniquely attributable to the nano-scale.* **[2011.01]**

B82B NANO-STRUCTURES FORMED BY MANIPULATION OF INDIVIDUAL ATOMS, MOLECULES, OR LIMITED COLLECTIONS OF ATOMS OR MOLECULES AS DISCRETE UNITS; MANUFACTURE OR TREATMENT THEREOF [7]

(1) This subclass does not cover chemical or biological nano-structures per se, provided for elsewhere, e.g., in classes C08 or C12. **[7]**

(2) Attention is drawn to the Note following the title of class B82, which defines the meaning of the terms "nano-size", "nano-scale" and "nano-structure" in this subclass. **[2011.01]**

(3) Subject matter classified in this subclass is further classified in subclass B82Y, in order to enable a comprehensive search of nano-structure technology using classification symbols of B82Y in combination with classification symbols of B82B. **[2011.01]**

(4) Nano-structures having specialised features or functions are further classified in appropriate places in other subclasses that provide for those features or functions, e.g. in G01Q, G02F 1/017, H01L 29/775. **[2011.01]**

1/00 Nano-structures formed by manipulation of individual atoms or molecules, or limited collections of atoms or molecules as discrete units [7]

3/00 Manufacture or treatment of nano-structures by manipulation of individual atoms or molecules, or limited collections of atoms or molecules as discrete units [7]

B82Y SPECIFIC USES OR APPLICATIONS OF NANO-STRUCTURES; MEASUREMENT OR ANALYSIS OF NANO-STRUCTURES; MANUFACTURE OR TREATMENT OF NANO-STRUCTURES [2011.01]

(1) This subclass covers applications and aspects of nano-structures which are produced by any method, and is not restricted to those that are formed by manipulation of individual atoms or molecules. **[2011.01]**

(2) Attention is drawn to the Note following the title of class B82, which defines the meaning of the terms "nano-size", "nano-scale" and "nano-structure" in this subclass. **[2011.01]**

(3) This subclass is intended to enable a comprehensive search of subject matter related to nano-structures by combination of classification symbols of this subclass with classification symbols from other subclasses. Therefore this subclass covers aspects of nano-structures that might also be entirely or partially covered elsewhere in the IPC. **[2011.01]**

(4) This subclass is for secondary classification, i.e. obligatory supplementary classification of subject matter already classified as such in other classification places, e.g.: **[2011.01]**

B82B		Nano-structures formed by individual manipulation of atoms, molecules, or limited collections of atoms or molecules as discrete units; manufacture or treatment thereof
A61K	9/51	Nano-capsules for medicinal preparations
B05D	1/20	Langmuir-Blodgett films
C01B	31/02	Carbon nano-structures, e.g. bucky-balls, nanotubes, nanocoils, nano-doughnuts or nano-onions
G01Q		Scanning probe techniques
G02F	1/017	Optical quantum wells or boxes
H01F	10/32	Nano-structured thin magnetic films
H01F	41/30	Molecular beam epitaxy [MBE]
H01L	29/775	Quantum wire FETs

(5) The classification symbols of this subclass are not listed first when assigned to patent documents. **[2011.01]**

(6) In this subclass, multi-aspects classification is applied, so that aspects of subject matter that are covered by more than one of its groups should be classified in each of those groups. **[2011.01]**

5/00 Nano-biotechnology or nano-medicine, e.g. protein engineering or drug delivery **[2011.01]**

10/00 Nano-technology for information processing, storage or transmission, e.g. quantum computing or single electron logic **[2011.01]**

15/00 ***Nano-technology for interacting, sensing or actuating, e.g. quantum dots as markers in protein assays or molecular motors*** **[2011.01]**

20/00 ***Nano-optics, e.g. quantum optics or photonic crystals*** **[2011.01]**

25/00 ***Nano-magnetism, e.g. magnetoimpedance, anisotropic magnetoresistance, giant magnetoresistance or tunneling magnetoresistance*** **[2011.01]**

30/00 ***Nano-technology for materials or surface science, e.g. nano-composites*** **[2011.01]**

35/00 ***Methods or apparatus for measurement or analysis of nano-structures*** **[2011.01]**

40/00 ***Manufacture or treatment of nano-structures*** **[2011.01]**

99/00 ***Subject matter not provided for in other groups of this subclass*** **[2011.01]**

B99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

B99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION C – CHEMISTRY; METALLURGY

(1) In section C, the definitions of groups of chemical elements are as follows:
Alkali metals: Li, Na, K, Rb, Cs, Fr
Alkaline earth metals: Ca, Sr, Ba, Ra
Lanthanides: elements with atomic numbers 57 to 71 inclusive
Rare earths: Sc, Y, Lanthanides
Actinides: elements with atomic numbers 89 to 103 inclusive
Refractory metals: Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W
Halogens: F, Cl, Br, I, At
Noble gases: He, Ne, Ar, Kr, Xe, Rn
Platinum group: Os, Ir, Pt, Ru, Rh, Pd
Noble metals: Ag, Au, Platinum group
Light metals: alkali metals, alkaline earth metals, Be, Al, Mg
Heavy metals: metals other than light metals
Iron group: Fe, Co, Ni
Non-metals: H, B, C, Si, N, P, O, S, Se, Te, noble gases, halogens
Metals: elements other than non-metals
Transition elements: elements with atomic numbers 21 to 30 inclusive, 39 to 48 inclusive, 57 to 80 inclusive, 89 upwards

(2) Section C covers :
(a) pure chemistry, which covers inorganic compounds, organic compounds, macromolecular compounds, and their methods of preparation;
(b) applied chemistry, which covers compositions containing the above compounds, such as: glass, ceramics, fertilisers, plastics compositions, paints, products of the petroleum industry. It also covers certain compositions on account of their having particular properties rendering them suitable for certain purposes, as in the case of explosives, dyestuffs, adhesives, lubricants, and detergents;
(c) certain marginal industries, such as the manufacture of coke and of solid or gaseous fuels, the production and refining of oils, fats and waxes, the fermentation industry (e.g., brewing and wine-making), the sugar industry;
(d) certain operations or treatments, which are either purely mechanical, e.g., the mechanical treatment of leather and skins, or partly mechanical, e.g., the treatment of water or the prevention of corrosion in general;
(e) metallurgy, ferrous or non-ferrous alloys.

(3) In all sections of the IPC, in the absence of an indication to the contrary, the Periodic System of chemical elements referred to is the one with 8 groups as represented in the table below. For example, group C07F 3/00 "Compounds containing elements of the 2nd Group of the Periodic System" refers to the elements of columns IIa and IIb. **[2009.01]**

(4)
(a) In the case of operations, treatments, products or articles having both a chemical and a non-chemical part or aspect, the general rule is that the chemical part or aspect is covered by section C.
(b) In some of these cases, the chemical part or aspect brings with it a non-chemical one, even though purely mechanical, because this latter aspect either is essential to the operation or treatment or constitutes an important element thereof. It has seemed, in fact, more logical not to dissociate the different parts or aspects of a coherent whole. This is the case for applied chemistry and for the industries, operations and treatments mentioned in Notes (1)(c), (d) and (e). For example, furnaces peculiar to the manufacture of glass are covered by class C03 and not by class F27.
(c) There are, however, some exceptions in which the mechanical (or non-chemical) aspect carries with it the chemical aspect, for example:
– Certain extractive processes, in subclass A61K;
– The chemical purification of air, in subclass A61L;
– Chemical methods of fire-fighting, in subclass A62D;
– Chemical processes and apparatus, in class B01;
– Impregnation of wood, in subclass B27K;
– Chemical methods of analysis or testing, in subclass G01N;
– Photographic materials and processes, in class G03, and, generally, the chemical treatment of textiles and the production of cellulose or paper, in section D.
(d) In still other cases, the pure chemical aspect is covered by section C and the applied chemical aspect by another section, such as A, B or F, e.g., the use of a substance or composition for:
– treatment of plants or animals, covered by subclass A01N;
– foodstuffs, covered by class A23;

– ammunition or explosives, covered by class F42.

(e) When the chemical and mechanical aspects are so closely interlocked that a neat and simple division is not possible, or when certain mechanical processes follow as a natural or logical continuation of a chemical treatment, section C may cover, in addition to the chemical aspect, a part only of the mechanical aspect, e.g., after-treatment of artificial stone, covered by class C04. In this latter case, a note or a reference is usually given to make the position clear, even if sometimes the division is rather arbitrary.

CHEMISTRY

C01 INORGANIC CHEMISTRY

(1) In subclasses C01B to C01G, and within each of these subclasses, in the absence of an indication to the contrary, a compound is classified in the last appropriate place, e.g. potassium permanganate is classified only as a permanganate compound, in subclass C01G. **[3]**

(2) Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P. **[8]**

(3) Processes using enzymes or micro-organisms in order to: **[5]**
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

C01B NON-METALLIC ELEMENTS; **COMPOUNDS THEREOF** (fermentation or enzyme-using processes for the preparation of elements or inorganic compounds except carbon dioxide C12P 3/00; production of non-metallic elements or inorganic compounds by electrolysis or electrophoresis C25B)

(1) In this subclass, tradenames that are often found in scientific and patent literature have been used in order to define precisely the scope of the groups. **[6]**

(2) Attention is drawn to the definitions of groups of chemical elements following the title of section C. **[3]**

(3) Attention is drawn to Note (1) after class C01, which defines the last place priority rule applied in this class, i.e. in the range of subclasses C01B to C01G and within these subclasses. **[8]**

(4) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

Subclass index

Hydrogen; **Hydrides**; **Water**; **Synthesis gas from hydrocarbons**

3/00 **Hydrogen**; **Gaseous mixtures containing hydrogen**; **Separation of hydrogen from mixtures containing it**; **Purification of hydrogen** (production of water-gas or synthesis gas from solid carbonaceous material C10J) **[3]**

3/02 . Production of hydrogen or of gaseous mixtures containing hydrogen **[3]**

3/04 . . by decomposition of inorganic compounds, e.g. ammonia **[3]**

3/06 . . by reaction of inorganic compounds containing electro-positively bound hydrogen, e.g. water, acids, bases, ammonia, with inorganic reducing agents (by electrolysis of water C25B 1/04) **[3]**

3/08 . . . with metals **[3]**

3/10 . . . . by reaction of water vapour with metals **[3]**

3/12 . . . by reaction of water vapour with carbon monoxide **[3]**

3/14 . . . . Handling of heat and steam **[3]**

3/16 . . . . using catalysts **[3]**

3/18 . . . . using moving solid particles **[3]**

3/20 . . . by reaction of metal hydroxides with carbon monoxide **[3]**

3/22 . . by decomposition of gaseous or liquid organic compounds **[3]**

3/24 . . . of hydrocarbons **[3]**

3/26 . . . . using catalysts **[3]**

3/28 . . . . using moving solid particles **[3]**

3/30 . . . . . using the fluidised bed technique **[3]**

3/32 . . by reaction of gaseous or liquid organic compounds with gasifying agents, e.g. water, carbon dioxide, air **[3]**

3/34 . . . by reaction of hydrocarbons with gasifying agents **[3]**

3/36 . . . . using oxygen or mixtures containing oxygen as gasifying agents **[3]**

3/38 . . . . using catalysts **[3]**

3/40 . . . . . characterised by the catalyst **[3]**

3/42 . . . . . using moving solid particles **[3]**
3/44 . . . . . using the fluidised bed technique **[3]**
3/46 . . . . using discontinuously preheated non-moving solid materials, e.g. blast and run **[3]**
3/48 . . . . followed by reaction of water vapour with carbon monoxide **[3]**
3/50 . Separation of hydrogen or hydrogen containing gases from gaseous mixtures, e.g. purification (C01B 3/14 takes precedence) **[3]**
3/52 . . by contacting with liquids; Regeneration of used liquids **[3]**
3/54 . . . including a catalytic reaction **[3]**
3/56 . . by contacting with solids; Regeneration of used solids **[3]**
3/58 . . . including a catalytic reaction **[3]**

4/00 Hydrogen isotopes; **Inorganic compounds thereof prepared by isotope exchange, e.g.** $NH_3 + D_2 \rightarrow NH_2D + HD$ **[2]**

5/00 Water
5/02 . Heavy water; Preparation by chemical reaction of hydrogen isotopes or their compounds, e.g. $4ND_3+7O_2 \rightarrow 4NO_2+6D_2O$, $2D_2+O_2 \rightarrow 2D_2O$

6/00 Hydrides of metals; **Monoborane or diborane**; **Addition complexes thereof [2]**
6/02 . Hydrides of transition elements; Addition complexes thereof
6/04 . Hydrides of alkali metals, alkaline earth metals, beryllium or magnesium; Addition complexes thereof
6/06 . Hydrides of aluminium, gallium, indium, thallium, germanium, tin, lead, arsenic, antimony, bismuth or polonium; Monoborane; Diborane; Addition complexes thereof
6/10 . . Monoborane; Diborane; Addition complexes thereof **[2]**
6/11 . . . Preparation from boron or inorganic compounds containing boron and oxygen **[2]**
6/13 . . . Addition complexes of monoborane or diborane, e.g. with phosphine, arsine or hydrazine **[2]**
6/15 . . . . Metal borohydrides; Addition complexes thereof **[2]**
6/17 . . . . . Preparation from boron or inorganic compounds containing boron and oxygen **[2]**
6/19 . . . . . Preparation from other compounds of boron **[2]**
6/21 . . . . . Preparation of borohydrides of alkali metals, alkaline earth metals, magnesium or beryllium; Addition complexes thereof, e.g. $LiBH_4.2N_2H_4$, NaB_2H_7 **[2]**
6/23 . . . . . Preparation of borohydrides of other metals, e.g. aluminium borohydride; Addition complexes thereof, e.g. $Li[Al(BH_4)_3H]$ **[2]**
6/24 . Hydrides containing at least two metals, e.g. $Li(AlH_4)$; Addition complexes thereof (C01B 6/13 to C01B 6/23 take precedence) **[2]**
6/26 . . Preparation from the metal with the highest valency or from its oxides or salts of its oxyacids
6/34 . Purification; Stabilisation

Halogens; **Compounds thereof**

7/00 Halogens; **Halogen acids**
7/01 . Chlorine; Hydrogen chloride **[2]**
7/03 . . Preparation from chlorides **[2,3]**
7/04 . . . Preparation of chlorine from hydrogen chloride **[3]**
7/05 . . . Preparation from ammonium chloride **[2,3]**
7/07 . . Purification **[2,3]**
7/075 . . . of liquid chlorine **[2,3]**
7/09 . Bromine; Hydrogen bromide **[2]**
7/13 . Iodine; Hydrogen iodide **[2]**
7/14 . . Iodine **[2]**
7/16 . . . Preparation from seaweed **[2]**
7/19 . Fluorine; Hydrogen fluoride **[2]**
7/20 . . Fluorine **[2]**
7/24 . Inter-halogen compounds

9/00 General methods of preparing halides (particular individual halides, see the relevant groups in subclasses C01B to C01G according to the element combined with the halogen; electrolytic production of inorganic compounds C25B)
9/02 . Chlorides
9/04 . Bromides
9/06 . Iodides
9/08 . Fluorides

11/00 Oxides or oxyacids of halogens; **Salts thereof**
11/02 . Oxides of chlorine
11/04 . Hypochlorous acid
11/06 . . Hypochlorites, e.g. chlorinated lime
11/08 . Chlorous acid
11/10 . . Chlorites
11/12 . Chloric acid
11/14 . . Chlorates
11/16 . Perchloric acid
11/18 . . Perchlorates
11/20 . Oxygen compounds of bromine
11/22 . Oxygen compounds of iodine
11/24 . Oxygen compounds of fluorine

Oxygen; **Oxides or hydroxides in general**; **Per-compounds**

13/00 Oxygen; **Ozone**; **Oxides or hydroxides in general**
13/02 . Preparation of oxygen (by liquefying F25J)
13/08 . . from air with the aid of metal oxides, e.g. barium oxide, manganese oxide
13/10 . Preparation of ozone
13/11 . . by electric discharge **[2]**
13/14 . Methods for preparing oxides or hydroxides in general (particular individual oxides or hydroxides, see the relevant groups of subclasses C01B to C01G or C25B, according to the element combined with the oxygen or hydroxy group)
13/16 . . Purification **[3]**
13/18 . . by thermal decomposition of compounds, e.g. of salts or hydroxides **[3]**
13/20 . . by oxidation of elements in the gaseous state; by oxidation or hydrolysis of compounds in the gaseous state **[3]**
13/22 . . . of halides or oxyhalides **[3]**
13/24 . . . . in the presence of hot combustion gases **[3]**
13/26 . . . . in the presence of a fluidised bed **[3]**
13/28 . . . . using a plasma or an electric discharge **[3]**

13/30 . . . . Removal and cooling of the oxide containing suspension **[3]**
13/32 . . by oxidation or hydrolysis of elements or compounds in the liquid or solid state **[3]**
13/34 . . by oxidation or hydrolysis of sprayed or atomised solutions **[3]**
13/36 . . by precipitation reactions in solutions **[3]**

15/00 Peroxides; **Peroxyhydrates**; **Peroxyacids or salts thereof**; **Superoxides**; **Ozonides**
15/01 . Hydrogen peroxide **[3]**
15/013 . . Separation; Purification; Concentration **[3]**
15/017 . . . Anhydrous hydrogen peroxide; Anhydrous solutions or gaseous mixtures containing hydrogen peroxide **[3]**
15/022 . . Preparation from organic compounds **[2]**
15/023 . . . by the alkyl-anthraquinone process **[3]**
15/024 . . . from hydrocarbons **[3]**
15/026 . . . from alcohols **[3]**
15/027 . . Preparation from water **[3]**
15/029 . . Preparation from hydrogen and oxygen **[3]**
15/03 . . Preparation from inorganic peroxy-compounds, e.g. from peroxysulfates **[3]**
15/032 . . . from metal peroxides **[3]**
15/037 . . Stabilisation by additives **[3]**
15/04 . Metal peroxides or peroxyhydrates thereof; Superoxides; Ozonides **[3]**
15/043 . . of alkali metals, alkaline earth metals or of magnesium **[2,3]**
15/047 . . of heavy metals **[2,3]**
15/055 . Peroxyhydrates (C01B 15/04 takes precedence); Peroxyacids or salts thereof **[3]**
15/06 . . containing sulfur **[3]**
15/08 . . . Peroxysulfates **[3]**
15/10 . . containing carbon **[3]**
15/12 . . containing boron **[3]**
15/14 . . containing silicon **[3]**
15/16 . . containing phosphorus **[3]**

17/00 Sulfur; **Compounds thereof**
17/02 . Preparation of sulfur; Purification
17/027 . . Recovery of sulfur from material containing elemental sulfur, e.g. luxmasses; Purification **[3]**
17/033 . . . using a liquid extractant **[3]**
17/04 . . from gaseous sulfur compounds including gaseous sulfides
17/05 . . . by wet processes **[3]**
17/06 . . from non-gaseous sulfides or materials containing such sulfides, e.g. ores
17/10 . . Finely-divided sulfur, e.g. sublimed sulfur, flowers of sulfur
17/12 . . Insoluble sulfur (mu-sulfur)
17/16 . Hydrogen sulfides
17/18 . . Hydrogen polysulfides
17/20 . Methods for preparing sulfides or polysulfides, in general (ammonium sulfides or polysulfides C01C; sulfides or polysulfides of metals, other than alkali metals, magnesium, calcium, strontium, and barium, see the relevant groups of subclasses C01F or C01G, according to the metal)
17/22 . Alkali metal sulfides or polysulfides
17/24 . . Preparation by reduction
17/26 . . . with carbon
17/28 . . . with reducing gases
17/30 . . Preparation from sodium or potassium amalgam with sulfur or sulfides
17/32 . . Hydrosulfides of sodium or potassium
17/34 . . Polysulfides of sodium or potassium
17/36 . . Purification
17/38 . . Dehydration
17/40 . . Making shaped products, e.g. granules
17/42 . Sulfides or polysulfides of magnesium, calcium, strontium, or barium
17/43 . . from oxides or hydroxides with sulfur or hydrogen sulfide
17/44 . . by reduction of sulfates
17/45 . Compounds containing sulfur and halogen, with or without oxygen
17/46 . Compounds containing sulfur, halogen, hydrogen, and oxygen
17/48 . Sulfur dioxide; Sulfurous acid
17/50 . . Preparation of sulfur dioxide
17/52 . . . by roasting sulfides (C22B 1/00 takes precedence)
17/54 . . . by burning elemental sulfur
17/56 . . . Separation; Purification
17/58 . . . Recovery of sulfur dioxide from acid tar or the like
17/60 . . . Isolation of sulfur dioxide from gases
17/62 . Methods of preparing sulfites in general (particular individual sulfites, see the relevant groups of subclasses C01B to C01G, according to the cation)
17/64 . Thiosulfates; Dithionites; Polythionates
17/66 . . Dithionites
17/69 . Sulfur trioxide; Sulfuric acid **[3]**
17/70 . . Stabilisation of gamma-form sulfur trioxide
17/74 . . Preparation **[3]**
17/76 . . . by contact processes
17/765 . . . . Multi-stage SO_3-conversion **[3]**
17/77 . . . . Fluidised-bed processes **[3]**
17/775 . . . . Liquid phase contacting processes or wet catalysis processes **[3]**
17/78 . . . . characterised by the catalyst used
17/79 . . . . . containing vanadium **[3]**
17/80 . . . . Apparatus
17/82 . . . of sulfuric acid using a nitrogen oxide process
17/84 . . . . Chamber process
17/86 . . . . Tower process
17/88 . . Concentration of sulfuric acid
17/90 . . Separation; Purification
17/92 . . . Recovery from acid tar or the like
17/94 . . . Recovery from nitration acids
17/96 . Methods for the preparation of sulfates in general (particular individual sulfates, see the relevant groups of subclasses C01B to C01G, according to the cation)
17/98 . Other compounds containing sulfur and oxygen (persulfuric acids C01B 15/06; persulfates C01B 15/08)

19/00 Selenium; **Tellurium**; **Compounds thereof**
19/02 . Elemental selenium or tellurium **[3]**
19/04 . Binary compounds **[3]**

21/00 Nitrogen; **Compounds thereof**
21/02 . Preparation of nitrogen (by decomposition of ammonia C01B 3/04)
21/04 . Purification or separation of nitrogen (by liquefying F25J)

21/06 . Binary compounds of nitrogen with metals, with silicon, or with boron
21/064 . . with boron **[3]**
21/068 . . with silicon **[3]**
21/072 . . with aluminium **[3]**
21/076 . . with titanium or zirconium **[3]**
21/08 . Hydrazoic acid; Azides; Halogen azides
21/082 . Compounds containing nitrogen and non-metals (C01B 21/06, C01B 21/08 take precedence) **[3]**
21/083 . . containing one or more halogen atoms **[3]**
21/084 . . . containing also one or more oxygen atoms, e.g. nitrosyl halides **[3]**
21/086 . . containing one or more sulfur atoms **[3]**
21/087 . . containing one or more hydrogen atoms **[3]**
21/088 . . . containing also one or more halogen atoms **[3]**
21/09 . . . . Halogeno-amines, e.g. chloramine **[3]**
21/092 . . . containing also one or more metal atoms **[3]**
21/093 . . . containing also one or more sulfur atoms **[3]**
21/094 . . . . Nitrosyl containing acids **[3]**
21/096 . . . . Amidosulfonic acid; Salts thereof **[3]**
21/097 . . containing phosphorus atoms **[3]**
21/098 . . . Phosphonitrilic dihalides; Polymers thereof **[3]**
21/12 . . Carbamic acid; Salts thereof
21/14 . . Hydroxylamine; Salts thereof
21/16 . . Hydrazine; Salts thereof
21/20 . Nitrogen oxides; Oxyacids of nitrogen; Salts thereof
21/22 . . Nitrous oxide (N_2O)
21/24 . . Nitric oxide (NO)
21/26 . . . Preparation by catalytic oxidation of ammonia
21/28 . . . . Apparatus
21/30 . . . Preparation by oxidation of nitrogen
21/32 . . . . Apparatus
21/34 . . Nitrogen trioxide (N_2O_3)
21/36 . . Nitrogen dioxide (NO_2, N_2O_4) (C01B 21/26, C01B 21/30 take precedence)
21/38 . . Nitric acid
21/40 . . . Preparation by absorption of oxides of nitrogen
21/42 . . . Preparation from nitrates
21/44 . . . Concentration
21/46 . . . Purification; Separation
21/48 . . Methods for the preparation of nitrates in general (particular individual nitrates, see the relevant groups of subclasses C01B to C01G, according to the cation)
21/50 . . Nitrous acid; Salts thereof

23/00 **Noble gases**; **Compounds thereof** (liquefying F25J)

25/00 **Phosphorus**; **Compounds thereof** (C01B 21/00, C01B 23/00 take precedence; perphosphates C01B 15/16) **[3]**
25/01 . Treating phosphate ores or other raw phosphate materials to obtain phosphorus or phosphorus compounds **[2]**
25/02 . Preparation of phosphorus
25/023 . . of red phosphorus **[2]**
25/027 . . of yellow phosphorus **[2]**
25/04 . Purification of phosphorus
25/043 . . of red phosphorus **[2]**
25/047 . . of yellow phosphorus **[2]**
25/06 . Hydrogen phosphides
25/08 . Other phosphides
25/10 . Halides or oxyhalides of phosphorus **[2]**
25/12 . Oxides of phosphorus
25/14 . Sulfur, selenium, or tellurium compounds of phosphorus
25/16 . Oxyacids of phosphorus; Salts thereof (peroxyacids or salts thereof C01B 15/00)
25/163 . . Phosphorous acid; Salts thereof **[2]**
25/165 . . Hypophosphorous acid; Salts thereof **[2]**
25/168 . . Pyrophosphorous acid; Salts thereof **[2]**
25/18 . . Phosphoric acid
25/20 . . . Preparation from elemental phosphorus or phosphoric anhydride
25/22 . . . Preparation by reacting phosphate containing material with an acid, e.g. wet process
25/222 . . . . with sulfuric acid, a mixture of acids mainly consisting of sulfuric acid or a mixture of compounds forming it in situ, e.g. a mixture of sulfur dioxide, water and oxygen **[3]**
25/223 . . . . . only one form of calcium sulfate being formed **[3]**
25/225 . . . . . Dihydrate process **[3]**
25/226 . . . . . Hemihydrate process **[3]**
25/228 . . . . . one form of calcium sulfate being formed and then converted to another form **[3]**
25/229 . . . . . Hemihydrate-dihydrate process **[3]**
25/231 . . . . . Dihydrate-hemihydrate process **[3]**
25/232 . . . . . Preparation by reacting phosphate containing material with concentrated sulfuric acid and subsequently lixiviating the obtained mass, e.g. clincker process **[3]**
25/234 . . . Purification; Stabilisation; Concentration (purification concomitant with preparation C01B 25/22; preparation involving solvent-solvent extraction C01B 25/46) **[3]**
25/235 . . . . Clarification; Stabilisation to prevent post-precipitation of dissolved impurities **[3]**
25/237 . . . . Selective elimination of impurities **[3]**
25/238 . . . . . Cationic impurities **[3]**
25/24 . . Condensed phosphoric acids
25/26 . . Phosphates (perphosphates C01B 15/16)
25/28 . . . Ammonium phosphates
25/30 . . . Alkali metal phosphates
25/32 . . . Phosphates of magnesium, calcium, strontium, or barium
25/34 . . . . Magnesium phosphates
25/36 . . . Aluminium phosphates
25/37 . . . Phosphates of heavy metals **[2]**
25/38 . . . Condensed phosphates
25/39 . . . . of alkali metals **[3]**
25/40 . . . . Polyphosphates **[2]**
25/41 . . . . . of alkali metals **[3]**
25/42 . . . . Pyrophosphates **[2]**
25/44 . . . . Metaphosphates **[2]**
25/445 . . . . . of alkali metals **[3]**
25/45 . . . containing plural metal, or metal and ammonium **[3]**
25/455 . . . containing halogen **[3]**
25/46 . . Preparation involving solvent-solvent extraction **[2]**

31/00 **Carbon**; **Compounds thereof** (C01B 21/00, C01B 23/00 take precedence; percarbonates C01B 15/10; carbon black C09C 1/48) **[3]**
31/02 . Preparation of carbon (by using ultra-high pressure, e.g. for the formation of diamonds, B01J 3/06; by crystal growth C30B); Purification
31/04 . . Graphite

31/06 . . Diamond
31/08 . Active carbon
31/10 . . Preparation by using gaseous activating agents
31/12 . . Preparation by using non-gaseous activating agents
31/14 . . Granulation
31/16 . Preparation of ion-exchanging materials from carbonaceous material
31/18 . Carbon monoxide
31/20 . Carbon dioxide
31/22 . . Solidifying
31/24 . Methods for the preparation of carbonates or bicarbonates in general (percarbonates C01B 15/10; particular individual carbonates, see the relevant groups of subclasses C01B to C01G, according to the cation)
31/26 . Compounds containing carbon and sulfur, e.g. carbon disulfide, carbon oxysulfide; Thiophosgene
31/28 . Phosgene
31/30 . Carbides
31/32 . . Calcium carbide
31/34 . . Tungsten or molybdenum carbides
31/36 . . Carbides of silicon or boron

33/00 **Silicon**; **Compounds thereof** (C01B 21/00, C01B 23/00 take precedence; persilicates C01B 15/14; carbides C01B 31/36) **[3]**
33/02 . Silicon (forming single crystals or homogeneous polycrystalline material with defined structure C30B) **[5]**
33/021 . . Preparation (chemical coating from the vapour phase C23C 16/00) **[5]**
33/023 . . . by reduction of silica or silica-containing material **[5]**
33/025 . . . . with carbon or a solid carbonaceous material, i.e. carbo-thermal process **[5]**
33/027 . . . by decomposition or reduction of gaseous or vaporised silicon compounds other than silica or silica-containing material **[5]**
33/029 . . . . by decomposition of monosilane **[5]**
33/03 . . . . by decomposition of silicon halides or halosilanes or reduction thereof with hydrogen as the only reducing agent **[5]**
33/031 . . . . . by decomposition of silicon tetraiodide **[5]**
33/033 . . . . by reduction of silicon halides or halosilanes with a metal or a metallic alloy as the only reducing agents **[5]**
33/035 . . . . by decomposition or reduction of gaseous or vaporised silicon compounds in the presence of heated filaments of silicon, carbon or a refractory metal, e.g. tantalum or tungsten, or in the presence of heated silicon rods on which the formed silicon is deposited, a silicon rod being obtained, e.g. Siemens process **[5]**
33/037 . . Purification (by zone-melting C30B 13/00) **[5]**
33/039 . . . by conversion of the silicon into a compound, optional purification of the compound, and reconversion into silicon **[5]**
33/04 . Hydrides of silicon
33/06 . Metal silicides
33/08 . Compounds containing halogen
33/10 . . Compounds containing silicon, fluorine, and other elements
33/107 . . Halogenated silanes **[3]**
33/113 . Silicon oxides; Hydrates thereof **[3]**
33/12 . . Silica; Hydrates thereof, e.g. lepidoic silicic acid **[3]**
33/14 . . . Colloidal silica, e.g. dispersions, gels, sols **[3]**
33/141 . . . . Preparation of hydrosols or aqueous dispersions **[3]**
33/142 . . . . . by acidic treatment of silicates **[3]**
33/143 . . . . . of aqueous solutions of silicates **[3]**
33/145 . . . . Preparation of hydroorganosols, organosols or dispersions in an organic medium **[3]**
33/146 . . . . After-treatment of sols (preparation of hydroorganosols, organosols or dispersions in an organic medium from hydrosols C01B 33/145) **[3]**
33/148 . . . . . Concentration; Drying; Dehydration; Stabilisation; Purification **[3]**
33/149 . . . . . Coating **[3]**
33/151 . . . . . by progressively adding a sol to a different sol, i.e. “build up” of particles using a “heel” **[3]**
33/152 . . . . Preparation of hydrogels **[3]**
33/154 . . . . . by acidic treatment of aqueous silicate solutions **[3]**
33/155 . . . . Preparation of hydroorganogels or organogels **[3]**
33/157 . . . . After-treatment of gels **[3]**
33/158 . . . . . Purification; Drying; Dehydrating **[3]**
33/159 . . . . . Coating or hydrophobisation **[3]**
33/16 . . . Preparation of silica xerogels **[3]**
33/18 . . . Preparation of finely divided silica neither in sol nor in gel form; After-treatment thereof (treatment to enhance the pigmenting or filling properties C09C) **[3]**
33/187 . . . . by acidic treatment of silicates **[3]**
33/193 . . . . . of aqueous solutions of silicates **[3]**
33/20 . Silicates (persilicates C01B 15/14)
33/22 . . Magnesium silicates
33/24 . . Alkaline earth metal silicates
33/26 . . Aluminium-containing silicates **[5]**
33/32 . . Alkali metal silicates (C01B 33/26 takes precedence) **[3]**
33/36 . . having base-exchange properties but not having molecular sieve properties **[6]**
33/38 . . . Layered base-exchange silicates, e.g. clays, micas or alkali metal silicates of kenyaite or magadiite type **[6]**
33/40 . . . . Clays **[6]**
33/42 . . . . Micas **[6]**
33/44 . . . . Products obtained from layered base-exchange silicates by ion-exchange with organic compounds such as ammonium, phosphonium or sulfonium compounds or by intercalation of organic compounds, e.g. organoclay material **[6]**
33/46 . . . Amorphous silicates, e.g. so-called “amorphous zeolites” **[6]**

35/00 **Boron**; **Compounds thereof** (monoborane, diborane, metal borohydrides or addition complexes thereof C01B 6/00; perborates C01B 15/12; binary compounds with nitrogen C01B 21/06; phosphides C01B 25/08; carbides C01B 31/36) **[2]**
35/02 . Boron; Borides **[2]**
35/04 . . Metal borides **[2]**
35/06 . Boron halogen compounds **[2]**
35/08 . Compounds containing boron and nitrogen, phosphorus, oxygen, sulfur, selenium or tellurium **[2]**

35/10 . . Compounds containing boron and oxygen (C01B 35/06 takes precedence) **[2]**
35/12 . . . Borates **[2]**
35/14 . . Compounds containing boron and nitrogen, phosphorus, sulfur, selenium or tellurium **[2]**
35/16 . Compounds containing direct bonding between two boron atoms, e.g. Cl_2B-BCl_2 **[2]**
35/18 . Compounds containing three or more boron atoms, e.g. NaB_3H_8, $MgB_{10}Br_{10}$ (borazoles C01B 35/14) **[2]**

Compounds characterised primarily by their physical or chemical properties, rather than by their chemical constitution [6]

37/00 Compounds having molecular sieve properties but not having base-exchange properties [6]
37/02 . Crystalline silica-polymorphs, e.g. silicalites **[6]**
37/04 . Aluminophosphates (APO compounds) **[6]**
37/06 . Aluminophosphates containing other elements, e.g. metals, boron **[6]**
37/08 . . Silicoaluminophosphates (SAPO compounds) **[6]**

39/00 Compounds having molecular sieve and base-exchange properties, e.g. crystalline zeolites; **Their preparation**; **After-treatment, e.g. ion-exchange or dealumination** (treatment to modify the sorption properties, e.g. shaping using a binder, B01J 20/10; treatment to modify the catalytic properties, e.g. combination of treatments to make the zeolites appropriate to their use as a catalyst, B01J 29/04; treatment to improve the ion-exchange properties B01J 39/14) **[6]**

Note

In this group, the following term is used with the meaning indicated: **[6]**
– "zeolites" means: **[6]**
(i) crystalline aluminosilicates with base-exchange and molecular sieve properties, having three dimensional, microporous lattice framework structure of tetrahedral oxide units; **[6]**
(ii) compounds isomorphous to those of the former category, wherein the aluminium or silicon atoms in the framework are partly or wholly replaced by atoms of other elements, e.g. by gallium, germanium, phosphorus or boron. **[6]**

39/02 . Crystalline aluminosilicate zeolites; Isomorphous compounds thereof; Direct preparation thereof; Preparation thereof starting from a reaction mixture containing a crystalline zeolite of another type, or from preformed reactants: After-treatment thereof **[6]**
39/04 . . using at least one organic template directing agent, e.g. an ionic quaternary ammonium compound or an aminated compound **[6]**
39/06 . . Preparation of isomorphous zeolites characterised by measures to replace the aluminium or silicon atoms in the lattice framework by atoms of other elements **[6]**
39/08 . . . the aluminium atoms being wholly replaced **[6]**
39/10 . . . the replacing atoms being phosphorus atoms **[6]**
39/12 . . . the replacing atoms being boron atoms **[6]**
39/14 . . Type A **[6]**
39/16 . . . from aqueous solutions of an alkali metal aluminate and an alkali metal silicate excluding any other source of alumina or silica but seeds **[6]**
39/18 . . . from a reaction mixture containing at least one aluminium silicate or aluminosilicate of a clay type, e.g. kaolin or metakaolin or its exotherm modification or allophane **[6]**
39/20 . . Faujasite type, e.g. type X or Y **[6]**
39/22 . . . Type X **[6]**
39/24 . . . Type Y **[6]**
39/26 . . Mordenite type **[6]**
39/28 . . Phillipsite or harmotome type, e.g. type B **[6]**
39/30 . . Erionite or offretite type, e.g. zeolite T **[6]**
39/32 . . Type L **[6]**
39/34 . . Type ZSM-4 or type **[6]**
39/36 . . Pentasil type, e.g. types ZSM-5, ZSM-8 or ZSM-11 **[6]**
39/38 . . . Type ZSM-5 **[6]**
39/40 . . . . using at least one organic template directing agent **[6]**
39/42 . . Type ZSM-12 **[6]**
39/44 . . Ferrierite type, e.g. types ZSM-21, ZSM-35 or ZSM-38 **[6]**
39/46 . . Other types characterised by their X-ray diffraction pattern and their defined composition **[6]**
39/48 . . . using at least one organic template directing agent **[6]**
39/50 . Zeolites wherein inorganic bases or salts occlude channels in the lattice framework, e.g. sodalite, cancrinite, nosean, hauynite **[6]**
39/52 . . Sodalites **[6]**
39/54 . Phosphates, e.g. APO or SAPO compounds **[6]**

C01C **AMMONIA**; **CYANOGEN**; **COMPOUNDS THEREOF** (salts of oxyacids of halogens C01B 11/00; peroxides, salts of peroxyacids C01B 15/00; thiosulfates, dithionites, polythionates C01B 17/64; compounds containing selenium or tellurium C01B 19/00; azides C01B 21/08; metal amides C01B 21/092; nitrites C01B 21/50; phosphides C01B 25/08; salts of oxyacids of phosphorus C01B 25/16; compounds containing silicon C01B 33/00; compounds containing boron C01B 35/00; fermentation or enzyme-using processes for the preparation of elements or inorganic compounds except carbon dioxide C12P 3/00; production of non-metallic elements or inorganic compounds by electrolysis or electrophoresis C25B)

(1) Attention is drawn to Note (1) after class C01, which defines the last place priority rule applied in this class, i.e. in the range of subclasses C01B to C01G and within these subclasses. **[8]**

(2) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

1/00 **Ammonia**; **Compounds thereof**
1/02 . Preparation or separation of ammonia
1/04 . . Preparation of ammonia by synthesis (preparation or purification of gas mixtures for ammonia synthesis C01B 3/02)
1/08 . . Preparation of ammonia from nitrogenous organic substances
1/10 . . Separation of ammonia from ammonia liquors, e.g. gas liquors
1/12 . . Separation of ammonia from gases and vapours
1/14 . . . Saturators
1/16 . Halides of ammonium
1/18 . Nitrates of ammonium
1/20 . Sulfides; Polysulfides
1/22 . Sulfites of ammonium
1/24 . Sulfates of ammonium (C01C 1/14 takes precedence)
1/242 . . Preparation from ammonia and sulfuric acid or sulfur trioxide **[2]**
1/244 . . Preparation by double decomposition of ammonium salts with sulfates **[2]**
1/245 . . Preparation from compounds containing nitrogen and sulfur **[2]**
1/246 . . . from sulfur-containing ammonium compounds **[2]**
1/247 . . . . by oxidation with free oxygen **[2]**
1/248 . . Preventing coalescing or controlling form or size of crystals **[2]**
1/249 . . Deacidifying the crystals **[2]**
1/26 . Carbonates or bicarbonates of ammonium
1/28 . Methods of preparing ammonium salts in general

(1) This group does not cover ammonium salts of complex acids (other than complex cyanides) containing a metal in the anion, which are covered by the relevant groups of subclasses C01D to C01G, according to the metal.
(2) Salts of polybasic acids with ammonium and a metal as cations are classified as though the ammonium were hydrogen.
(3) Complex ammine salts are classified in the relevant groups of subclasses C01D to C01G, according to the metal.

3/00 **Cyanogen**; **Compounds thereof**
3/02 . Preparation of hydrogen cyanide
3/04 . . Separation from gases
3/06 . Stabilisation of hydrogen cyanide
3/08 . Simple or complex cyanides of metals
3/10 . . Simple alkali metal cyanides **[3]**
3/11 . . Complex cyanides **[3]**
3/12 . . Simple or complex iron cyanides **[2]**
3/14 . Cyanic acid; Salts thereof
3/16 . Cyanamide; Salts thereof
3/18 . . Calcium cyanamide
3/20 . Thiocyanic acid; Salts thereof

C01D **COMPOUNDS OF ALKALI METALS, I.E. LITHIUM, SODIUM, POTASSIUM, RUBIDIUM, CAESIUM, OR FRANCIUM** (metal hydrides C01B 6/00; salts of oxyacids of halogens C01B 11/00; peroxides, salts of peroxyacids C01B 15/00; sulfides or polysulfides C01B 17/22; thiosulfates, dithionites, polythionates C01B 17/64; compounds containing selenium or tellurium C01B 19/00; binary compounds of nitrogen with metals C01B 21/06; azides C01B 21/08; metal amides C01B 21/092; nitrites C01B 21/50; phosphides C01B 25/08; salts of oxyacids of phosphorus C01B 25/16; carbides C01B 31/30; compounds containing silicon C01B 33/00; compounds containing boron C01B 35/00; cyanides C01C 3/08; salts of cyanic acid C01C 3/14; salts of cyanamide C01C 3/16; thiocyanates C01C 3/20; fermentation or enzyme-using processes for the preparation of elements or inorganic compounds except carbon dioxide C12P 3/00; obtaining metal compounds from mixtures, e.g. ores, which are intermediate compounds in a metallurgical process for obtaining a free metal C22B; production of non-metallic elements or inorganic compounds by electrolysis or electrophoresis C25B)

(1) Attention is drawn to Note (1) after class C01, which defines the last place priority rule applied in this class, i.e. in the range of subclasses C01B to C01G and within these subclasses. **[8]**
(2) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

1/00 **Oxides or hydroxides of sodium, potassium, or alkali metals in general [2]**
1/02 . Oxides
1/04 . Hydroxides
1/20 . . Preparation by reacting oxides or hydroxides with alkali metal salts
1/22 . . . with carbonates or bicarbonates
1/24 . . . from or via fluorides or silico-fluorides
1/26 . . Preparation from or via cyano compounds, e.g. cyanides, cyanamides
1/28 . . Purification; Separation
1/30 . . . by crystallisation
1/32 . . . by adsorption or precipitation
1/34 . . . with selective solvents
1/36 . . . by oxidation
1/38 . . . by dialysis
1/40 . . . by electrolysis
1/42 . . Concentration; Dehydration
1/44 . . Preparation in the form of granules, pieces, or other shaped products

3/00 **Halides of sodium, potassium, or alkali metals in general [2]**
3/02 . Fluorides
3/04 . Chlorides

3/06 . . Preparation by working up brines, seawater or spent lyes
3/08 . . Preparation by working up natural or industrial salt mixtures or siliceous minerals
3/10 . Bromides
3/12 . Iodides
3/14 . Purification
3/16 . . by precipitation or adsorption
3/18 . . with selective solvents
3/20 . . by melting
3/22 . Preparation in the form of granules, pieces, or other shaped products
3/24 . . Influencing the crystallisation process
3/26 . Preventing the absorption of moisture or caking of the crystals

5/00 Sulfates or sulfites of sodium, potassium, or alkali metals in general [2]

5/02 . Preparation of sulfates from alkali metal salts and sulfuric acid or bisulfates; Preparation of bisulfates
5/04 . Preparation of sulfates with the aid of sulfurous acid or sulfites, e.g. Hargreaves process
5/06 . Preparation of sulfates by double decomposition
5/08 . . with each other or with ammonium sulfate
5/10 . . with sulfates of magnesium, calcium, strontium, or barium
5/12 . Preparation of double sulfates of magnesium with sodium or potassium **[2]**
5/14 . Preparation of sulfites (C01D 5/04 takes precedence)
5/16 . Purification
5/18 . Dehydration

7/00 Carbonates of sodium, potassium, or alkali metals in general [2]

7/02 . Preparation by double decomposition
7/04 . . with a fluoride or silico-fluoride (C01D 1/24 takes precedence)
7/06 . Preparation via sodium or potassium magnesium carbonate
7/07 . Preparation from the hydroxides **[2]**
7/08 . Preparation from or via cyano compounds of sodium or potassium (C01D 1/26 takes precedence)
7/10 . Preparation of bicarbonates from carbonates (ammonia-soda process C01D 7/18)
7/12 . Preparation of carbonates from bicarbonates
7/14 . Preparation of sesquicarbonates
7/16 . Preparation from compounds of sodium or potassium with amines and carbon dioxide
7/18 . Preparation by the ammonia-soda process
7/22 . Purification
7/24 . . Crystallisation
7/26 . . by precipitation or adsorption
7/28 . . with selective solvents
7/30 . . by oxidation
7/32 . . by dialysis
7/34 . . by electrolysis
7/35 . Varying the content of water of crystallisation or the specific gravity **[2]**
7/37 . . Densifying sodium carbonate **[2]**
7/38 . Preparation in the form of granules, pieces, or other shaped products
7/40 . . Influencing the crystallisation process
7/42 . Preventing the absorption of moisture or caking

9/00 Nitrates of sodium, potassium, or alkali metals in general [2]

9/02 . Preparation by working-up natural salt mixtures
9/04 . Preparation with liquid nitric acid
9/06 . Preparation with gaseous nitric acid or nitrogen oxides
9/08 . Preparation by double decomposition
9/10 . . with ammonium nitrate
9/12 . . with nitrates of magnesium, calcium, strontium, or barium
9/14 . . of salts of potassium with sodium nitrate
9/16 . Purification
9/18 . Preparation in the form of shaped products, e.g. granules
9/20 . Preventing the absorption of moisture or caking

13/00 Compounds of sodium or potassium not provided for elsewhere [2]

15/00 Lithium compounds [2]

15/02 . Oxides; Hydroxides **[2]**
15/04 . Halides **[2]**
15/06 . Sulfates; Sulfites **[2]**
15/08 . Carbonates; Bicarbonates **[2]**
15/10 . Nitrates **[2]**

17/00 Rubidium, caesium, or francium compounds [2]

C01F COMPOUNDS OF THE METALS BERYLLIUM, MAGNESIUM, ALUMINIUM, CALCIUM, STRONTIUM, BARIUM, RADIUM, THORIUM, OR OF THE RARE-EARTH METALS (metal hydrides C01B 6/00; salts of oxyacids of halogens C01B 11/00; peroxides, salts of peroxyacids C01B 15/00; sulfides or polysulfides of magnesium, calcium, strontium, or barium C01B 17/42; thiosulfates, dithionites, polythionates C01B 17/64; compounds containing selenium or tellurium C01B 19/00; binary compounds of nitrogen with metals C01B 21/06; azides C01B 21/08; metal amides C01B 21/092; nitrites C01B 21/50; phosphides C01B 25/08; salts of oxyacids of phosphorus C01B 25/16; carbides C01B 31/30; compounds containing silicon C01B 33/00; compounds containing boron C01B 35/00; compounds having molecular sieve properties but not having base-exchange properties C01B 37/00; compounds having molecular sieve and base-exchange properties, e.g. crystalline zeolites, C01B 39/00; cyanides C01C 3/08; salts of cyanic acid C01C 3/14; salts of cyanamide C01C 3/16; thiocyanates C01C 3/20; fermentation or enzyme-using processes for the preparation of elements or inorganic compounds except carbon dioxide C12P 3/00; obtaining metal compounds from mixtures, e.g. ores, which are intermediate compounds in a metallurgical process for obtaining a free metal C22B; production of non-metallic elements or inorganic compounds by electrolysis or electrophoresis C25B)

(1) Attention is drawn to Note (1) after class C01, which defines the last place priority rule applied in this class, i.e. in the range of subclasses C01B to C01G and within these subclasses. **[8]**

(2) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

1/00 Methods of preparing compounds of the metals beryllium, magnesium, aluminium, calcium, strontium, barium, radium, thorium, or the rare earths, in general

3/00 Compounds of beryllium

3/02 . Oxides; Hydroxides **[3]**

5/00 Compounds of magnesium

5/02 . Magnesia

5/04 . . by oxidation of metallic magnesium

5/06 . . by thermal decomposition of magnesium compounds (calcining magnesite or dolomite C04B 2/10)

5/08 . . . by calcining magnesium hydroxide

5/10 . . . by thermal decomposition of magnesium chloride with water vapour

5/12 . . . by thermal decomposition of magnesium sulfate, with or without reduction

5/14 . Magnesium hydroxide

5/16 . . by treating magnesia, e.g. calcined dolomite, with water or solutions of salts not containing magnesium

5/20 . . by precipitation from solutions of magnesium salts with ammonia

5/22 . . from magnesium compounds with alkali hydroxides or alkaline earth oxides or hydroxides

5/24 . Magnesium carbonates

5/26 . Magnesium halides

5/28 . . Fluorides

5/30 . . Chlorides

5/32 . . . Preparation of anhydrous magnesium chloride by chlorinating magnesium compounds

5/34 . . . Dehydrating magnesium chloride containing water of crystallisation

5/36 . . Bromides

5/38 . Magnesium nitrates

5/40 . Magnesium sulfates (double sulfates of magnesium with sodium or potassium C01D 5/12, with other alkali metals C01D 15/06, C01D 17/00) **[3]**

5/42 . Magnesium sulfites

7/00 Compounds of aluminium

7/02 . Aluminium oxide; Aluminium hydroxide; Aluminates

7/04 . . Preparation of alkali metal aluminates; Aluminium oxide or hydroxide therefrom

7/06 . . . by treating aluminous minerals with alkali hydroxide

7/08 . . . by treating aluminous minerals with sodium carbonate

7/10 . . . by treating aluminous minerals with alkali sulfates and reducing agents

7/12 . . . Alkali metal aluminates from alkaline earth metal aluminates

7/14 . . . Aluminium oxide or hydroxide from alkali metal aluminates

7/16 . . Preparation of alkaline earth metal aluminates; Aluminium oxide or hydroxide therefrom

7/18 . . . Aluminium oxide or hydroxide from alkaline earth metal aluminates

7/20 . . Preparation of aluminium oxide or hydroxide from aluminous ores with acids or salts

7/22 . . . with halides

7/24 . . . with nitric acid or nitrogen oxides

7/26 . . . with sulfuric acids or sulfates

7/28 . . . with sulfurous acid

7/30 . . Preparation of aluminium oxide or hydroxide by thermal decomposition of aluminium compounds

7/32 . . . of sulfates

7/34 . . Preparation of aluminium hydroxide by precipitation from solutions containing aluminium salts

7/36 . . . from organic aluminium salts

7/38 . . Preparation of aluminium oxide by thermal reduction of aluminous minerals

7/40 . . . in the presence of aluminium sulfide

7/42 . . Preparation of aluminium oxide or hydroxide from metallic aluminium, e.g. by oxidation

7/44 . . Dehydration of aluminium hydroxide

7/46 . . Purification of aluminium oxide, aluminium hydroxide or aluminates **[5]**

7/47 . . . of aluminates **[5]**

7/48 . Aluminium halides

7/50 . . Fluorides

7/52 . . . Double compounds containing both fluorine and other acid groups

7/54 . . . Double compounds containing both aluminium and alkali metals or alkaline earth metals

7/56 . . Chlorides (containing fluorine C01F 7/52) **[3]**

7/58 . . . Preparation of anhydrous aluminium chloride

7/60 . . . . from oxygen-containing aluminium compounds

7/62 . . . Purification

7/64 . . Bromides (containing fluorine C01F 7/52) **[3]**

7/66 . Aluminium nitrates (containing fluorine C01F 7/52) **[3]**

7/68 . Aluminium compounds containing sulfur (containing fluorine C01F 7/52) **[3]**

7/70 . . Sulfides

7/72 . . Sulfites

7/74 . . Sulfates

7/76 . . . Double salts, e.g. alums

11/00 Compounds of calcium, strontium, or barium (C01F 7/00 takes precedence) **[3]**

11/02 . Oxides or hydroxides (production of lime C04B 2/00)

11/04 . . by thermal decomposition

11/06 . . . of carbonates

11/08 . . by reduction of sulfates

11/10 . . from sulfides

11/12 . . from silicates

11/16 . . Purification

11/18 . Carbonates

11/20 . Halides

11/22 . . Fluorides

11/24 . . Chlorides

11/26 . . . from sulfides

11/28 . . . by chlorination of alkaline earth metal compounds

11/30 . . . Concentrating; Dehydrating; Preventing the absorption of moisture or caking

11/32 . . . Purification

11/34 . . Bromides

11/36 . Nitrates

11/38 . . Preparation with nitric acid or nitrogen oxides

11/40 . . Preparation by double decomposition with nitrates

11/42 . . Double salts (with magnesium C01F 5/38)
11/44 . . Concentrating; Crystallising; Dehydrating; Preventing the absorption of moisture or caking
11/46 . Sulfates (dehydration of gypsum C04B 11/02)
11/48 . Sulfites

13/00 Compounds of radium

15/00 Compounds of thorium

17/00 Compounds of the rare-earth metals, i.e. scandium, yttrium, lanthanum, or the group of the lanthanides

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C01G COMPOUNDS CONTAINING METALS NOT COVERED BY SUBCLASSES C01D OR C01F (metal hydrides C01B 6/00; salts of oxyacids of halogens C01B 11/00; peroxides, salts of peroxyacids C01B 15/00; thiosulfates, dithionites, polythionates C01B 17/64; compounds containing selenium or tellurium C01B 19/00; binary compounds of nitrogen with metals C01B 21/06; azides C01B 21/08; metal amides C01B 21/092; nitrites C01B 21/50; phosphides C01B 25/08; salts of oxyacids of phosphorus C01B 25/16; carbides C01B 31/30; compounds containing silicon C01B 33/00; compounds containing boron C01B 35/00; compounds having molecular sieve properties but not having base-exchange properties C01B 37/00; compounds having molecular sieve and base-exchange properties, e.g. crystalline zeolites, C01B 39/00; cyanides C01C 3/08; salts of cyanic acid C01C 3/14; salts of cyanamide C01C 3/16; thiocyanates C01C 3/20; fermentation or enzyme-using processes for the preparation of elements or inorganic compounds except carbon dioxide C12P 3/00; obtaining metal compounds from mixtures, e.g. ores, which are intermediate compounds in a metallurgical process for obtaining a free metal C21B, C22B; production of non-metallic elements or inorganic compounds by electrolysis or electrophoresis C25B)

(1) Attention is drawn to Note (1) after class C01, which defines the last place priority rule applied in this class, i.e. in the range of subclasses C01B to C01G and within these subclasses. **[8]**
(2) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

Subclass index

1/00 Methods of preparing compounds of metals not covered by subclasses C01B, C01C, C01D, C01F, in general (electrolytic production of inorganic compounds C25B 1/00) **[2]**
1/02 . Oxides
1/04 . Carbonyls
1/06 . Halides
1/08 . Nitrates
1/10 . Sulfates
1/12 . Sulfides
1/14 . Sulfites

3/00 Compounds of copper
3/02 . Oxides; Hydroxides
3/04 . Halides
3/05 . . Chlorides **[3]**
3/06 . . Oxychlorides
3/08 . Nitrates
3/10 . Sulfates
3/12 . Sulfides
3/14 . Complexes with ammonia

5/00 Compounds of silver
5/02 . Halides **[3]**

7/00 Compounds of gold

9/00 Compounds of zinc
9/02 . Oxides; Hydroxides **[3]**
9/03 . . Processes of production using dry methods, e.g. vapour phase processes **[3]**
9/04 . Halides
9/06 . Sulfates
9/08 . Sulfides

11/00 Compounds of cadmium
11/02 . Sulfides **[3]**

13/00 Compounds of mercury
13/02 . Oxides
13/04 . Halides

15/00 Compounds of gallium, indium, or thallium

17/00 Compounds of germanium
17/02 . Germanium dioxide
17/04 . Halides of germanium

19/00 Compounds of tin
19/02 . Oxides
19/04 . Halides
19/06 . . Stannous chloride
19/08 . . Stannic chloride

21/00 Compounds of lead
21/02 . Oxides
21/04 . . Lead suboxide (Pb_2O)
21/06 . . Lead monoxide (PbO)
21/08 . . Lead dioxide (PbO_2)
21/10 . . Red lead (Pb_3O_4)
21/12 . Hydroxides
21/14 . Carbonates
21/16 . Halides
21/18 . Nitrates
21/20 . Sulfates
21/21 . Sulfides **[3]**
21/22 . Plumbates; Plumbites

23/00 Compounds of titanium
23/02 . Halides of titanium
23/04 . Oxides; Hydroxides **[3]**
23/047 . . Titanium dioxide **[3]**
23/053 . . . Producing by wet processes, e.g. hydrolysing titanium salts **[3]**
23/07 . . . Producing by vapour phase processes, e.g. halide oxidation **[3]**
23/08 . . . Drying; Calcining **[3]**

25/00 Compounds of zirconium
25/02 . Oxides
25/04 . Halides
25/06 . Sulfates

27/00 Compounds of hafnium
27/02 . Oxides
27/04 . Halides
27/06 . Sulfates

28/00 Compounds of arsenic [3]
28/02 . Arsenates; Arsenites **[3]**

29/00 Compounds of bismuth

30/00 Compounds of antimony [3]
30/02 . Antimonates; Antimonites **[3]**

31/00 Compounds of vanadium
31/02 . Oxides **[3]**
31/04 . Halides **[3]**

33/00 Compounds of niobium

35/00 Compounds of tantalum
35/02 . Halides **[3]**

37/00 Compounds of chromium
37/02 . Oxides or hydrates thereof
37/027 . . Chromium dioxide **[3]**
37/033 . . Chromium trioxide; Chromic acid **[3]**
37/04 . Chromium halides
37/06 . . Chromylhalides
37/08 . Chromium sulfates
37/10 . . Chrome alum
37/14 . Chromates; Bichromates

39/00 Compounds of molybdenum
39/02 . Oxides; Hydroxides **[3]**
39/04 . Halides **[3]**
39/06 . Sulfides **[3]**

41/00 Compounds of tungsten
41/02 . Oxides; Hydroxides **[3]**
41/04 . Halides **[3]**

43/00 Compounds of uranium
43/01 . Oxides; Hydroxides **[3]**
43/025 . . Uranium dioxide **[3]**
43/04 . Halides of uranium
43/06 . . Fluorides
43/08 . . Chlorides
43/10 . . Bromides
43/12 . . Iodides

45/00 Compounds of manganese
45/02 . Oxides; Hydroxides
45/04 . Carbonyls
45/06 . Halides
45/08 . Nitrates
45/10 . Sulfates
45/12 . Manganates; Permanganates

47/00 Compounds of rhenium

49/00 Compounds of iron
49/02 . Oxides; Hydroxides
49/04 . . Ferrous oxide (FeO)
49/06 . . Ferric oxide (Fe_2O_3)
49/08 . . Ferroso-ferric oxide (Fe_3O_4)
49/10 . Halides
49/12 . Sulfides
49/14 . Sulfates
49/16 . Carbonyls

51/00 Compounds of cobalt
51/02 . Carbonyls
51/04 . Oxides; Hydroxides
51/06 . Carbonates
51/08 . Halides
51/10 . Sulfates
51/12 . Complexes with ammonia

53/00 Compounds of nickel

53/02 . Carbonyls

53/04 . Oxides; Hydroxides

53/06 . Carbonates

53/08 . Halides

53/09 . . Chlorides **[3]**

53/10 . Sulfates

53/11 . Sulfides **[3]**

53/12 . Complexes with ammonia

55/00 Compounds of ruthenium, rhodium, palladium, osmium, iridium, or platinum

56/00 Compounds of transuranic elements

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

C02 TREATMENT OF WATER, WASTE WATER, SEWAGE, OR SLUDGE

C02F **TREATMENT OF WATER, WASTE WATER, SEWAGE, OR SLUDGE** (processes for making harmful chemical substances harmless, or less harmful, by effecting a chemical change in the substances A62D 3/00; separation, settling tanks or filter devices B01D; special arrangements on waterborne vessels of installations for treating water, waste water or sewage, e.g. for producing fresh water, B63J; adding materials to water to prevent corrosion C23F; treating radioactively-contaminated liquids G21F 9/04) **[3]**

(1) Processes using enzymes or micro-organisms classified in this subclass are not further classified in subclass C12S. **[5]**
(2) When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**
(3) In this subclass, it is desirable to add the indexing codes of groups C02F 101/00 or C02F 103/00. **[7]**

Subclass index

1/00 **Treatment of water, waste water, or sewage** (C02F 3/00 to C02F 9/00 take precedence) **[3]**

1/02 . by heating **[3]**
1/04 . . by distillation or evaporation **[3]**
1/06 . . . Flash evaporation **[3]**
1/08 . . . Thin film evaporation **[3]**
1/10 . . . by direct contact with a particulate solid or with a fluid, as a heat transfer medium **[3]**
1/12 . . . . Spray evaporation **[3]**
1/14 . . . using solar energy **[3]**
1/16 . . . using waste heat from other processes **[3]**
1/18 . . . Transportable devices to obtain potable water **[3]**
1/20 . by degassing, i.e. liberation of dissolved gases **[3]**
1/22 . by freezing **[3]**
1/24 . by flotation (C02F 1/465 takes precedence) **[3,5]**
1/26 . by extraction **[3]**
1/28 . by sorption (using ion-exchange C02F 1/42; sorbent compositions B01J) **[3]**
1/30 . by irradiation **[3]**
1/32 . . with ultra-violet light **[3]**
1/34 . with mechanical oscillations **[3]**
1/36 . . ultrasonic vibrations **[3]**
1/38 . by centrifugal separation **[3]**
1/40 . Devices for separating or removing fatty or oily substances or similar floating material (cleaning or keeping clear the surface of open water from oil or like materials E02B 15/04; devices in sewers for separating liquid or solid substances from sewage E03F 5/14) **[3,5]**
1/42 . by ion-exchange **[3]**
1/44 . by dialysis, osmosis or reverse osmosis **[3]**
1/46 . by electrochemical methods **[3,5]**
1/461 . . by electrolysis **[5]**
1/463 . . . by electrocoagulation **[5]**
1/465 . . . by electroflotation **[5]**
1/467 . . . by electrochemical disinfection **[5]**
1/469 . . by electrochemical separation, e.g. by electro-osmosis, electrodialysis, electrophoresis **[5]**
1/48 . with magnetic or electric fields (C02F 1/46 takes precedence) **[3]**
1/50 . by addition or application of a germicide or by oligodynamic treatment (C02F 1/467 takes precedence) **[3,5]**
1/52 . by flocculation or precipitation of suspended impurities **[3]**
1/54 . . using organic material **[3]**
1/56 . . . Macromolecular compounds **[3]**
1/58 . by removing specified dissolved compounds (using ion-exchange C02F 1/42; softening water C02F 5/00) **[3]**
1/60 . . Silicon compounds **[3]**
1/62 . . Heavy metal compounds **[3]**
1/64 . . . of iron or manganese **[3]**
1/66 . by neutralisation; pH adjustment (for degassing C02F 1/20; using ion-exchange C02F 1/42; for flocculation or precipitation of suspended impurities C02F 1/52; for removing dissolved compounds C02F 1/58) **[3]**
1/68 . by addition of specified substances, e.g. trace elements, for ameliorating potable water **[3]**
1/70 . by reduction **[3]**
1/72 . by oxidation **[3]**
1/74 . . with air (aeration of stretches of water C02F 7/00) **[3]**
1/76 . . with halogens or compounds of halogens **[3]**
1/78 . . with ozone **[3]**

3/00 **Biological treatment of water, waste water, or sewage [3]**

3/02 . Aerobic processes **[3]**
3/04 . . using trickle filters **[3]**
3/06 . . using submerged filters **[3]**
3/08 . . using moving contact bodies **[3]**
3/10 . . Packings; Fillings; Grids **[3]**
3/12 . . Activated sludge processes **[3]**
3/14 . . . using surface aeration **[3]**
3/16 . . . . the aerator having a vertical axis **[3]**
3/18 . . . . the aerator having a horizontal axis **[3]**
3/20 . . . using diffusers **[3]**
3/22 . . . using circulation pipes **[3]**
3/24 . . . using free-fall aeration or spraying **[3]**
3/26 . . . using pure oxygen or oxygen-rich gas **[3]**
3/28 . Anaerobic digestion processes **[3]**

3/30 . Aerobic and anaerobic processes **[3]**
3/32 . characterised by the animals or plants used, e.g. algae **[3]**
3/34 . characterised by the micro-organisms used **[3]**

5/00 **Softening water**; **Preventing scale**; **Adding scale preventatives or scale removers to water, e.g. adding sequestering agents** (softening using ion-exchange C02F 1/42) **[3]**
5/02 . Softening water by precipitation of the hardness **[3]**
5/04 . . using phosphates (C02F 5/06 takes precedence) **[3]**
5/06 . . using calcium compounds **[3]**
5/08 . Treatment of water with complexing chemicals or other solubilising agents for softening, scale prevention or scale removal, e.g. adding sequestering agents **[3]**
5/10 . . using organic substances **[3]**
5/12 . . . containing nitrogen (C02F 5/14 takes precedence) **[3]**
5/14 . . . containing phosphorus **[3]**

7/00 **Aeration of stretches of water [3]**

9/00 **Multistep treatment of water, waste water or sewage [3]**

(1) This group covers only those combined treating operations where the essential characteristic resides in the combination of treatment steps. **[3]**
(2) This group does not cover treatments where the essential characteristic resides in an individual step of the treatment, which treatments are covered by groups C02F 1/00 to C02F 7/00. An example of such treatments is a treatment in which the essential characteristic resides in a chemical treatment step and in which the one or more other steps, such as filtration or settlement, are conventional. **[3]**
(3) In this group, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**
(4) Any individual step of a multistep treatment, which is not identified by the classification in the last appropriate place, and which is considered to represent information of interest for search, may also be classified in one or more of groups C02F 1/00 to C02F 1/56 or C02F 1/66 to C02F 7/00. This can, for example, be the case which it is considered of interest to enable searching of multistep treatments using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

9/02 . involving a separation step **[7]**
9/04 . at least one step being a chemical treatment **[7]**
9/06 . . Electrochemical treatment **[7]**
9/08 . at least one step being a physical treatment **[7]**
9/10 . . Thermal treatment **[7]**
9/12 . . Irradiation or treatment with electric or magnetic fields **[7]**
9/14 . at least one step being a biological treatment **[7]**

11/00 **Treatment of sludge**; **Devices therefor [3]**
11/02 . Biological treatment **[3]**
11/04 . . Anaerobic treatment; Production of methane by such processes **[3]**
11/06 . by oxidation **[3]**
11/08 . . Wet air oxidation **[3]**
11/10 . by pyrolysis **[3]**
11/12 . by de-watering, drying, or thickening **[3]**
11/14 . . with addition of chemical agents **[3]**
11/16 . . using drying or composting beds **[3]**
11/18 . by thermal conditioning (by pyrolysis C02F 11/10) **[3]**
11/20 . . by freezing **[3]**

Indexing scheme associated with groups C02F 1/00 to C02F 11/00 relating to the nature of the contaminant in the water, waste water, sewage or sludge. [7]

101/00 **Nature of the contaminant [7]**
101/10 . Inorganic compounds **[7]**
101/12 . . Halogens or halogen-containing compounds **[7]**
101/14 . . . Fluorine or fluorine-containing compounds **[7]**
101/16 . . Nitrogen compounds, e.g. ammonia **[7]**
101/18 . . . Cyanides **[7]**
101/20 . . Heavy metals or heavy metal compounds **[7]**
101/22 . . . Chromium or chromium compounds, e.g. chromates **[7]**
101/30 . Organic compounds **[7]**
101/32 . . Hydrocarbons, e.g. oil **[7]**
101/34 . . containing oxygen **[7]**
101/36 . . containing halogen **[7]**
101/38 . . containing nitrogen **[7]**

Indexing scheme associated with groups C02F 1/00 to C02F 11/00, relating to the nature of the water, waste water, sewage or sludge to be treated. [7]

103/00 **Nature of the water, waste water, sewage or sludge to be treated [7]**
103/02 . Non-contaminated water, e.g. for industrial water supply **[7]**
103/04 . . for obtaining pure or ultra-pure water **[7]**
103/06 . Contaminated groundwater or leachate **[7]**
103/08 . Seawater, e.g. for desalination **[7]**
103/10 . from quarries or from mining activities **[7]**
103/12 . from the silicate or ceramic industries, e.g. waste waters from cement or glass factories **[7]**
103/14 . Paint wastes **[7]**
103/16 . from metallurgical processes, i.e. from the production, refining or treatment of metals, e.g. galvanic wastes **[7]**
103/18 . from the wet purification of gaseous effluents **[7]**
103/20 . from animal husbandry **[7]**
103/22 . from the processing of animals, e.g. poultry, fish, or parts thereof **[7]**
103/24 . . from tanneries **[7]**
103/26 . from the processing of plants or parts thereof **[7]**
103/28 . . from the paper or cellulose industry **[7]**
103/30 . from the textile industry **[7]**
103/32 . from the food or foodstuff industry, e.g. brewery waste waters **[7]**
103/34 . from the chemical industry not provided for in groups C02F 103/12 to C02F 103/32 **[7]**
103/36 . . from the manufacture of organic compounds **[7]**
103/38 . . . Polymers **[7]**
103/40 . . from the manufacture or use of photosensitive materials **[7]**
103/42 . from bathing facilities, e.g. swimming pools **[7]**
103/44 . from vehicle washing facilities **[7]**

C03 GLASS; MINERAL OR SLAG WOOL

C03B MANUFACTURE OR SHAPING OF GLASS, OR OF MINERAL OR SLAG WOOL; SUPPLEMENTARY PROCESSES IN THE MANUFACTURE OR SHAPING OF GLASS, OR OF MINERAL OR SLAG WOOL (surface treatment C03C)

Subclass index

Melting the raw material

1/00 Preparing the batches

1/02 . Compacting the glass batches, e.g. pelletising **[5]**

3/00 Charging the melting furnaces

3/02 . combined with preheating, premelting or pretreating the glass-making ingredients, pellets or cullet **[5]**

5/00 Melting in furnaces; Furnaces so far as specially adapted for glass manufacture

5/02 . in electric furnaces

5/027 . . by passing an electric current between electrodes immersed in the glass bath, i.e. by direct resistance heating **[3]**

5/03 . . . Tank furnaces **[5]**

5/033 . . by using resistance heaters above or in the glass bath, i.e. by indirect resistance heating **[3]**

Note

Group C03B 5/02 takes precedence over groups C03B 5/04 to C03B 5/14.

5/04 . in tank furnaces

5/05 . . Discontinuously-working tank furnaces, e.g. day tanks **[5]**

5/06 . in pot furnaces

5/08 . . Glass-melting pots

5/10 . in combined tank furnaces and pots

5/12 . in shaft furnaces

5/14 . in revolving cylindrical furnaces

5/16 . Special features of the melting process; Auxiliary means specially adapted for glass-melting furnaces

5/167 . . Means for preventing damage to equipment, e.g. by molten glass, hot gases, batches (C03B 5/20, C03B 5/42 take precedence) **[5]**

5/173 . . Apparatus for changing the composition of the molten glass in glass furnaces, e.g. for colouring the molten glass (chemical aspects C03C) **[5]**

5/18 . . Stirring devices; Homogenisation

5/182 . . . by moving the molten glass along fixed elements, e.g. deflectors, weirs, baffle plates **[5]**

5/183 . . . using thermal means, e.g. for creating convection currents **[5]**

5/185 . . . . Electric means **[5]**

5/187 . . . with moving elements **[3]**

5/193 . . . using gas, e.g. bubblers **[3]**

5/20 . . Bridges, shoes, throats, or other devices for withholding dirt, foam, or batch

5/225 . . Refining (C03B 5/18 takes precedence) **[3]**

5/23 . . Cooling the molten glass (C03B 5/18, C03B 5/225 take precedence) **[3]**

5/235 . . Heating the glass (C03B 5/02, C03B 5/18, C03B 5/225 take precedence) **[3]**

5/237 . . . Regenerators or recuperators specially adapted for glass-melting furnaces **[5]**

5/24 . . Automatically regulating the melting process

5/26 . . Outlets; Overflows

5/28 . . Siphons

5/42 . . Details of construction of furnace walls, e.g. to prevent corrosion; Use of materials for furnace walls **[3]**

5/425 . . . Preventing corrosion or erosion (C03B 5/44 takes precedence) **[5]**

5/43 . . . Use of materials for furnace walls, e.g. fire-bricks **[5]**

5/435 . . . Heating arrangements for furnace walls **[5]**

5/44 . . . Cooling arrangements for furnace walls **[3]**

7/00 Distributors for the molten glass; Means for taking-off charges of molten glass; Producing the gob

7/01 . Means for taking-off charges of molten glass **[5]**

7/02 . Forehearths, i.e. feeder channels **[3]**

7/04 . . Revolving forehearths **[3]**

7/06 . . Means for thermal conditioning or controlling the temperature of the glass **[3]**

7/07 . . . Electric means **[5]**

7/08 . Feeder spouts, e.g. gob feeders **[3]**

7/082 . . Pneumatic feeders **[5]**

7/084 . . Tube mechanisms **[5]**

7/086 . . Plunger mechanisms **[5]**

7/088 . . Outlets, e.g. orifice rings **[5]**

7/09 . . Spout blocks **[5]**

7/092 . . Stirring devices; Homogenisation (C03B 5/18 takes precedence) **[5]**

7/094 . . Means for heating, cooling or insulation **[5]**

7/096 . . . for heating **[5]**

7/098 . . . . electric **[5]**
7/10 . Cutting-off the glass flow with the aid of knives or scissors; Construction of the blades used **[3]**
7/11 . . Construction of the blades **[5]**
7/12 . . Cutting-off a free-hanging glass stream **[3]**
7/14 . Transferring molten glass or gobs to glass blowing or pressing machines (C03B 7/18 to C03B 7/22 take precedence) **[3]**
7/16 . . using deflector chutes **[3]**
7/18 . Suction feeders **[3]**
7/20 . Scoop feeders **[3]**
7/22 . Gathering-devices in the form of rods or pipes **[3]**

8/00 **Production of glass by other processes than melting processes** (C03B 37/014 takes precedence; preparation of finely divided silica, in general C01B 33/18) **[4]**
8/02 . by liquid phase reaction processes **[4]**
8/04 . by gas phase reaction processes **[4]**

Shaping of glass

9/00 **Blowing glass**; **Production of hollow glass articles**
9/02 . with the mouth; Auxiliary means therefor
9/03 . . Blow pipes **[3]**
9/04 . . Making hollow glass articles with feet or projections
9/06 . . Making hollow glass articles with double walls, e.g. vacuum flasks
9/08 . Finish-blowing with compressed air of blanks blown with the mouth
9/10 . Blowing glass cylinders for sheet manufacture
9/12 . starting from a ribbon of glass; Ribbon machines
9/13 . in gob feeder machines (C03B 9/28, C03B 9/29 take precedence) **[3]**
9/14 . . in "blow" machines or in "blow-and-blow" machines (C03B 9/193, C03B 9/20 take precedence) **[3]**
9/16 . . . in machines with turn-over moulds **[3]**
9/18 . . . . Rotary-table machines **[3]**
9/19 . . . . . having only one rotary table **[3]**
9/193 . . in "press-and-blow" machines **[3]**
9/195 . . . Rotary-table machines **[3]**
9/197 . . . Construction of the blank mould **[3]**
9/20 . in "vacuum blowing" or in "vacuum-and-blow" machines
9/22 . . Rotary table machines
9/24 . . Construction of the blank mould
9/28 . in machines of the endless-chain type (C03B 9/12 takes precedence) **[3]**
9/29 . Paste mould machines (C03B 9/28 takes precedence) **[3]**
9/295 . . Rotary table machines **[5]**
9/30 . Details of blowing glass (for blowing with the mouth C03B 9/02); Use of materials for the moulds
9/31 . . Blowing laminated glass articles or glass with enclosures, e.g. wires, bubbles **[5]**
9/32 . . Giving special shapes to parts of hollow glass articles
9/325 . . . Forming screw threads or lips at the mouth of hollow glass articles; Neck moulds **[3]**
9/33 . . . Making hollow glass articles with feet or projections; Moulds therefor **[3]**
9/335 . . . Forming bottoms to blown hollow glass articles; Bottom moulds **[3]**
9/34 . . Glass-blowing moulds not otherwise provided for
9/347 . . . Construction of the blank or blow mould **[3]**
9/353 . . . Mould holders **[3]**
9/36 . . Blow heads; Supplying, ejecting, or controlling the air
9/38 . . Means for cooling, heating, or insulating glass-blowing machines
9/40 . . Gearing or controlling mechanisms specially adapted for glass-blowing machines
9/41 . . . Electric or electronic systems (in general G05B 19/00) **[5]**
9/42 . . Means for fusing, burning-off, or edge-melting combined with glass-blowing machines (uniting glass pieces by fusing C03B 23/20)
9/44 . . Means for discharging combined with glass-blowing machines, e.g. take-outs
9/447 . . . Means for the removal of glass articles from the blow-mould, e.g. take-outs **[5]**
9/453 . . . Means for pushing newly formed glass articles onto a conveyer, e.g. sweep-out mechanisms; Dead-plate mechanisms **[5]**
9/46 . . Means for cutting the hot glass in glass-blowing machines (burning-off C03B 9/42)
9/48 . . Use of materials for the moulds **[3]**

11/00 **Pressing glass**
11/02 . in machines with rotary tables
11/04 . in machines with moulds fed by suction
11/05 . in machines with reciprocating moulds **[3]**
11/06 . Construction of plunger or mould
11/07 . . Suction moulds **[3]**
11/08 . . for making solid articles, e.g. lenses
11/10 . . for making hollow articles
11/12 . Cooling, heating, or insulating the plunger, the mould, or the glass-pressing machine (C03B 9/38 takes precedence) **[3]**
11/14 . with metal inserts
11/16 . Gearing or controlling mechanisms specially adapted for glass presses

13/00 **Rolling glass**
13/01 . Rolling profiled glass articles **[5]**
13/02 . Rolling non-patterned sheets discontinuously
13/04 . Rolling non-patterned sheets continuously
13/06 . Rolling corrugated sheets
13/08 . Rolling patterned sheets
13/10 . Rolling multi-layer sheets
13/12 . Rolling glass with enclosures, e.g. wire or asbestos
13/14 . Rolling other articles
13/16 . Construction of the glass rollers
13/18 . Auxiliary means for rolling glass, e.g. sheet supports, gripping devices, hand-ladles, means for moving glass pots

15/00 **Drawing glass upwardly from the melt**
15/02 . Drawing glass sheets
15/04 . . from the free surface of the melt
15/06 . . from a debiteuse
15/08 . . by means of bars below the surface of the melt
15/10 . . multi-layer glass sheets or glass sheets coated with coloured layers
15/12 . . Construction of the annealing tower
15/14 . Drawing tubes, cylinders, or rods from the melt
15/16 . . Drawing tubes, cylinders, or rods, coated with coloured layers
15/18 . Means for laying-down and conveying combined with the drawing of glass sheets, tubes, or rods

17/00 **Forming glass by flowing out, pushing-out, or drawing downwardly or laterally from forming slits or by overflowing over lips**
17/02 . Forming glass coated with coloured layers
17/04 . Forming tubes or rods by drawing from stationary or rotating tools or from forming nozzles
17/06 . Forming glass sheets **[3]**

18/00 **Shaping glass in contact with the surface of a liquid**
18/02 . Forming sheets
18/04 . . Changing or regulating the dimensions of the molten glass ribbon **[3]**
18/06 . . . using mechanical means, e.g. restrictor bars, edge rollers **[3]**
18/08 . . . using gas **[3]**
18/10 . . . using electric means **[3]**
18/12 . . Making multilayer, coloured or armoured glass (chemical aspects C03C) **[3]**
18/14 . . Changing the surface of the glass ribbon, e.g. roughening (by chemical methods C03C) **[3]**
18/16 . . Construction of the float tank; Use of material for the float tank; Coating or protection of the tank wall **[3]**
18/18 . . Controlling or regulating the temperature of the float bath; Composition or purification of the float bath **[3]**
18/20 . . Composition of the atmosphere above the float bath; Treating or purifying the atmosphere above the float bath **[3]**
18/22 . . . Controlling or regulating the temperature of the atmosphere above the float tank **[3]**

19/00 **Other methods of shaping glass** (manufacture or treatment of flakes, fibres, or filaments from softened glass, minerals, or slags C03B 37/00)
19/01 . by progressive fusion of powdered glass onto a shaping substrate, i.e. accretion **[5]**
19/02 . by casting
19/04 . by centrifuging
19/06 . by sintering (production of quartz or fused silica articles C03B 20/00) **[2]**
19/08 . by foaming
19/09 . by fusing powdered glass in a shaping mould **[3]**
19/10 . Forming beads
19/12 . by liquid-phase reaction processes **[5]**
19/14 . by gas-phase reaction processes **[5]**

20/00 **Processes specially adapted for the production of quartz or fused silica articles [3]**

21/00 **Severing glass sheets, tubes, or rods while still plastic**
21/02 . by cutting (C03B 9/46 takes precedence)
21/04 . by punching out
21/06 . by flashing-off, burning-off, or fusing (C03B 9/42 takes precedence) **[3]**

23/00 **Re-forming shaped glass** (re-forming fibres or filaments C03B 37/14)
23/02 . Re-forming glass sheets
23/023 . . by bending **[3]**
23/025 . . . by gravity **[3]**
23/027 . . . . with moulds having at least two upward pivotable mould sections **[3]**
23/03 . . . by press-bending between shaping moulds **[3]**
23/031 . . . . the glass sheets being in a vertical position (C03B 23/033 takes precedence) **[5]**
23/033 . . . . in a continuous way, e.g. roll forming **[3]**
23/035 . . . using a gas cushion or by changing gas pressure, e.g. by applying vacuum **[3]**
23/037 . . by drawing **[3]**
23/04 . Re-forming tubes or rods
23/043 . . Heating devices specially adapted for re-forming tubes or rods in general, e.g. burners **[5]**
23/045 . . Tools or apparatus specially adapted for re-forming tubes or rods in general, e.g. glass lathes, chucks (C03B 23/043 takes precedence) **[5]**
23/047 . . by drawing (C03B 37/025 takes precedence) **[5]**
23/049 . . by pressing (C03B 21/04, C03B 23/26 take precedence) **[5]**
23/051 . . by gravity, e.g. sagging **[5]**
23/053 . . by centrifuging (C03B 37/04 takes precedence) **[5]**
23/055 . . by rolling **[5]**
23/057 . . by fusing, e.g. for flame sealing (C03B 9/42, C03B 21/06, C03B 33/08 take precedence) **[5]**
23/06 . . by bending
23/07 . . by blowing, e.g. for making electric bulbs **[3]**
23/08 . . to exact dimensions, e.g. calibrating
23/09 . . Reshaping the ends, e.g. as grooves, threads or mouths **[3]**
23/11 . . Reshaping by drawing without blowing, in combination with separating, e.g. for making ampoules **[3]**
23/13 . . Reshaping combined with uniting or heat sealing, e.g. making vacuum bottles **[3]**
23/18 . Re-forming and sealing ampoules
23/20 . Uniting glass pieces by fusing without substantial reshaping
23/203 . . Uniting glass sheets (C03B 23/24 takes precedence) **[3]**
23/207 . . Uniting glass rods, glass tubes, or hollow glassware (C03B 23/24 takes precedence) **[3]**
23/213 . . . Joining projections or feet **[3]**
23/217 . . . for the production of cathode ray tubes or similarly shaped tubes **[3]**
23/22 . . Uniting glass lenses, e.g. forming bifocal lenses
23/24 . . Making hollow glass sheets or bricks
23/26 . Punching reheated glass

After-treatment of glass product

25/00 **Annealing glass products** (after-treatment of fibres C03B 37/10)
25/02 . in a discontinuous way
25/04 . in a continuous way
25/06 . . with horizontal displacement of the glass products **[3]**
25/08 . . . of glass sheets **[3]**
25/087 . . . . being in a vertical position **[5]**
25/093 . . . . being in a horizontal position on a fluid support, e.g. a gas or molten metal **[5]**
25/10 . . with vertical displacement of the glass products **[3]**
25/12 . . . of glass sheets **[3]**

27/00 **Tempering glass products** (after-treatment of fibres C03B 37/10)
27/004 . by bringing the hot glass product in contact with a solid cooling surface, e.g. sand grains **[5]**
27/008 . by using heat of sublimation of solid particles **[5]**
27/012 . by heat treatment, e.g. for crystallisation; Heat treatment of glass products before tempering by cooling (C03B 27/008, C03B 27/016 take precedence) **[5]**

27/016 . by absorbing heat radiated from the glass product **[5]**
27/02 . using liquid **[3,5]**
27/03 . . the liquid being a molten metal or a molten salt **[5]**
27/04 . using gas **[3]**
27/044 . . for flat or bent glass sheets being in a horizontal position **[5]**
27/048 . . . on a gas cushion **[5]**
27/052 . . for flat or bent glass sheets being in a vertical position **[5]**
27/056 . . . supported on the lower edge **[5]**
27/06 . . for glass products other than flat or bent glass plates, e.g. hollow glassware, lenses **[3]**

29/00 Reheating glass products for softening or fusing their surfaces; **Fire-polishing**; **Fusing of margins** (after-treatment of fibres C03B 37/10)
29/02 . in a discontinuous way
29/04 . in a continuous way
29/06 . . with horizontal displacement of the products **[5]**
29/08 . . . Glass sheets **[5]**
29/10 . . . . being in a vertical position **[5]**
29/12 . . . . being in a horizontal position on a fluid support, e.g. a gas or molten metal **[5]**
29/14 . . with vertical displacement of the products **[5]**
29/16 . . . Glass sheets **[5]**

31/00 Manufacture of rippled or crackled glass

32/00 Thermal after-treatment of glass products not provided for in groups C03B 25/00 to C03B 31/00, e.g. crystallisation, eliminating gas inclusions or other impurities (after-treatment of fibres C03B 37/10) **[2]**
32/02 . Thermal crystallisation, e.g. for crystallising glass bodies into glass-ceramic articles **[5]**

33/00 Severing cooled glass (severing glass fibres C03B 37/16)
33/02 . Cutting or splitting sheet glass; Apparatus or machines therefor (C03B 33/09 takes precedence; glass-cutting tools C03B 33/10) **[3]**
33/023 . . the sheet being in a horizontal position **[5]**
33/027 . . . Scoring tool holders; Driving mechanisms therefor **[5]**
33/03 . . . Glass cutting tables; Apparatus for transporting or handling sheet glass during the cutting or breaking operations **[5]**
33/033 . . . Apparatus for opening score lines in glass sheets **[5]**
33/037 . . . Controlling or regulating **[5]**
33/04 . . Cutting or splitting in curves, especially for making spectacle lenses
33/06 . Cutting or splitting glass tubes, rods, or hollow products (C03B 33/09 takes precedence) **[3]**
33/07 . Cutting armoured or laminated glass products **[3]**
33/08 . by fusing
33/085 . . Tubes, rods or hollow products **[5]**
33/09 . by thermal shock **[3]**
33/095 . . Tubes, rods or hollow products **[5]**
33/10 . Glass-cutting tools, e.g. scoring tools
33/12 . . Hand tools **[3]**
33/14 . . . specially adapted for cutting tubes, rods or hollow products **[5]**

35/00 Transporting of glass products during their manufacture (conveying systems for fragile sheets, e.g. glass, B65G 49/06) **[2]**
35/04 . Transporting of hot hollow glass products (C03B 35/26 takes precedence) **[3]**
35/06 . . Feeding of hot hollow glass products into annealing or heating kilns **[3]**
35/08 . . . using rotary means directly acting on the products **[3]**
35/10 . . . using reciprocating means directly acting on the products, e.g. pushers, stackers **[3]**
35/12 . . . by picking-up and depositing **[3]**
35/14 . Transporting hot glass sheets **[3]**
35/16 . . by roller conveyers **[3]**
35/18 . . . Construction of the conveyer rollers **[3]**
35/20 . . by gripping tongs or supporting frames **[3]**
35/22 . . on a fluid support bed, e.g. on molten metal **[3]**
35/24 . . . on a gas support bed **[3]**
35/26 . Transporting of glass tubes or rods **[3]**

37/00 Manufacture or treatment of flakes, fibres, or filaments from softened glass, minerals, or slags
37/005 . Manufacture of flakes **[5]**
37/01 . Manufacture of glass fibres or filaments **[3]**
37/012 . . Manufacture of preforms for drawing fibres or filaments **[4]**
37/014 . . . made entirely or partially by chemical means **[4]**
37/016 . . . . by a liquid phase reaction process, e.g. through a gel phase **[4]**
37/018 . . . . by glass deposition on a glass substrate, e.g. by chemical vapour deposition (C03B 37/016 takes precedence; surface treatment of glass by coating with glass C03C 17/02) **[4]**
37/02 . . by drawing or extruding (C03B 37/04 takes precedence) **[3]**
37/022 . . . from molten glass in which the resultant product consists of different sorts of glass or is characterised by shape, e.g. hollow fibres **[4]**
37/023 . . . . Fibres composed of different sorts of glass, e.g. fibre optics **[4]**
37/025 . . . from reheated softened tubes, rods, fibres or filaments **[3]**
37/026 . . . . Drawing fibres reinforced with a metal wire **[5]**
37/027 . . . . Fibres composed of different sorts of glass, e.g. fibre optics (C03B 37/028 takes precedence) **[4]**
37/028 . . . . Drawing fibre bundles, e.g. for making fibre bundles of multifibres **[4]**
37/029 . . . . Furnaces therefor **[5]**
37/03 . . . Drawing means, e.g. drawing drums **[3]**
37/035 . . . . having means for deflecting or stripping-off fibres **[3]**
37/04 . . by using centrifugal force **[3]**
37/05 . . . by projecting on a rotating body having no radial orifices **[3]**
37/06 . . by blasting or blowing molten glass, e.g. for making staple fibres **[3]**
37/065 . . . starting from tubes, rods, fibres, or filaments **[3]**
37/07 . Controlling or regulating (controlling or regulating in general G05) **[3]**

37/075 . Manufacture of fibres or filaments consisting of different sorts of glass or characterised by shape, e.g. hollow fibres, undulated fibres (C03B 37/022, C03B 37/027, C03B 37/028 take precedence) **[3,4]**
37/08 . Bushings; Spinnerettes; Nozzles; Nozzle plates (nozzles in general B05B)
37/081 . . Indirect-melting bushings **[5]**
37/083 . . Nozzles; Bushing nozzle plates (C03B 37/095 takes precedence) **[5]**
37/085 . . Feeding devices therefor **[3]**
37/09 . . electrically heated **[3]**
37/092 . . . Direct-resistance heating **[5]**
37/095 . . Use of materials therefor **[3]**
37/10 . Non-chemical treatment (C03C 25/00 takes precedence; yarns or threads D02; woven fabrics D03; non-woven fabrics D04)
37/12 . . of fibres or filaments during winding up **[3]**
37/14 . . Re-forming fibres or filaments (C03B 37/025 takes precedence) **[3]**
37/15 . . . with heat application, e.g. for making optical fibres (fusion-splicing of light guides G02B 6/255; treatment of light guides to shape optical elements G02B 6/287) **[5]**
37/16 . . Cutting or severing (light guides G02B 6/25) **[3,5]**

40/00 Preventing adhesion between glass and glass or between glass and the means used to shape it [3]

40/02 . by lubrication; Use of materials as release or lubricating compositions **[3]**
40/027 . . Apparatus for applying lubricants to glass shaping moulds or tools **[5]**
40/033 . . Means for preventing adhesion between glass and glass **[5]**
40/04 . using gas **[3]**

C03C CHEMICAL COMPOSITION OF GLASSES, GLAZES, OR VITREOUS ENAMELS; SURFACE TREATMENT OF GLASS; SURFACE TREATMENT OF FIBRES OR FILAMENTS FROM GLASS, MINERALS OR SLAGS; JOINING GLASS TO GLASS OR OTHER MATERIALS

Subclass index

Chemical composition of glasses, glazes, or vitreous enamels

Note

In groups C03C 1/00 to C03C 14/00, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

1/00 Ingredients generally applicable to manufacture of glasses, glazes or vitreous enamels

1/02 . Pretreated ingredients
1/04 . Opacifiers, e.g. fluorides or phosphates; Pigments
1/06 . . to produce non-uniformly pigmented, e.g. speckled, marbled, or veined products
1/08 . to produce crackled effects
1/10 . to produce uniformly-coloured transparent products

3/00 Glass compositions (glass batch compositions C03C 6/00) **[4]**

3/04 . containing silica **[4]**

Note

If silica is specified as being present in a percent range covered by two of the groups C03C 3/06, C03C 3/062 or C03C 3/076, classification is made in both groups. If the range is covered by the three groups, classification is made in group C03C 3/04 itself. **[4]**

3/06 . . with more than 90% silica by weight, e.g. quartz
3/062 . . with less than 40% silica by weight **[4]**
3/064 . . . containing boron **[4]**
3/066 . . . . containing zinc **[4]**
3/068 . . . . containing rare earths **[4]**
3/07 . . . containing lead **[4]**
3/072 . . . . containing boron **[4]**
3/074 . . . . . containing zinc **[4]**
3/076 . . with 40% to 90% silica by weight **[4]**
3/078 . . . containing an oxide of a divalent metal, e.g. an oxide of zinc **[4]**
3/083 . . . containing aluminium oxide or an iron compound **[4]**
3/085 . . . . containing an oxide of a divalent metal **[4]**
3/087 . . . . . containing calcium oxide, e.g. common sheet or container glass **[4]**
3/089 . . . containing boron **[4]**
3/091 . . . . containing aluminium **[4]**
3/093 . . . . . containing zinc or zirconium **[4]**
3/095 . . . containing rare earths **[4]**
3/097 . . . containing phosphorus, niobium or tantalum **[4]**
3/102 . . . containing lead **[4]**
3/105 . . . . containing aluminium **[4]**
3/108 . . . . containing boron **[4]**
3/11 . . . containing halogen or nitrogen **[4]**
3/112 . . . . containing fluorine **[4]**
3/115 . . . . . containing boron **[4]**
3/118 . . . . . containing aluminium **[4]**
3/12 . Silica-free oxide glass compositions **[4]**
3/14 . . containing boron **[4]**

3/145 . . . containing aluminium or beryllium **[4]**
3/15 . . . containing rare earths **[4]**
3/155 . . . . containing zirconium, titanium, tantalum or niobium **[4]**
3/16 . . containing phosphorus **[4]**
3/17 . . . containing aluminium or beryllium **[4]**
3/19 . . . containing boron **[4]**
3/21 . . . containing titanium, zirconium, vanadium, tungsten or molybdenum **[4]**
3/23 . . containing halogen and at least one oxide, e.g. oxide of boron **[4]**
3/247 . . . containing fluorine and phosphorus **[4]**
3/253 . . containing germanium **[4]**
3/32 . Non-oxide glass compositions, e.g. binary or ternary halides, sulfides, or nitrides of germanium, selenium or tellurium **[4]**

4/00 **Compositions for glass with special properties [4]**

Note

When classifying in group C03C 4/00, classification is also made in the appropriate subgroups of group C03C 3/00 according to the glass composition. **[4]**

4/02 . for coloured glass **[4]**
4/04 . for photosensitive glass **[4]**
4/06 . . for phototropic or photochromic glass **[4]**
4/08 . for glass selectively absorbing radiation of specified wave lengths **[4]**
4/10 . for infra-red transmitting glass **[4]**
4/12 . for luminescent glass; for fluorescent glass **[4]**
4/14 . for electro-conductive glass **[4]**
4/16 . for dielectric glass **[4]**
4/18 . for ion-sensitive glass **[4]**
4/20 . for chemical resistant glass **[4]**

6/00 **Glass batch compositions** (single ingredients of batch compositions C03C 1/00) **[4]**

Note

This group covers also compositions which are intended to be heated sufficiently for their ingredients to fuse into a glass, e.g. glass furnace charges. **[4]**

6/02 . containing silicates, e.g. cullet **[4]**
6/04 . containing uncombined silica, e.g. sand **[4]**
6/06 . containing halogen compounds **[4]**
6/08 . containing pellets or agglomerates **[4]**
6/10 . containing slag **[4]**

8/00 **Enamels**; **Glazes** (cold glazes for ceramics C04B 41/86); **Fusion seal compositions being frit compositions having non-frit additions [4]**
8/02 . Frit compositions, i.e. in a powdered or comminuted form **[4]**
8/04 . . containing zinc **[4]**
8/06 . . containing halogen **[4]**
8/08 . . containing phosphorus **[4]**
8/10 . . containing lead **[4]**
8/12 . . . containing titanium or zirconium **[4]**
8/14 . Glass frit mixtures having non-frit additions, e.g. opacifiers, colorants, mill additions **[4]**
8/16 . . with vehicle or suspending agents, e.g. slip **[4]**
8/18 . . containing free metals **[4]**
8/20 . . containing titanium compounds; containing zirconium compounds **[4]**
8/22 . containing two or more distinct frits having different compositions **[4]**
8/24 . Fusion seal compositions being frit compositions having non-frit additions, i.e. for use as seals between dissimilar materials, e.g. glass and metal; Glass solders **[4]**

10/00 **Devitrified glass ceramics, i.e. glass ceramics having a crystalline phase dispersed in a glassy phase and constituting at least 50% by weight of the total composition [4]**
10/02 . Non-silica and non-silicate crystalline phase, e.g. spinel, barium titanate **[4]**
10/04 . Silicate or polysilicate crystalline phase, e.g. mullite, diopside, sphene, plagioclase **[4]**
10/06 . . Divalent metal oxide aluminosilicate crystalline phase, e.g. anorthite, slagcerams **[4]**
10/08 . . . Magnesium aluminosilicate, e.g. cordierite **[4]**
10/10 . . Alkali metal aluminosilicate crystalline phase **[4]**
10/12 . . . Lithium aluminosilicate, e.g. spodumene, eucryptite **[4]**
10/14 . Silica crystalline phase, e.g. stuffed quartz, cristobalite **[4]**
10/16 . Halogen-containing crystalline phase **[4]**

11/00 **Multi-cellular glass**

12/00 **Powdered glass** (C03C 8/02 takes precedence); **Bead compositions [4]**
12/02 . Reflective beads **[4]**

13/00 **Fibre or filament compositions** (manufacture of fibres or filaments C03B 37/00)
13/02 . containing compounds of titanium or zirconium **[4]**
13/04 . Fibre optics, e.g. core and clad fibre compositions **[4]**
13/06 . Mineral fibres, e.g. slag wool, mineral wool, rock wool **[4]**

14/00 **Glass compositions containing a non-glass component, e.g. compositions containing fibres, filaments, whiskers, platelets, or the like, dispersed in a glass matrix** (glass batch compositions C03C 6/00; devitrified glass-ceramics C03C 10/00) **[4]**

Surface treatment of glass; **Surface treatment of fibres or filaments from glass, minerals or slags**

Note

Treatment of materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone is classified in subclass C04B. **[4]**

15/00 **Surface treatment of glass, not in the form of fibres or filaments, by etching** (etching or surface-brightening compositions, in general C09K 13/00) **[2]**
15/02 . for making a smooth surface

17/00 **Surface treatment of glass, e.g. of devitrified glass, not in the form of fibres or filaments, by coating** (optical coatings of optical elements G02B 1/10)
17/02 . with glass (C03C 17/34, C03C 17/44 take precedence) **[3]**
17/04 . . by fritting glass powder
17/06 . with metals (C03C 17/34, C03C 17/44 take precedence) **[3]**
17/09 . . by deposition from the vapour phase **[3]**
17/10 . . by deposition from the liquid phase

17/22 . with other inorganic material (C03C 17/34, C03C 17/44 take precedence) **[3]**
17/23 . . Oxides (C03C 17/02 takes precedence) **[3]**
17/245 . . . by deposition from the vapour phase **[3]**
17/25 . . . by deposition from the liquid phase **[3]**
17/27 . . . by oxidation of a coating previously applied **[3]**
17/28 . with organic material (C03C 17/34, C03C 17/44 take precedence) **[3]**
17/30 . . with silicon-containing compounds
17/32 . . with synthetic or natural resins (C03C 17/30 takes precedence)
17/34 . with at least two coatings having different compositions (C03C 17/44 takes precedence) **[3]**
17/36 . . at least one coating being a metal **[3]**
17/38 . . . at least one coating being a coating of an organic material **[3]**
17/40 . . . all coatings being metal coatings **[3]**
17/42 . . at least one coating of an organic material and at least one non-metal coating **[3]**
17/44 . Lustring **[3]**

19/00 Surface treatment of glass, not in the form of fibres or filaments, by mechanical means (sand-blasting, grinding, or polishing glass B24)

21/00 Treatment of glass, not in the form of fibres or filaments, by diffusing ions or metals into the surface

23/00 Other surface treatment of glass not in the form of fibres or filaments

25/00 Surface treatment of fibres or filaments from glass, minerals, or slags

25/10 . by coating **[7]**
25/12 . . General methods for coating; Devices therefor **[7]**
25/14 . . . Spraying **[7]**
25/16 . . . Dipping **[7]**
25/18 . . . using extrusion devices **[7]**
25/20 . . . Contacting the fibres with applicators, e.g. rolls **[7]**
25/22 . . . Deposition from the vapour phase **[7]**

(1) In groups C03C 25/24 to C03C 25/48, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[7]**

(2) A coating composition, i.e. a mixture of two or more constituents, is classified in the last of groups C03C 25/24 to C03C 25/42 that provides for at least one of these constituents. **[8]**

(3) When classifying in groups C03C 25/24 to C03C 25/42 any individual constituent, i.e. compound or ingredient of a coating composition, which is not identified by the classification according to Note (2), and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups C03C 25/24 to C03C 25/42. **[8]**

(4) When classifying in groups C03C 25/24 to C03C 25/42 any individual constituent of a coating composition which is not identified by the classification according to Note (2) or (3), and which is considered to represent information of interest for search, may also be classified in groups C03C 25/24 to C03C 25/42. This can, for example, be the case when it is considered of interest to enable searching of coating compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

25/24 . . Coatings containing organic materials **[7]**
25/26 . . . Macromolecular compounds or prepolymers **[7]**
25/28 . . . . obtained by reactions involving only carbon-to-carbon unsaturated bonds, e.g. acrylic resins **[7]**
25/30 . . . . . Polyolefins **[7]**
25/32 . . . . obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds **[7]**
25/34 . . . . . Condensation polymers of aldehydes, e.g. with phenols, ureas, melamines, amides or amines **[7]**
25/36 . . . . . Epoxy resins **[7]**
25/38 . . . Organo-metallic compounds **[7]**
25/40 . . . Organo-silicon compounds **[7]**
25/42 . . Coatings containing inorganic materials **[7]**
25/44 . . . Carbon, e.g. graphite **[7]**
25/46 . . . Metals **[7]**
25/48 . . with two or more coatings having different compositions **[7]**

Note

When classifying in this group, any individual coating which itself is determined to be novel and non-obvious must also be classified in groups C03C 25/24 to C03C 25/42, according to Notes (1) to (4) before group C03C 25/24.

25/50 . . . Coatings containing organic materials only **[7]**
25/52 . . . Coatings containing inorganic materials only **[7]**
25/54 . . . Combinations of one or more coatings containing organic materials only with one or more coatings containing inorganic materials only **[7]**
25/60 . by diffusing ions or metals into the surface **[7]**
25/62 . by application of electric or wave energy or particle radiation, or by ion implantation (for drying or dehydration C03C 25/64) **[7]**
25/64 . Drying; Dehydration; Dehydroxylation **[7]**
25/66 . Chemical treatment, e.g. leaching, acid or alkali treatment (dehydroxylation C03C 25/64) **[7]**
25/68 . . by etching **[7]**
25/70 . Cleaning, e.g. for reuse (C03C 25/62 to C03C 25/66 take precedence) **[7]**

Joining glass to glass or to other materials

Note

Layered products classified in groups C03C 27/00 or C03C 29/00 are also classified in subclass B32B.

27/00 **Joining pieces of glass to pieces of other inorganic material**; **Joining glass to glass other than by fusing** (C03C 17/00takes precedence; fusion seal compositions C03C 8/24; wired glass C03B; joining glass to ceramics C04)

27/02 . by fusing glass directly to metal

27/04 . Joining glass to metal by means of an interlayer

27/06 . Joining glass to glass by processes other than fusing (fusing C03B 23/20; units for use as elements for closing wall or like openings and comprising two or more parallel glass panes in spaced relationship, the panes being permanently secured together E06B 3/66)

27/08 . . with the aid of intervening metal

27/10 . . with the aid of adhesive specially adapted for that purpose

27/12 . . . Laminated glass (mechanical features in manufacture of glass laminates part of which is of plastic material B32B)

29/00 **Joining metals with the aid of glass**

C04 CEMENTS; CONCRETE; ARTIFICIAL STONE; CERAMICS; REFRACTORIES [4]

Note

This class does not cover mechanical features provided for elsewhere, e.g. mechanical working B28, kilns F27.

C04B LIME; MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, E.G. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE; CERAMICS (devitrified glass-ceramics C03C 10/00); REFRACTORIES (alloys based on refractory metals C22C); TREATMENT OF NATURAL STONE [4]

Note

In this subclass, the following terms or expressions are used with the meanings indicated: **[6]**
- "fillers" includes pigments, aggregates and fibrous reinforcing materials; **[6]**
- "active ingredients" includes processing aids or property improvers, e.g. grinding aids used after the burning process or used in the absence of a burning process; **[6]**
- "mortars", "concrete" and "artificial stone" are to be considered as a single group of materials, and therefore, in the absence of an indication to be contrary, they include mortar, concrete and other cementitious compositions. **[6]**

Subclass index

Lime; **Magnesia**; **Slag**

2/00 Lime, magnesia or dolomite [4]
- 2/02 . Lime **[4]**
- 2/04 . . Slaking **[4]**
- 2/06 . . . with addition of substances, e.g. hydrophobic agents **[4]**
- 2/08 . . . Devices therefor **[4]**
- 2/10 . Preheating, burning, calcining or cooling (decarbonation during burning of cement raw materials C04B 7/43) **[4]**
- 2/12 . . in shaft or vertical furnaces **[4]**

5/00 Treatment of molten slag (manufacture of slag wool C03B; treatment of slag in or for the production of metals C21B, C22B); **Artificial stone from molten slag [4]**
- 5/02 . Granulating (granulating apparatus B01J 2/00); Dehydrating; Drying
- 5/06 . Ingredients, other than water, added to the molten slag; Treatment with gases or gas generating material, e.g. to obtain porous slag **[4]**

Cements

Note

In groups C04B 7/00 to C04B 32/00, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

7/00 Hydraulic cements
- 7/02 . Portland cement
- 7/04 . . using raw materials containing gypsum
- 7/06 . . using alkaline raw materials
- 7/12 . Natural pozzuolanas; Natural pozzuolana cements **[4]**
- 7/13 . . Mixtures thereof with inorganic cementitious materials, e.g. Portland cements **[4]**
- 7/14 . Cements containing slag
- 7/147 . . Metallurgical slag **[4]**
- 7/153 . . . Mixtures thereof with other inorganic cementitious materials or other activators **[4]**
- 7/17 . . . . with calcium oxide containing activators **[4]**
- 7/19 . . . . . Portland cements **[4]**
- 7/21 . . . . with calcium sulfate containing activators **[4]**
- 7/22 . Iron ore cements
- 7/24 . Cements from oil shales, residues or waste other than slag **[4]**
- 7/26 . . from raw materials containing flue dust
- 7/28 . . from combustion residues (C04B 7/26 takes precedence) **[4]**
- 7/30 . . from oil shale; from oil shale residues **[4]**
- 7/32 . Aluminous cements
- 7/34 . Hydraulic lime cements; Roman cements
- 7/345 . Hydraulic cements not provided for in one of the groups C04B 7/02 to C04B 7/34 **[4]**
- 7/36 . Manufacture of hydraulic cements in general
- 7/38 . . Preparing or treating the raw materials individually or as batches **[4]**
- 7/40 . . . Dehydrating; Forming, e.g. granulating (granulating apparatus B01J 2/00)
- 7/42 . . . Active ingredients added before, or during, the burning process

7/43 . . Heat treatment, e.g. precalcining, burning, melting; Cooling **[4]**
7/44 . . . Burning; Melting **[4]**
7/45 . . . . in fluidised beds **[4]**
7/46 . . . . electric **[4]**
7/47 . . . Cooling **[4]**
7/48 . . Clinker treatment (C04B 7/47 takes precedence) **[4]**
7/51 . . . Hydrating **[4]**
7/52 . . . Grinding
7/60 . . Methods for eliminating alkali metals or compounds thereof **[4]**

9/00 Magnesium cements or silimar cements
9/02 . Magnesium cements containing chlorides, e.g. Sorel cement
9/04 . Magnesium cements containing sulfates, nitrates, phosphates, or fluorides
9/06 . Cements containing metal compounds other than magnesium compounds, e.g. compounds of zinc or lead
9/11 . Mixtures thereof with other inorganic cementitious materials **[4]**
9/12 . . with hydraulic cements, e.g. Portland cements **[4]**
9/20 . Manufacture, e.g. preparing the batches (preheating, burning, calcining or cooling lime stone, magnesite or dolomite C04B 2/10)

11/00 Calcium sulfate cements
11/02 . Dehydrating gypsum
11/024 . . Ingredients added before, or during, the calcining process, e.g. calcination modifiers **[4]**
11/028 . . Devices therefor **[4]**
11/032 . . . for the wet process, e.g. dehydrating in solution or under saturated vapor conditions **[4]**
11/036 . . . for the dry process, e.g. dehydrating in a fluidised bed or in a rotary kiln **[4]**
11/05 . obtaining anhydrite (C04B 11/028 takes precedence) **[4]**
11/06 . starting from anhydrite
11/26 . starting from phosphogypsum or from waste, e.g. purification products of smoke (C04B 11/02 takes precedence) **[4]**
11/28 . Mixtures thereof with other inorganic cementitious materials (C04B 7/04, C04B 7/153 take precedence) **[4]**
11/30 . . with hydraulic cements, e.g. Portland cements **[4]**

12/00 Cements not provided for in groups C04B 7/00 to C04B 11/00 [4]
12/02 . Phosphate cements **[4]**
12/04 . Alkali metal or ammonium silicate cements **[4]**

Use of materials as fillers for mortars, concrete or artificial stone [4]

14/00 Use of inorganic materials as fillers, e.g. pigments, for mortars, concrete or artificial stone; **Treatment of inorganic materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone** (reinforcing elements for building E04C 5/00) **[4]**
14/02 . Granular materials **[4]**
14/04 . . Silica-rich materials; Silicates **[4]**
14/06 . . . Quartz; Sand **[4]**
14/08 . . . Diatomaceous earth **[4]**
14/10 . . . Clay **[4]**
14/12 . . . . Expanded clay **[4]**
14/14 . . . Minerals of vulcanic origin **[4]**
14/16 . . . . porous, e.g. pumice **[4]**
14/18 . . . . Perlite **[4]**
14/20 . . . Mica; Vermiculite **[4]**
14/22 . . . Glass **[4]**
14/24 . . . . porous, e.g. foamed glass **[4]**
14/26 . . Carbonates **[4]**
14/28 . . . of calcium **[4]**
14/30 . . Oxides other than silica **[4]**
14/32 . . Carbides; Nitrides; Borides **[4]**
14/34 . . Metals **[4]**
14/36 . . Inorganic materials not provided for in groups C04B 14/04 to C04B 14/34 **[4]**
14/38 . Fibrous materials; Whiskers **[4]**
14/40 . . Asbestos **[4]**
14/42 . . Glass **[4]**
14/44 . . . Treatment for enhancing alkali resistance **[4]**
14/46 . . Rock wool **[4]**
14/48 . . Metal **[4]**

16/00 Use of organic materials as fillers, e.g. pigments, for mortars, concrete or artificial stone; **Treatment of organic materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone** (reinforcing elements for building E04C 5/00) **[4]**
16/02 . Cellulosic materials **[4]**
16/04 . Macromolecular compounds (C04B 16/02 takes precedence) **[4]**
16/06 . . fibrous **[4]**
16/08 . . porous, e.g. expanded polystyrene beads **[4]**
16/10 . . . Treatment for enhancing the mixability with the mortar **[4]**
16/12 . characterised by the shape (fibrous macromolecular compounds C04B 16/06; porous macromolecular compounds C04B 16/08) **[4]**

18/00 Use of agglomerated or waste materials or refuse as fillers for mortars, concrete or artificial stone; **Treatment of agglomerated or waste materials or refuse, specially adapted to enhance their filling properties in mortars, concrete or artificial stone** (reinforcing elements for building E04C 5/00) **[4]**
18/02 . Agglomerated materials **[4]**
18/04 . Waste materials; Refuse **[4]**
18/06 . . Combustion residues, e.g. purification products of smoke, fumes or exhaust gases **[4]**
18/08 . . . Flue dust **[4]**
18/10 . . . Burned refuse **[4]**
18/12 . . from quarries, mining or the like **[4]**
18/14 . . from metallurgical processes (treatment of molten slag C04B 5/00) **[4]**
18/16 . . from building or ceramic industry **[4]**
18/18 . . organic (C04B 18/10 takes precedence) **[4]**
18/20 . . . from macromolecular compounds **[4]**
18/22 . . . . Rubber **[4]**
18/24 . . . Vegetable refuse, e.g. rice husks, maize-ear refuse; Cellulosic materials, e.g. paper **[4]**
18/26 . . . . Wood, e.g. sawdust, wood shavings **[4]**
18/28 . . . . Mineralising; Compositions therefor **[4]**
18/30 . . Mixed waste; Waste of undefined composition, e.g. municipal waste (C04B 18/10 takes precedence) **[4]**

20/00 **Use of materials as fillers for mortars, concrete or artificial stone according to more than one of groups C04B 14/00 to C04B 18/00 and characterised by shape or grain distribution**; **Treatment of materials according to more than one of the groups C04B 14/00 to C04B 18/00 specially adapted to enhance their filling properties in mortars, concrete or artificial stone**; **Expanding or defibrillating materials** (reinforcing elements for building E04C 5/00) **[4]**

20/02 . Treatment **[4]**
20/04 . . Heat treatment **[4]**
20/06 . . . Expanding clay, perlite, vermiculite or like granular materials **[4]**
20/08 . . Defibrillating asbestos **[4]**
20/10 . Coating or impregnating **[4]**
20/12 . . Multiple coating or impregnating **[4]**

Use of materials as active ingredients [4]

(1) Active ingredients which react with cement compounds for forming new or modified mineralogical phases and are added before the hardening process, as well as cements added as additives to other cements, are classified in groups C04B 7/00 to C04B 12/00. **[4]**

(2) In groups C04B 22/00 to C04B 24/00, it is desirable to add the indexing codes of group C04B 103/00. **[6]**

22/00 **Use of inorganic materials as active ingredients for mortars, concrete or artificial stone, e.g. accelerators [4]**

22/02 . Elements **[4]**
22/04 . . Metals, e.g. aluminium used as blowing agent **[4]**
22/06 . Oxides; Hydroxides **[4]**
22/08 . Acids or salts thereof **[4]**
22/10 . . containing carbon in the anion, e.g. carbonates **[4]**
22/12 . . containing halogen in the anion, e.g. calcium chloride **[4]**
22/14 . . containing sulfur in the anion, e.g. sulfides **[4]**
22/16 . . containing phosphorus in the anion, e.g. phosphates **[4]**

24/00 **Use of organic materials as active ingredients for mortars, concrete or artificial stone, e.g. plasticisers [4]**

24/02 . Alcohols; Phenols; Ethers **[4]**
24/04 . Carboxylic acids; Salts, anhydrides or esters thereof **[4]**
24/06 . . containing hydroxy groups **[4]**
24/08 . Fats; Fatty oils; Ester type waxes; Higher fatty acids, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group; Oxidised oils or fats **[4]**
24/10 . Carbohydrates or derivatives thereof **[4]**
24/12 . Nitrogen containing compounds **[4]**
24/14 . . Peptides; Proteins; Derivatives thereof **[4]**
24/16 . Sulfur-containing compounds **[4]**
24/18 . . Lignin sulfonic acid or derivatives thereof, e.g. sulfite lye **[4]**
24/20 . . Sulfonated aromatic compounds **[4]**
24/22 . . . Condensation products thereof **[4]**
24/24 . Macromolecular compounds (C04B 24/14 takes precedence; macromolecular compounds comprising sulfonate or sulfate groups C04B 24/16) **[4,6]**
24/26 . . obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
24/28 . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
24/30 . . . Condensation polymers of aldehydes or ketones **[4]**
24/32 . . . Polyethers, e.g. alkylphenol polyglycolether **[4]**
24/34 . . Natural resins, e.g. rosin **[4]**
24/36 . . Bituminous materials, e.g. tar, pitch **[4]**
24/38 . . Polysaccharides or derivatives thereof **[4]**
24/40 . Compounds containing silicon, titanium or zirconium **[4]**
24/42 . . Compounds having one or more carbon-to-silicon linkages **[4]**

Compositions of mortars, concrete or artificial stone [4]

(1) Any ingredient of compositions of mortars, concrete or artificial stone, classified in groups C04B 26/00 to C04B 32/00 according to the last place rule, and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups C04B 7/00 to C04B 24/00. **[4,8]**

(2) Any ingredient of compositions of mortars, concrete or artificial stone, which is not identified by the classification in groups C04B 26/00 to C04B 32/00 according to the last place rule, and which is considered to represent information of particular interest for search, may also be classified in the last appropriate place in groups C04B 7/00 to C04B 24/00. This can for example be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. For example, a well defined Portland cement mortar mixture containing clay as an essential or characterising filler is classified in group C04B 28/04 and may also additionally be classified in group C04B 14/10. **[4,8]**

(3) In groups C04B 26/00 to C04B 32/00, it is desirable to add the indexing codes of group C04B 111/00. **[6]**

26/00 **Compositions of mortars, concrete or artificial stone, containing only organic binders [4]**

26/02 . Macromolecular compounds **[4]**
26/04 . . obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
26/06 . . . Acrylates **[4]**
26/08 . . . containing halogen **[4]**
26/10 . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
26/12 . . . Condensation polymers of aldehydes or ketones **[4]**
26/14 . . . Polyepoxides **[4]**
26/16 . . . Polyurethanes **[4]**
26/18 . . . Polyesters; Polycarbonates **[4]**
26/20 . . . Polyamides **[4]**
26/22 . . Natural resins, e.g. rosin **[4]**
26/24 . . . Cellulosic waste liquor, e.g. sulfite lye **[4]**
26/26 . . Bituminous materials, e.g. tar, pitch **[4]**
26/28 . . Polysaccharides or derivatives thereof **[4]**
26/30 . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages **[4]**
26/32 . . containing silicon **[4]**

28/00 **Compositions of mortars, concrete or artificial stone, containing inorganic binders or the reaction product of an inorganic and an organic binder, e.g. polycarboxylate cements [4]**
28/02 . containing hydraulic cements other than calcium sulfates **[4]**
28/04 . . Portland cements **[4]**
28/06 . . Aluminous cements **[4]**
28/08 . . Slag cements **[4]**
28/10 . . Lime cements or magnesium oxide cements **[4]**
28/12 . . . Hydraulic lime **[4]**
28/14 . containing calcium sulfate cements **[4]**
28/16 . . containing anhydrite **[4]**
28/18 . containing mixtures of the silica-lime type **[4]**
28/20 . . Sand-lime **[4]**
28/22 . . Lime and pozzuolanas **[4]**
28/24 . containing alkyl ammonium or alkali metal silicates; containing silica sols **[4]**
28/26 . . Silicates of the alkali metals **[4]**
28/28 . containing organic polyacids, e.g. polycarboxylate cements **[4]**
28/30 . containing magnesium cements (magnesium oxide cements C04B 28/10) **[4]**
28/32 . . Magnesium oxychloride cements, e.g. Sorel cement **[4]**
28/34 . containing cold phosphate binders **[4]**
28/36 . containing sulfur, sulfides or selenium **[4]**

30/00 **Compositions for artificial stone, not containing binders** (artificial stone from molten slag C04B 5/00) **[4]**
30/02 . containing fibrous materials **[4]**

32/00 **Artificial stone not provided for in other groups of this subclass** (artificial stone from molten slag C04B 5/00) **[4]**
32/02 . with reinforcements **[4]**

Ceramics

33/00 **Clay-wares** (monolithic refractories or refractory mortars C04B 35/66; porous products C04B 38/00) **[2]**
33/02 . Preparing or treating the raw materials individually or as batches
33/04 . . Clay; Kaolin
33/06 . . . Rendering lime harmless
33/08 . . . . Preventing efflorescence
33/10 . . Eliminating iron or lime
33/13 . . Compounding ingredients (C04B 33/36, C04B 35/71 take precedence) **[2]**
33/132 . . . Waste materials; Refuse (C04B 33/16 takes precedence) **[8]**
33/135 . . . . Combustion residues, e.g fly ash, incineration waste **[8]**
33/138 . . . . from metallurgical processes, e.g. slag, furnace dust, galvanic waste **[8]**
33/14 . . . Colouring matters
33/16 . . . Lean materials, e.g. grog, quartz
33/18 . . . for liquefying the batches
33/20 . . for dry-pressing (C04B 33/13 takes precedence)
33/22 . Grog products
33/24 . Manufacture of porcelain or white ware
33/26 . . of porcelain for electrical insulation
33/28 . Slip casting
33/30 . Drying methods
33/32 . Burning methods
33/34 . . combined with glazing
33/36 . Reinforced clay-wares **[2]**

35/00 **Shaped ceramic products characterised by their composition**; **Ceramic compositions** (containing free metal bonded to carbides, diamond, oxides, borides, nitrides, silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides, other than as macroscopic reinforcing agents C22C); **Processing powders of inorganic compounds preparatory to the manufacturing of ceramic products [4]**

(1) In this group, in the absence of an indication to the contrary, compositions are classified according to the constituent present in the highest proportion by weight. **[3]**
(2) In this group, magnesium is considered as an alkaline earth metal. **[6]**
(3) In this group, a composite is considered as a sintered mixture of different powdered materials, other than sintering aids, the materials being present as separate phases in the sintered product. **[6]**
(4) In this group, fine ceramics are considered as products having a polycrystalline fine-grained microstructure, e.g. of dimensions below 100 micrometers. **[6]**
(5) The production of ceramic powder is classified in this group in so far as it relates to the preparation of powder with specific characteristics. **[6]**

35/01 . based on oxides **[6]**
35/03 . . based on magnesium oxide, calcium oxide or oxide mixtures derived from dolomite **[6]**
35/035 . . . Refractories from grain sized mixtures containing non-oxide refractory materials, e.g. carbon **[6]**
35/04 . . . based on magnesium oxide **[6]**
35/043 . . . . Refractories from grain sized mixtures **[6]**
35/047 . . . . . containing chromium oxide or chrome ore **[6]**
35/05 . . . . Refractories by fusion casting **[6]**
35/053 . . . . Fine ceramics **[6]**
35/057 . . . based on calcium oxide **[6]**
35/06 . . . based on oxide mixtures derived from dolomite
35/08 . . based on beryllium oxide **[6]**
35/10 . . based on aluminium oxide **[6]**
35/101 . . . Refractories from grain sized mixtures **[6]**
35/103 . . . . containing non-oxide refractory materials, e.g. carbon (C04B 35/106 takes precedence) **[6]**
35/105 . . . . containing chromium oxide or chrome ore **[6]**
35/106 . . . . containing zirconium oxide or zircon ($ZrSiO_4$) **[6]**
35/107 . . . Refractories by fusion casting **[6]**
35/109 . . . . containing zirconium oxide or zircon ($ZrSiO_4$) **[6]**
35/111 . . . Fine ceramics **[6]**
35/113 . . . . based on beta-aluminium oxide **[6]**
35/115 . . . . Translucent or transparent products **[6]**
35/117 . . . . Composites **[6]**
35/119 . . . . . with zirconium oxide **[6]**
35/12 . . based on chromium oxide (C04B 35/047, C04B 35/105 take precedence) **[6]**
35/14 . . based on silica **[6]**
35/16 . . based on silicates other than clay **[6]**

35/18 . . . rich in aluminium oxide **[6]**
35/185 . . . . Mullite **[6]**
35/19 . . . . Alkali metal aluminosilicates, e.g. spodumene **[6]**
35/195 . . . . Alkaline earth aluminosilicates, e.g. cordierite **[6]**
35/20 . . . rich in magnesium oxide **[6]**
35/22 . . . rich in calcium oxide **[6]**
35/26 . . based on ferrites **[2,6]**
35/28 . . . with nickel oxide as the principal oxide **[2,6]**
35/30 . . . . with zinc oxide **[2,6]**
35/32 . . . with cobalt oxide as the principal oxide **[2,6]**
35/34 . . . . with zinc oxide **[2,6]**
35/36 . . . with manganese oxide as the principal oxide **[2,6]**
35/38 . . . . with zinc oxide **[2,6]**
35/40 . . . with rare earth oxide **[2,6]**
35/42 . . based on chromites (C04B 35/047, C04B 35/105 take precedence) **[2,6]**
35/44 . . based on aluminates **[2,6]**
35/443 . . . Magnesium aluminate spinel **[6]**
35/447 . . based on phosphates **[6]**
35/45 . . based on copper oxide or solid solutions thereof with other oxides **[6]**
35/453 . . based on zinc, tin or bismuth oxides or solid solutions thereof with other oxides, e.g. zincates, stannates or bismuthates **[6]**
35/457 . . . based on tin oxides or stannates **[6]**
35/46 . . based on titanium oxides or titanates (containing also zirconium or hafnium oxides, zirconates or hafnates C04B 35/49) **[6]**
35/462 . . . based on titanates **[6]**
35/465 . . . . based on alkaline earth metal titanates **[6]**
35/468 . . . . . based on barium titanates **[6]**
35/47 . . . . . based on strontium titanates **[6]**
35/472 . . . . based on lead titanates **[6]**
35/475 . . . . based on bismuth titanates **[6]**
35/478 . . . . based on aluminium titanates **[6]**
35/48 . . based on zirconium or hafnium oxides or zirconates or hafnates **[6]**
35/482 . . . Refractories from grain sized mixtures **[6]**
35/484 . . . Refractories by fusion casting **[6]**
35/486 . . . Fine ceramics **[6]**
35/488 . . . . Composites **[6]**
35/49 . . . containing also titanium oxide or titanates **[3,6]**
35/491 . . . . based on lead zirconates and lead titanates **[6]**
35/493 . . . . . containing also other lead compounds **[6]**
35/495 . . based on vanadium, niobium, tantalum, molybdenum or tungsten oxides or solid solutions thereof with other oxides, e.g. vanadates, niobates, tantalates, molybdates or tungstates **[6]**
35/497 . . . based on solid solutions with lead oxide **[6]**
35/499 . . . . containing also titanates **[6]**
35/50 . based on rare earth compounds
35/505 . . based on yttrium oxide **[6]**
35/51 . based on compounds of actinides **[2]**
35/515 . based on non-oxides (C04B 35/50, C04B 35/51 take precedence) **[6]**
35/52 . . based on carbon, e.g. graphite **[6]**
35/524 . . . obtained from polymer precursors, e.g. glass-like carbon material **[6]**
35/528 . . . obtained from carbonaceous particles with or without other non-organic components **[6]**
35/532 . . . . containing a carbonisable binder **[6]**
35/536 . . . based on expanded graphite **[6]**
35/547 . . based on sulfides or selenides **[6]**
35/553 . . based on fluorides **[6]**
35/56 . . based on carbides **[4]**
35/563 . . . based on boron carbide **[6]**
35/565 . . . based on silicon carbide **[6]**
35/567 . . . . Refractories from grain sized mixtures **[6]**
35/569 . . . . Fine ceramics **[6]**
35/571 . . . . . obtained from polymer precursors **[6]**
35/573 . . . . . obtained by reaction sintering **[6]**
35/575 . . . . . obtained by pressure sintering **[6]**
35/576 . . . . . obtained by sintering without pressure **[6]**
35/577 . . . . . Composites **[6]**
35/58 . . based on borides, nitrides or silicides **[4,6]**
35/581 . . . based on aluminium nitride **[6]**
35/582 . . . . Composites **[6]**
35/583 . . . based on boron nitride **[6]**
35/5831 . . . . based on cubic boron nitride **[6]**
35/5833 . . . . based on hexagonal boron nitride **[6]**
35/5835 . . . . Composites **[6]**
35/584 . . . based on silicon nitride **[6]**
35/586 . . . . Refractories from grain sized mixtures **[6]**
35/587 . . . . Fine ceramics **[6]**
35/589 . . . . . obtained from polymer precursors **[6]**
35/591 . . . . . obtained by reaction sintering **[6]**
35/593 . . . . . obtained by pressure sintering (C04B 35/594 takes precedence) **[6]**
35/594 . . . . . obtained by sintering a reaction-sintered product, with or without pressure **[6]**
35/596 . . . . . Composites **[6]**
35/597 . . . based on silicon oxynitrides **[6]**
35/599 . . . . based on silicon aluminium oxynitrides (SIALONS) **[6]**
35/622 . Forming processes; Processing powders of inorganic compounds preparatory to the manufacturing of ceramic products **[6]**
35/624 . . Sol-gel processing **[6]**
35/626 . . Preparing or treating the powders individually or as batches **[6]**
35/628 . . . Coating the powders **[6]**
35/63 . . . using additives specially adapted for forming the products **[6]**
35/632 . . . . Organic additives **[6]**
35/634 . . . . . Polymers (C04B 35/636 takes precedence) **[6]**
35/636 . . . . . Polysaccharides or derivatives thereof **[6]**
35/638 . . . . Removal thereof **[6]**
35/64 . . Burning or sintering processes (C04B 33/32 takes precedence) **[6]**
35/645 . . . Pressure sintering **[6]**
35/65 . . . Reaction sintering of free metal- or free silicon-containing compositions **[3]**
35/653 . . Processes involving a melting step **[6]**
35/657 . . . for manufacturing refractories (C04B 35/05, C04B 35/107, C04B 35/484 take precedence) **[6]**
35/66 . Monolithic refractories or refractory mortars, including those whether or not containing clay

Note

Any ingredient of a refractory mortar composition containing a hydraulic cement, e.g. aluminous cement, classified in group C04B 35/66, which is considered to represent information of interest for search, may also be classified in the last appropriate place in groups C04B 7/00 to C04B 24/00. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". For example, such an additional classification in group C04B 24/00 may be given for an organic retarder added to the mortar composition. **[8]**

35/71 . Ceramic products containing macroscopic reinforcing agents (C04B 35/66 takes precedence) **[3,4]**
35/74 . . containing shaped metallic materials **[2]**
35/76 . . . Fibres, filaments, whiskers, platelets, or the like **[2]**
35/78 . . containing non-metallic materials **[2]**
35/80 . . . Fibres, filaments, whiskers, platelets, or the like **[2]**
35/81 . . . . Whiskers **[6]**
35/82 . . . . Asbestos; Glass; Fused silica **[2]**
35/83 . . . . Carbon fibres in a carbon matrix **[6]**

Note

The products covered by this group are usually referred to as "carbon-carbon composites". **[6]**

35/84 . . . Impregnated or coated materials **[2]**

37/00 **Joining burned ceramic articles with other burned ceramic articles or other articles by heating**
37/02 . with metallic articles
37/04 . with articles made from glass

38/00 **Porous mortars, concrete, artificial stone or ceramic ware**; **Preparation thereof** (treating slag with gases or gas generating material C04B 5/06) **[4,6]**

Note

Porous mortars, concrete, artificial stone or ceramic ware characterised by the ingredients or compositions are also classified in groups C04B 2/00 to C04B 35/00. **[4]**

38/02 . by adding chemical blowing agents **[4]**
38/04 . by dissolving-out added substances **[4]**
38/06 . by burning-out added substances **[4]**
38/08 . by adding porous substances **[4]**
38/10 . by using foaming agents (C04B 38/02 takes precedence) **[4]**

40/00 **Processes, in general, for influencing or modifying the properties of mortars, concrete or artificial stone compositions, e.g. their setting or hardening ability** (by selecting active ingredients C04B 22/00 to C04B 24/00; hardening of a well-defined composition C04B 26/00 to C04B 28/00; making porous, cellular or lightening C04B 38/00) **[4,6]**
40/02 . Selection of the hardening environment **[4]**
40/04 . Preventing evaporation of the mixing water (permanent coverings C04B 41/00) **[4]**
40/06 . Inhibiting the setting, e.g. mortars of the deferred action type containing water in breakable containers **[4]**

41/00 **After-treatment of mortars, concrete, artificial stone or ceramics**; **Treatment of natural stone** (glazes, other than cold glazes, C03C 8/00) **[3]**

(1) In this group, the following terms or expressions are used with the meanings indicated: **[6]**
– "mortars", "concrete" and "artificial stone" cover materials after primary shaping. **[6]**
(2) Treating, e.g. coating or impregnating, a material with the same material or with a substance which ultimately is transformed into the same material is not considered after-treatment for this group but is classified as preparation of the material, e.g. a carbon body impregnated with a carbonisable substance is classified in C04B 35/52.
(3) In groups C04B 41/45 to C04B 41/80, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

41/45 . Coating or impregnating **[4]**
41/46 . . with organic materials **[4]**
41/47 . . . Oils, fats or waxes **[4]**
41/48 . . . Macromolecular compounds **[4]**
41/49 . . . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages **[4]**
41/50 . . with inorganic materials **[4]**
41/51 . . . Metallising **[4]**
41/52 . . Multiple coating or impregnating **[4]**
41/53 . involving the removal of part of the materials of the treated article **[4]**
41/60 . of only artificial stone **[4]**
41/61 . . Coating or impregnating **[4]**
41/62 . . . with organic materials **[4]**
41/63 . . . . Macromolecular compounds **[4]**
41/64 . . . . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages **[4]**
41/65 . . . with inorganic materials **[4]**
41/66 . . . . Fluorides, e.g. ocratation **[4]**
41/67 . . . . Phosphates **[4]**
41/68 . . . . Silicic acid; Silicates **[4]**
41/69 . . . . Metals **[4]**
41/70 . . . for obtaining at least two superposed coatings having different compositions **[4]**
41/71 . . . . at least one coating being an organic material **[4]**
41/72 . . involving the removal of part of the materials of the treated articles, e.g. etching **[4]**
41/80 . of only ceramics **[4]**
41/81 . . Coating or impregnating **[4]**
41/82 . . . with organic materials **[4]**
41/83 . . . . Macromolecular compounds **[4]**
41/84 . . . . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages **[4]**
41/85 . . . with inorganic materials **[4]**
41/86 . . . . Glazes; Cold glazes **[4]**
41/87 . . . . Ceramics **[4]**
41/88 . . . . Metals **[4]**
41/89 . . . for obtaining at least two superposed coatings having different compositions **[4]**

41/90 . . . . at least one coating being a metal **[4]**
41/91 . . involving the removal of part of the materials of the treated articles, e.g. etching **[4]**

Indexing scheme associated with groups C04B 22/00 and C04B 24/00, relating to the function or property of the active ingredients. [6]

103/00 Function or property of the active ingredients [6]
103/10 . Accelerators **[6]**
103/12 . . Set accelerators **[6]**
103/14 . . Hardening accelerators **[6]**
103/20 . Retarders **[6]**
103/22 . . Set retarders **[6]**
103/24 . . Hardening retarders **[6]**
103/30 . Water reducers, plasticisers, air-entrainers **[6]**
103/32 . . Superplasticisers **[6]**
103/40 . Surface-active agents, dispersants **[6]**
103/42 . Pore formers **[6]**
103/44 . Thickening, gelling or viscosity increasing agents **[6]**
103/46 . Water-loss reducers, hygroscopic or hydrophilic agents **[6]**
103/48 . Foam stabilisers **[6]**
103/50 . Defoamers, air detrainers **[6]**
103/52 . Grinding aids **[6]**
103/54 . Pigments; Dyes **[6]**
103/56 . Opacifiers **[6]**
103/60 . Agents for protection against chemical, physical or biological attack **[6]**
103/61 . . Corrosion inhibitors **[6]**
103/63 . . Flame-proofing agents **[6]**
103/65 . . Water proofers or repellants **[6]**
103/67 . . Biocides **[6]**
103/69 . . . Fungicides **[6]**

Indexing scheme associated with groups C04B 26/00 to C04B 32/00, relating to the function, property or use of the mortars, concrete or artificial stone. [6]

111/00 Function, property or use of the mortars, concrete or artificial stone [6]
111/10 . Compositions characterized by the absence of a specified material **[6]**
111/12 . . Absence of asbestos, e.g. cement-asbestos substitutes **[6]**
111/20 . Resistance against chemical, physical or biological attack **[6]**
111/21 . . Efflorescence resistance **[6]**
111/22 . . Carbonation resistance **[6]**
111/23 . . Acid resistance **[6]**
111/24 . . Sea water resistance **[6]**
111/25 . . Graffiti resistance **[6]**
111/26 . . Corrosion of reinforcement resistance **[6]**
111/27 . . Water resistance, i.e. waterproof or water repellant materials **[6]**
111/28 . . Fire resistance **[6]**
111/30 . Nailable or sawable materials **[6]**
111/32 . Expansion inhibited materials **[6]**
111/34 . Non-shrinking materials **[6]**
111/40 . Porous or lightweight materials **[6]**
111/42 . . Floating materials **[6]**
111/50 . Flexible or elastic materials **[6]**
111/52 . Sound insulating materials **[6]**
111/54 . Substitutes for natural stone, e.g. artificial marble **[6]**
111/56 . Compositions suited for fabrication of pipes, e.g. by centrifugal casting **[6]**
111/60 . Flooring materials **[6]**
111/62 . . Self-levelling compositions **[6]**
111/70 . Grouts **[6]**
111/72 . Compositions used for repairing existing buildings or building materials **[6]**
111/74 . Underwater applications **[6]**
111/76 . Use at sub-zero temperatures **[6]**
111/80 . Optical properties, e.g. transparency **[6]**
111/82 . . Coloured materials **[6]**
111/90 . Electrical properties **[6]**
111/92 . . Electrically insulating materials **[6]**
111/94 . . Electrically conducting materials **[6]**

C05 FERTILISERS; MANUFACTURE THEREOF [4]

(1) An ingredient in a mixture of fertilisers, or a single fertiliser which contains more than one of the chemical elements on which the subdivision into subclasses is based, is classified only in the first of the appropriate subclasses. Thus, a nitrophosphate or an ammoniated superphosphate is classified in C05B but not in C05C, magnesium phosphate is classified in C05B but not in C05D, and calcium cyanamide in C05C but not in C05D.

(2) Any ingredient in a mixture, which is considered to represent information of interest for search, may also additionally be classified according to Note (1). This can, for example, be the case when it is considered of interest to enable searching of mixtures using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

C05B PHOSPHATIC FERTILISERS

Subclass index

1/00 Superphosphates, i.e. fertilisers produced by reacting rock or bone phosphates with sulfuric or phosphoric acid in such amounts and concentrations as to yield solid products directly

1/02 . Superphosphates

1/04 . Double-superphosphate; Triple-superphosphate Other fertilisers based essentially on monocalcium phosphate

1/06 . Ammoniation of superphosphates (fertilisers based essentially on ammonium orthophosphate C05B 7/00)

1/10 . Apparatus for the manufacture of superphosphates

3/00 Fertilisers based essentially on di-calcium phosphate (C05B 11/00 takes precedence)

5/00 Thomas phosphate; **Other slag phosphates**

7/00 Fertilisers based essentially on alkali or ammonium orthophosphates (C05B 11/00 takes precedence)

9/00 Fertilisers based essentially on phosphates or double phosphates of magnesium (C05B 11/00 takes precedence)

11/00 Fertilisers produced by wet-treating or leaching raw materials either with acids in such amounts and concentrations as to yield solutions followed by neutralisation, or with alkaline lyes

11/02 . Pretreatment

11/04 . using mineral acid

11/06 . . using nitric acid (nitrophosphates)

11/08 . . using sulfuric acid

11/10 . . using orthophosphoric acid

11/12 . . using aqueous hydrochloric acid

11/14 . . using wet gaseous acids

11/16 . using alkaline lyes

13/00 Fertilisers produced by pyrogenic processes from phosphatic materials

13/02 . from rock phosphates (C05B 13/06 takes precedence)

13/04 . from metallic phosphorus compounds, e.g. ferro-phosphorus

13/06 . Alkali or alkaline earth meta- or polyphosphate fertilisers

15/00 Organic phosphatic fertilisers (bone meal C05B 17/00)

17/00 Other phosphatic fertilisers, e.g. soft rock phosphates, bone meal

17/02 . containing manganese

19/00 Granulation or pelletisation of phosphatic fertilisers other than slag (granulating slag C04B)

19/02 . of superphosphates or mixtures containing them

21/00 Mixtures of phosphatic fertilisers covered by more than one of main groups C05B 1/00 to C05B 19/00

C05C NITROGENOUS FERTILISERS

Subclass index

1/00 **Ammonium nitrate fertilisers**
1/02 . Granulation; Pelletisation; Stabilisation; Colouring

3/00 **Fertilisers containing other salts of ammonia or ammonia itself, e.g. gas liquor**

5/00 **Fertilisers containing other nitrates**
5/02 . containing sodium or potassium nitrate
5/04 . containing calcium nitrate

7/00 **Fertilisers containing calcium or other cyanamides**
7/02 . Granulation; Pelletisation; De-gassing; Hydrating; Hardening; Stabilisation; Oiling

9/00 **Fertilisers containing urea or urea compounds**
9/02 . containing urea-formaldehyde condensates

11/00 **Other nitrogenous fertilisers**

13/00 **Mixtures of nitrogenous fertilisers covered by more than one of main groups C05C 1/00 to C05C 11/00**

C05D INORGANIC FERTILISERS NOT COVERED BY SUBCLASSES C05B, C05C; FERTILISERS PRODUCING CARBON DIOXIDE

1/00 **Fertilisers containing potassium** (C05D 7/00 takes precedence)
1/02 . Manufacture from potassium chloride or sulfate or double or mixed salts thereof
1/04 . from minerals or volcanic rocks

3/00 **Calcareous fertilisers** (C05D 7/00 takes precedence)
3/02 . from limestone, calcium carbonate, calcium hydrate, slaked lime, calcium oxide, waste calcium compounds
3/04 . from blast-furnace slag or other slags containing lime or calcium silicates

5/00 **Fertilisers containing magnesium** (C05D 7/00 takes precedence)

7/00 **Fertilisers producing carbon dioxide**

9/00 **Other inorganic fertilisers**
9/02 . containing trace elements

11/00 **Mixtures of fertilisers covered by more than one of main groups C05D 1/00 to C05D 9/00**

C05F ORGANIC FERTILISERS NOT COVERED BY SUBCLASSES C05B, C05C, E.G. FERTILISERS FROM WASTE OR REFUSE

(1) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

(2) Processes where the composting step is the characterising feature, or apparatus therefor, are classified in group C05F 17/00. **[5]**

1/00 **Fertilisers made from animal corpses, or parts thereof**
1/02 . Apparatus for their manufacture

3/00 **Fertilisers from human or animal excrements, e.g. manure**
3/02 . Guano
3/04 . from human faecal masses
3/06 . Apparatus for their manufacture

5/00 **Fertilisers from distillery wastes, molasses, vinasses, sugar plant, or similar wastes or residues**

7/00 **Fertilisers from waste water, sewage sludge, sea slime, ooze or similar masses** (methods or installations for de-watering, drying, or incineration of sludge C02F 11/00)
7/02 . from sulfite liquor or other waste lyes from the manufacture of cellulose
7/04 . from waste liquors in the potash industry

9/00 **Fertilisers from household or town refuse**
9/02 . Apparatus for the manufacture
9/04 . Biological compost

11/00 **Other organic fertilisers**
11/02 . from peat, brown coal, or similar vegetable deposits
11/04 . . Horticultural earth ("Gärtnerische Erden") from peat
11/06 . . Apparatus for their manufacture
11/08 . Organic fertilisers containing added bacterial cultures, mycelia or the like
11/10 . Fertilisers containing plant vitamins or hormones

15/00 **Mixtures of fertilisers covered by more than one of main groups C05F 1/00 to C05F 11/00; Fertilisers from mixtures of starting materials, all the starting materials being covered by this subclass but not by the same main group [5]**

17/00 **Preparation of fertilisers characterised by the composting step [5]**
17/02 . Apparatus therefor **[5]**

C05G MIXTURES OF FERTILISERS COVERED INDIVIDUALLY BY DIFFERENT SUBCLASSES OF CLASS C05; MIXTURES OF ONE OR MORE FERTILISERS WITH MATERIALS NOT HAVING A SPECIFIC FERTILISING ACTIVITY, E.G. PESTICIDES, SOIL-CONDITIONERS, WETTING AGENTS (organic fertilisers containing added bacterial cultures, mycelia, or the like C05F 11/08; organic fertilisers containing plant vitamins or hormones C05F 11/10); **FERTILISERS CHARACTERISED BY THEIR FORM [4]**

(1) This subclass covers mixtures of fertilisers with soil-conditioning or soil-stabilising materials characterised by their fertilising activity. **[6]**

(2) This subclass does not cover mixtures of fertilisers with soil-conditioning or soil-stabilising materials characterised by their soil-conditioning or soil-stabilising activity, which are covered by group C09K 17/00. **[6]**

1/00 Mixtures of fertilisers covered individually by different subclasses of class C05

1/02 . of superphosphates with ammonium nitrate

1/04 . of Thomas phosphate with potassium compounds

1/06 . of alkali or ammonium orthophosphates with ammonium nitrate or ammonium sulfate or other nitrates or potassium compounds

1/08 . of ammonium nitrate with limestone or calcium carbonate

1/10 . of ammonium sulfate with potassium compounds

3/00 Mixtures of one or more fertilisers with materials not having a specifically fertilising activity

3/02 . with pesticides

3/04 . with soil conditioners

3/06 . with wetting agents

3/08 . with agents affecting the nitrification of ammonium compounds or urea in the soil

3/10 . with dust-preventing coatings **[4]**

5/00 Fertilisers characterised by their form (granulating fertilisers characterised by their chemical constitution, see the relevant groups in C05B to C05G) **[4]**

C06 EXPLOSIVES; MATCHES

C06B EXPLOSIVE OR THERMIC COMPOSITIONS (blasting F42D); MANUFACTURE THEREOF; USE OF SINGLE SUBSTANCES AS EXPLOSIVES [2]

(1) This subclass covers:
- compositions which are:
  (a) explosive: compositions included are those containing both a fuel and sufficient oxidiser so that, upon initiation, they are capable of undergoing a chemical change of a relatively high rate of speed, resulting in the production of usable force for blasting, firearms, propelling missiles, or the like; **[2]**
  (b) thermic: compositions included have (i) a consumable fuel component which consists of any element which is a metal, B, Si, Se or Te, or mixtures, intercompounds, or hydrides thereof; and (ii) in combination an oxidant component which is either a metal oxide or a salt (organic or inorganic) capable of yielding a metal oxide on decomposition; **[2]**
  (c) fuels for rocket engines and intended for reaction with an oxidant, excluding air, in order to provide thrust for motive power purposes; **[2]**
  (d) for use in affecting the explosion environment, e.g. for neutralising the poisonous gases of explosives, for cooling the explosion gases, or the like; **[2]**
- methods or apparatus for preparing or treating such compositions not otherwise provided for; **[2]**
- methods of using single substances as explosives. **[2]**

(2) In this subclass, the following term is used with the meaning indicated:
- "nitrated" covers compounds having a nitro group or a nitrate ester group. **[2]**

(3) Methods or apparatus for preparing or treating such compositions are classified according to the particular components of the compositions. **[2]**

Subclass index

21/00 Apparatus or methods for working-up explosives, e.g. forming, cutting, drying

Note

In groups C06B 23/00 to C06B 49/00, in the absence of an indication to the contrary, a composition is classified in the last place that provides for an ingredient. **[2]**

23/00 Compositions characterised by non-explosive or non-thermic constituents [2]

23/02 . for neutralising poisonous gases from explosives produced during blasting **[2]**

23/04 . for cooling the explosion gases **[2]**

25/00 Compositions containing a nitrated organic compound [2]

25/02 . the nitrated compound being starch or sugar **[2]**

25/04 . the nitrated compound being an aromatic **[2]**

25/06 . . with two or more nitrated aromatic compounds present **[2]**

25/08 . . . at least one of which is nitrated toluene **[2]**

25/10 . the compound being nitroglycerine **[2]**

25/12 . . with other nitrated organic compound **[2]**

25/14 . . . the other compound being a nitrated aliphatic diol **[2]**

25/16 . . . the other compound being a nitrated aromatic **[2]**

25/18 . the compound being nitrocellulose present as 10% or more by weight of the total composition **[2]**

25/20 . . with a non-explosive or a non-thermic component **[2]**

25/22 . . with a nitrated aromatic compound **[2]**

25/24 . . with nitroglycerine **[2]**

25/26 . . . with an organic non-explosive or an organic non-thermic component **[2]**

25/28 . the compound being nitrocellulose present as less than 10% by weight of the total composition **[2]**

25/30 . . with nitroglycerine **[2]**

25/32 . the compound being nitrated pentaerythritol **[2]**

25/34 . the compound being a nitrated acyclic, alicyclic or heterocyclic amine **[2]**

25/36 . the compound being a nitroparaffin **[2]**

25/38 . . with other nitrated organic compound **[2]**

25/40 . . with two or more nitroparaffins present **[2]**

27/00 Compositions containing a metal, boron, silicon, selenium or tellurium or mixtures, intercompounds or hydrides thereof, and hydrocarbons or halogenated hydrocarbons [2]

29/00 Compositions containing an inorganic oxygen-halogen salt, e.g. chlorate, perchlorate [2]

29/02 . of an alkali metal **[2]**

29/04 . . with an inorganic non-explosive or an inorganic non-thermic component **[2]**
29/06 . . . the component being a cyanide; the component being an oxide of iron, chromium or manganese **[2]**
29/08 . . with an organic non-explosive or an organic non-thermic component **[2]**
29/10 . . . the component being a dye or a colouring agent **[2]**
29/12 . . with carbon or sulfur **[2]**
29/14 . . with iodine or an iodide **[2]**
29/16 . . with a nitrated organic compound **[2]**
29/18 . . . the compound being nitrated toluene or a nitrated phenol **[2]**
29/20 . . . the compound being nitrocellulose **[2]**
29/22 . the salt being ammonium perchlorate **[2]**

31/00 Compositions containing an inorganic nitrogen-oxygen salt [2]
31/02 . the salt being an alkali metal or an alkaline earth metal nitrate **[2]**
31/04 . . with carbon or sulfur **[2]**
31/06 . . . with an organic non-explosive or an organic non-thermic component **[2]**
31/08 . . with a metal oxygen-halogen salt, e.g. inorganic chlorate, inorganic perchlorate **[2]**
31/10 . . . with carbon or sulfur **[2]**
31/12 . . with a nitrated organic compound **[2]**
31/14 . . . the compound being an aromatic **[2]**
31/16 . . . . the compound being a nitrated toluene **[2]**
31/18 . . . . the compound being a nitrated phenol, e.g. picric acid **[2]**
31/20 . . . the compound being nitroglycerine **[2]**
31/22 . . . the compound being nitrocellulose **[2]**
31/24 . . . . with other explosive or thermic component **[2]**
31/26 . . . . . the other component being nitroglycerine **[2]**
31/28 . the salt being ammonium nitrate **[2]**
31/30 . . with vegetable matter; with resin; with rubber **[2]**
31/32 . . with a nitrated organic compound **[2]**
31/34 . . . the nitrated compound being starch or sugar **[2]**
31/36 . . . . with other explosive or thermic component **[2]**
31/38 . . . the nitrated compound being an aromatic **[2]**
31/40 . . . . with an organic non-explosive or an organic non-thermic component **[2]**
31/42 . . . . with other explosive or thermic component **[2]**
31/44 . . . the compound being nitroglycerine **[2]**
31/46 . . . . with a vegetable matter component, e.g. wood pulp, sawdust **[2]**
31/48 . . . . with other explosive or thermic component **[2]**
31/50 . . . . . the other component being a nitrated organic compound **[2]**
31/52 . . . the compound being nitrocellulose present as 10% or more by weight of the total composition **[2]**
31/54 . . . . with other nitrated organic compound **[2]**
31/56 . . . the compound being nitrocellulose present as less than 10% by weight of the total composition **[2]**

33/00 Compositions containing particulate metal, alloy, boron, silicon, selenium or tellurium with at least one oxygen supplying material which is either a metal oxide or a salt, organic or inorganic, capable of yielding a metal oxide [2]
33/02 . with an organic non-explosive or an organic non-thermic component **[2]**
33/04 . the material being an inorganic nitrogen-oxygen salt **[2]**
33/06 . the material being an inorganic oxygen-halogen salt **[2]**
33/08 . with a nitrated organic compound **[2]**
33/10 . . the compound being an aromatic **[2]**
33/12 . the material being two or more oxygen-yielding compounds **[2]**
33/14 . . at least one being an inorganic nitrogen-oxygen salt **[2]**

35/00 Compositions containing a metal azide [2]

37/00 Compositions containing a metal fulminate [2]
37/02 . with a nitrated organic compound or an inorganic oxygen-halogen salt **[2]**

39/00 Compositions containing free phosphorus or a binary compound of phosphorus, except with oxygen [2]
39/02 . with an inorganic oxygen-halogen salt **[2]**
39/04 . . with a binary compound of phosphorus, except with oxygen **[2]**
39/06 . with free metal, alloy, boron, silicon, selenium or tellurium **[2]**

41/00 Compositions containing a nitrated metallo-organic compound [2]
41/02 . the compound containing lead **[2]**
41/04 . . with an organic explosive or an organic thermic component **[2]**
41/06 . . . with an inorganic explosive or an inorganic thermic component **[2]**
41/08 . . with a metal azide or a metal fulminate **[2]**
41/10 . . with other nitrated metallo-organic compound **[2]**

43/00 Compositions characterised by explosive or thermic constituents not provided for in groups C06B 25/00 to C06B 41/00 [2]

45/00 Compositions or products which are defined by structure or arrangement of component or product (explosive charges of particular form or shape F42B 1/00, F42B 3/00) **[2]**
45/02 . comprising particles of diverse size or shape **[2]**
45/04 . comprising solid particles dispersed in solid solution or matrix **[2]**
45/06 . . the solid solution or matrix containing an organic component **[2]**
45/08 . . . the dispersed solid containing an inorganic explosive or an inorganic thermic component **[2]**
45/10 . . . the organic component containing a resin **[2]**
45/12 . having contiguous layers or zones **[2]**
45/14 . . a layer or zone containing an inorganic explosive or an inorganic thermic component **[2]**
45/16 . . . the layer or zone containing at least one inorganic component from the group of azide, fulminate, phosphorus and phosphide **[2]**
45/18 . comprising a coated component (particles dispersed in a matrix C06B 45/04; coated explosive charges F42B) **[2]**

45/20 . . the component base containing an organic explosive or an organic thermic component **[2]**
45/22 . . . the coating containing an organic compound **[2]**
45/24 . . . . the compound being an organic explosive or an organic thermic component **[2]**
45/26 . . . . . the compound being a nitrated toluene **[2]**
45/28 . . . the component base containing nitrocellulose and nitroglycerine **[2]**
45/30 . . the component base containing an inorganic explosive or an inorganic thermic component **[2]**
45/32 . . . the coating containing an organic compound **[2]**
45/34 . . . . the compound being an organic explosive or an organic thermic component **[2]**
45/36 . . the component base containing both an organic explosive or thermic component and an inorganic explosive or thermic component **[2]**

47/00 Compositions in which the components are separately stored until the moment of burning or explosion, e.g. "Sprengel"-type explosives; **Suspensions of solid component in a normally non-explosive liquid phase, including a thickened aqueous phase [2]**
47/02 . the components comprising a binary propellant **[2]**
47/04 . . a component containing a nitrogen oxide or acid thereof **[2]**
47/06 . . a component being a liquefied normally gaseous material supplying oxygen (C06B 47/04 takes precedence) **[2]**
47/08 . . a component containing hydrazine or a hydrazine derivative **[2]**
47/10 . . a component containing free boron, an organic borane or a binary compound of boron, except with oxygen **[2]**
47/12 . . a component being a liquefied normally gaseous fuel **[2]**
47/14 . comprising a solid component and an aqueous phase **[2]**

49/00 Use of single substances as explosives [2]

C06C DETONATING OR PRIMING DEVICES; FUSES; CHEMICAL LIGHTERS; PYROPHORIC COMPOSITIONS [2]

5/00 Fuses, e.g. fuse cords
5/04 . Detonating fuses
5/06 . Fuse igniting means; Fuse connectors
5/08 . Devices for the manufacture of fuses

7/00 Non-electric detonators; **Blasting caps**; **Primers**
7/02 . Manufacture; Packing

9/00 Chemical contact igniters; **Chemical lighters**

15/00 Pyrophoric compositions; **Flints** (chemical lighters C06C 9/00)

C06D MEANS FOR GENERATING SMOKE OR MIST; GAS-ATTACK COMPOSITIONS; GENERATION OF GAS FOR BLASTING OR PROPULSION (CHEMICAL PART) [2]

3/00 Generation of smoke or mist (chemical part) (compositions used as biocides, pest repellants or attractants, or plant growth regulators A01N 25/18)

5/00 Generation of pressure gas, e.g. for blasting cartridges, starting cartridges, rockets (explosive compositions containing an oxidizer, fuels for rocket engines intended for reaction with an oxidant other than air C06B)
5/02 . by decompressing compressed, liquefied, or solidified gases
5/04 . by auto-decomposition of single substances
5/06 . by reaction of two or more solids
5/08 . by reaction of two or more liquids
5/10 . by reaction of solids with liquids

7/00 Compositions for gas-attacks

C06F MATCHES; MANUFACTURE OF MATCHES

1/00 Mechanical manufacture of matches
1/02 . Cutting match splints
1/04 . Filling match splints into carrier bars; Discharging matches
1/06 . Dipping, coating, impregnating, or drying of matches **[2]**
1/08 . Carrier bars
1/10 . . Guiding means for carrier bars
1/12 . Filling matches into boxes
1/14 . Manufacture of ignition strips
1/16 . Manufacture of matches connected together, e.g. in bands or blocks
1/18 . Printing on matches or match-boxes when combined with match manufacture
1/20 . Applying strike-surfaces, e.g. on match-boxes, on match-books
1/22 . Assembling matches
1/24 . Safety devices against fire
1/26 . Machines for complete match manufacture

3/00 Chemical features in the manufacture of matches
3/02 . Wooden strip for matches or substitute therefor
3/04 . . Chemical treatment before or after dipping, e.g. dyeing, impregnating
3/08 . Strike-surface compositions

5/00 Matches (match-books A24F 27/12)
5/02 . Permanent matches
5/04 . Wax matches

C07 ORGANIC CHEMISTRY [2]

(1) In this class, the following term is used with the meaning indicated:
– "preparation" covers purification, separation, stabilisation or use of additives, unless a separate place is provided therefor. **[4]**

(2) Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P. **[8]**

(3) In subclasses C07C to C07K and within each of theses subclasses, in the absence of an indication to the contrary, and with the exception referred to below, a compound is classified in the last appropriate place. For example, 2-butyl-pyridine, which contains an acyclic chain and a heterocyclic ring, is classified only as a heterocyclic compound, in subclass C07D. In general, and in the absence of an indication to the contrary (such as groups C07C 59/58, C07C 59/70), the terms "acyclic" and "aliphatic" are used to describe compounds in which there is no ring; and, if a ring were present, the compound would be taken by the "last place" rule to a later group for cycloaliphatic or aromatic compounds, if such a group exists. Where a compound or an entire group of compounds exists in tautomeric forms, it is classified as though existing in the form which is classified last in the system, unless the other form is specifically mentioned earlier in the system.

(4) Chemical compounds and their preparation are classified in the groups for the type of compound prepared. The processes of preparation are also classified in the groups for the types of reaction employed, if of interest. General processes for the preparation of a class of compounds falling into more than one main group are classified in the groups for the processes employed, when such groups exist. The compounds prepared are also classified in the groups for the types of compound prepared, if of interest.

(5) In this class, in the absence of an indication to the contrary, the compounds containing carboxyl or thiocarboxyl groups are classified as the relevant carboxylic or thiocarboxylic acids, unless the "last place rule" (see Note (3), above) dictates otherwise; a carboxyl group being a carbon atom having three bonds, and no more than three, to hetero atoms, other than nitrogen atoms of nitro or nitroso groups, with at least one multiple bond to the same hetero atom and a thiocarboxyl group being a carboxyl group having at least one bond to a sulfur atom, e.g. amides or nitriles of carboxylic acids, are classified with the corresponding acids. **[5]**

(6) Salts of a compound, unless specifically provided for, are classified as that compound, e.g. aniline hydrochloride is classified as containing carbon, hydrogen and nitrogen only (in group C07C 211/46), sodium malonate is classified as malonic acid (in C07C 55/08), and a mercaptide is classified as the mercaptan. Metal chelates are dealt with in the same way. Similarly, metal alcoholates and metal phenates are classified in subclass C07C and not in subclass C07F, the alcoholates in groups C07C 31/28 to C07C 31/32 and the phenates as the corresponding phenols in group C07C 39/235 or C07C 39/44. Salts, adducts or complexes formed between two or more organic compounds are classified according to all compounds forming the salts, adducts or complexes. **[2]**

C07B GENERAL METHODS OF ORGANIC CHEMISTRY; APPARATUS THEREFOR (preparation of carboxylic acid esters by telomerisation C07C 67/47; processes for preparing macromolecular compounds, e.g. telomerisation C08F, C08G)

(1) In this subclass, a functional group which is already present in some residue being introduced and is not substantially involved in a chemical reaction, is not considered as the functional group which is formed or introduced as a result of the chemical reaction. **[4]**

(2) In this subclass, the following term is used with the meaning indicated:
– "separation" means separation only for the purposes of recovering organic compounds. **[4]**

(3) When classifying in this subclass, classification is also made in group B01D 15/08insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

(4) In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place according to the type of reaction employed, noting the bond or the functional group which is formed or introduced as a result of the chemical reaction. **[4]**

Subclass index

31/00 Reduction in general [4]

33/00 Oxidation in general [4]

Reactions without formation or introduction of functional groups containing hetero atoms [4]

35/00 Reactions without formation or introduction of functional groups containing hetero atoms, involving a change in the type of bonding between two carbon atoms already directly linked [4]

35/02 . Reduction **[4]**
35/04 . Dehydrogenation **[4]**
35/06 . Decomposition, e.g. elimination of halogens, water or hydrogen halides **[4]**
35/08 . Isomerisation **[4]**

37/00 Reactions without formation or introduction of functional groups containing hetero atoms, involving either the formation of a carbon-to-carbon bond between two carbon atoms not directly linked already or the disconnection of two directly linked carbon atoms [4]

37/02 . Addition **[4]**
37/04 . Substitution **[4]**
37/06 . Decomposition, e.g. elimination of carbon dioxide **[4]**
37/08 . Isomerisation **[4]**
37/10 . Cyclisation **[4]**
37/12 . . Diels-Alder reactions **[4]**

Reactions with formation or introduction of functional groups containing hetero atoms [4]

39/00 Halogenation [4]

41/00 Formation or introduction of functional groups containing oxygen [4]

41/02 . of hydroxy or O-metal groups **[4]**
41/04 . of ether, acetal or ketal groups **[4]**
41/06 . of carbonyl groups **[4]**
41/08 . of carboxyl groups or salts, halides or anhydrides thereof **[4]**
41/10 . . Salts, halides or anhydrides of carboxyl groups **[4]**
41/12 . of carboxylic acid ester groups **[4]**
41/14 . of peroxy or hydroperoxy groups **[4]**

43/00 Formation or introduction of functional groups containing nitrogen [4]

43/02 . of nitro or nitroso groups **[4]**
43/04 . of amino groups **[4]**
43/06 . of amide groups **[4]**
43/08 . of cyano groups **[4]**
43/10 . of isocyanate groups **[4]**

45/00 Formation or introduction of functional groups containing sulfur [4]

45/02 . of sulfo or sulfonyldioxy groups **[4]**
45/04 . of sulfonyl or sulfinyl groups **[4]**
45/06 . of mercapto or sulfide groups **[4]**

47/00 Formation or introduction of functional groups not provided for in groups C07B 39/00 to C07B 45/00 [4]

49/00 Grignard reactions [4]

51/00 Introduction of protecting groups or activating groups, not provided for in groups C07B 31/00 to C07B 49/00 [4]

53/00 Asymmetric syntheses [4]

55/00 Racemisation; Complete or partial inversion [4]

57/00 Separation of optically-active organic compounds [4]

59/00 Introduction of isotopes of elements into organic compounds [4]

***60/00 Generation of organic free radicals* [2011.01]**

61/00 Other general methods [4]

Purification; Separation; Stabilisation [4]

63/00 Purification; Separation specially adapted for the purpose of recovering organic compounds (separation of optically-active organic compounds C07B 57/00); **Stabilisation; Use of additives [4]**

63/02 . by treatment giving rise to a chemical modification **[4]**
63/04 . Use of additives **[4]**

C07C ACYCLIC OR CARBOCYCLIC COMPOUNDS (preparation of macromolecular compounds C08F; production of organic compounds by electrolysis or electrophoresis C25B 3/00, C25B 7/00)

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
- "bridged" means the presence of at least one fusion other than ortho, peri or spiro;
- two rings are "condensed" if they share at least one ring member, i.e. "spiro" and "bridged" are considered as condensed;
- "condensed ring system" is a ring system in which all rings are condensed among themselves;
- "number of rings" in a condensed ring system equals the number of scissions necessary to convert the ring system into one acyclic chain;
- "quinones" are compounds derived from compounds containing a six-membered aromatic ring or a system comprising six-membered aromatic rings (which system may be condensed or not condensed) by replacing two or four $\rangle CH$ groups of the six-membered aromatic rings by $\rangle C{=}O$ groups, and by removing one or two carbon-to-carbon double bonds, respectively, and rearranging the remaining carbon-to-carbon double bonds to give a ring or ring system with alternating double bonds, including the carbon-to-oxygen bonds; this means that acenaphthenequinone or camphorquinone are not considered as quinones. **[5]**

(2) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07K and within these subclasses. **[8]**

(3) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

(4) When classifying in this subclass, classification is also made in group B01D 15/08insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

(5) In this subclass, in the absence of an indication to the contrary, a process is classified in the last appropriate place. **[3]**

(6) In this subclass, in the absence of an indication to the contrary, "quaternary ammonium compounds" are classified with the corresponding "non-quaternised nitrogen compounds". **[5]**

(7) For the classification of compounds in groups C07C 1/00 to C07C 71/00and C07C 401/00 to C07C 409/00:
- a compound is classified considering the molecule as a whole (rule of the "whole molecule approach");
- a compound is considered to be saturated if it does not contain carbon atoms bound to each other by multiple bonds;
- a compound is considered to be unsaturated if it contains carbon atoms bound to each other by multiple bonds, which includes a six-membered aromatic ring,

unless otherwise specified or implicitly derivable from the subdivision, as in group C07C 69/00, e.g. C07C 69/712.

(8) For the classification of compounds in groups C07C 201/00 to C07C 395/00, i.e. after the functional group has been determined according to the "last place rule", a compound is classified according to the following principles:
- compounds are classified in accordance with the nature of the carbon atom to which the functional group is attached;
- a carbon skeleton is a carbon atom, other than a carbon atom of a carboxyl group, or a chain of carbon atoms bound to each other; a carbon skeleton is considered to be terminated by every bond to an element other than carbon or to a carbon atom of a carboxyl group;
- when the molecule contains several functional groups, only functional groups linked to the same carbon skeleton as the one first determined are considered;
- a carbon skeleton is considered to be saturated if it does not contain carbon atoms bound to each other by multiple bonds;
- a carbon skeleton is considered to be unsaturated if it contains carbon atoms bound to each other by multiple bonds, which includes a six-membered aromatic ring. **[5]**

Subclass index

Hydrocarbons [3]

1/00 Preparation of hydrocarbons from one or more compounds, none of them being a hydrocarbon

1/02 . from oxides of carbon (preparation of liquid hydrocarbon mixtures of undefined composition C10G 2/00; of synthetic natural gas C10L 3/06) **[5]**
1/04 . . from carbon monoxide with hydrogen
1/06 . . . in the presence of organic compounds, e.g. hydrocarbons
1/08 . . . Isosyntheses
1/10 . . from carbon monoxide with water vapour
1/12 . . from carbon dioxide with hydrogen
1/20 . starting from organic compounds containing only oxygen atoms as hetero atoms
1/207 . . from carbonyl compounds **[5]**
1/213 . . . by splitting of esters **[5]**
1/22 . . by reduction
1/24 . . by elimination of water
1/247 . . by splitting of cyclic ethers **[3]**
1/26 . starting from organic compounds containing only halogen atoms as hetero atoms
1/28 . . by ring closure
1/30 . . by splitting-off the elements of hydrogen halide from a single molecule
1/32 . starting from compounds containing hetero atoms other than, or in addition to, oxygen or halogen **[3]**
1/34 . . reacting phosphines with aldehydes or ketones, e.g. Wittig reaction **[3]**
1/36 . by splitting of esters (C07C 1/213, C07C 1/30 take precedence) **[3,5]**

2/00 Preparation of hydrocarbons from hydrocarbons containing a smaller number of carbon atoms [3]

2/02 . by addition between unsaturated hydrocarbons **[3]**
2/04 . . by oligomerisation of well-defined unsaturated hydrocarbons without ring formation **[3]**
2/06 . . . of alkenes, i.e. acyclic hydrocarbons having only one carbon-to-carbon double bond **[3]**
2/08 . . . . Catalytic processes **[3]**
2/10 . . . . . with metal oxides **[3]**
2/12 . . . . . with crystalline alumino-silicates, e.g. molecular sieves **[3]**
2/14 . . . . . with inorganic acids; with salts or anhydrides of acids **[3]**
2/16 . . . . . Acids of sulfur; Salts thereof; Sulfur oxides **[3]**
2/18 . . . . . Acids of phosphorus; Salts thereof; Phosphorus oxides **[3]**
2/20 . . . . . Acids of halogen; Salts thereof **[3]**
2/22 . . . . . Metal halides; Complexes thereof with organic compounds **[3]**
2/24 . . . . . with metals **[3]**
2/26 . . . . . with hydrides or organic compounds (C07C 2/22 takes precedence) **[3]**
2/28 . . . . . with ion-exchange resins **[3]**
2/30 . . . . . containing a metal-to-carbon bond; Metal hydrides **[3]**
2/32 . . . . . as complexes, e.g. acetyl-acetonates **[3]**
2/34 . . . . . Metal-hydrocarbon complexes **[3]**
2/36 . . . . . as phosphines, arsines, stilbines or bismuthines **[3]**
2/38 . . . of dienes or alkynes **[3]**
2/40 . . . . of conjugated dienes **[3]**
2/42 . . homo- or co-oligomerisation with ring formation, not being a Diels-Alder conversion **[3]**
2/44 . . . of conjugated dienes only **[3]**
2/46 . . . . Catalytic processes **[3]**
2/48 . . . of only hydrocarbons containing a carbon-to-carbon triple bond **[3]**
2/50 . . Diels-Alder conversion **[3]**
2/52 . . . Catalytic processes **[3]**
2/54 . by addition of unsaturated hydrocarbons to saturated hydrocarbons, or to hydrocarbons containing a six-membered aromatic ring with no unsaturation outside the aromatic ring **[3]**
2/56 . . Addition to acyclic hydrocarbons **[3]**
2/58 . . . Catalytic processes **[3]**
2/60 . . . . with halides **[3]**
2/62 . . . . with acids **[3]**
2/64 . . Addition to a carbon atom of a six-membered aromatic ring **[3]**
2/66 . . . Catalytic processes **[3]**
2/68 . . . . with halides **[3]**
2/70 . . . . with acids **[3]**
2/72 . . Addition to a non-aromatic carbon atom of hydrocarbons containing a six-membered aromatic ring **[3]**
2/74 . by addition with simultaneous hydrogenation **[3]**
2/76 . by condensation of hydrocarbons with partial elimination of hydrogen **[3]**
2/78 . . Processes with partial combustion **[3]**
2/80 . . Processes with the aid of electrical means **[3]**
2/82 . . oxidative coupling **[3]**
2/84 . . . catalytic **[3]**
2/86 . by condensation between a hydrocarbon and a non-hydrocarbon **[3]**
2/88 . . Growth and elimination reactions **[3]**

4/00 Preparation of hydrocarbons from hydrocarbons containing a larger number of carbon atoms [3]

4/02 . by cracking a single hydrocarbon or a mixture of individually defined hydrocarbons or a normally gaseous hydrocarbon fraction **[3]**
4/04 . . Thermal processes **[3]**
4/06 . . Catalytic processes **[3]**
4/08 . by splitting-off an aliphatic or cycloaliphatic part from the molecule **[3]**
4/10 . . from acyclic hydrocarbons **[3]**
4/12 . . from hydrocarbons containing a six-membered aromatic ring, e.g. propyltoluene to vinyltoluene **[3]**
4/14 . . . splitting taking place at an aromatic-aliphatic bond **[3]**
4/16 . . . . Thermal processes **[3]**
4/18 . . . . Catalytic processes **[3]**
4/20 . . . . Hydrogen being formed in situ, e.g. from steam **[3]**
4/22 . by depolymerisation to the original monomer, e.g. dicyclopentadiene to cyclopentadiene **[3]**
4/24 . by splitting polyarylsubstituted aliphatic compounds at an aliphatic-aliphatic bond, e.g. 1,4-diphenylbutane to styrene **[3]**
4/26 . by splitting polyaryl compounds at a bond between uncondensed six-membered aromatic rings, e.g. biphenyl to benzene **[3]**

5/00 Preparation of hydrocarbons from hydrocarbons containing the same number of carbon atoms

5/02 . by hydrogenation

5/03 . . of non-aromatic carbon-to-carbon double bonds **[3]**
5/05 . . . Partial hydrogenation **[3]**
5/08 . . of carbon-to-carbon triple bonds
5/09 . . . to carbon-to-carbon double bonds **[3]**
5/10 . . of aromatic six-membered rings
5/11 . . . Partial hydrogenation **[3]**
5/13 . . with simultaneous isomerisation **[3]**
5/22 . by isomerisation (with simultaneous hydrogenation C07C 5/13)
5/23 . . Rearrangement of carbon-to-carbon unsaturated bonds **[3]**
5/25 . . . Migration of carbon-to-carbon double bonds **[3]**
5/27 . . Rearrangement of carbon atoms in the hydrocarbon skeleton **[3]**
5/29 . . . changing the number of carbon atoms in a ring while maintaining the number of rings **[3]**
5/31 . . . changing the number of rings **[3]**
5/32 . by dehydrogenation with formation of free hydrogen **[2]**
5/327 . . Formation of non-aromatic carbon-to-carbon double bonds only **[3]**
5/333 . . . Catalytic processes **[3]**
5/35 . . Formation of carbon-to-carbon triple bonds only **[3]**
5/367 . . Formation of an aromatic six-membered ring from an existing six-membered ring, e.g. dehydrogenation of ethylcyclohexane to ethylbenzene **[3]**
5/373 . . with simultaneous isomerisation **[3]**
5/387 . . . of cyclic compounds containing no six-membered ring to compounds containing a six-membered aromatic ring **[3]**
5/393 . . . with cyclisation to an aromatic six-membered ring, e.g. dehydrogenation of n-hexane to benzene **[3]**
5/41 . . . . Catalytic processes **[3]**
5/42 . by dehydrogenation with a hydrogen acceptor **[2]**

(1) In this group:
– the catalyst is considered as forming part of the acceptor system in case of simultaneous catalyst reduction; **[3]**
– compounds added for binding the reduced acceptor system are not considered as belonging to the acceptor system. **[3]**

(2) The acceptor system is classified according to the supplying substances in case of in situ formation of the acceptor system or of in situ regeneration of the reduced acceptor system. **[3]**

5/44 . . with a halogen or a halogen-containing compound as an acceptor **[2]**
5/46 . . with sulfur or a sulfur-containing compound as an acceptor **[2]**
5/48 . . with oxygen as an acceptor **[2]**
5/50 . . with an organic compound as an acceptor **[2]**
5/52 . . . with a hydrocarbon as an acceptor, e.g. hydrocarbon disproportionation, i.e. 2 $C_nH_p \rightarrow C_nH_{p+q} + C_nH_{p-q}$ **[2]**
5/54 . . with an acceptor system containing at least two compounds provided for in more than one of groups C07C 5/44 to C07C 5/50 **[3]**
5/56 . . . containing only oxygen and either halogens or halogen-containing compounds **[3]**

6/00 Preparation of hydrocarbons from hydrocarbons containing a different number of carbon atoms by redistribution reactions [3]
6/02 . Metathesis reactions at an unsaturated carbon-to-carbon bond **[3]**
6/04 . . at a carbon-to-carbon double bond **[3]**
6/06 . . . at a cyclic carbon-to-carbon double bond **[3]**
6/08 . by conversion at a saturated carbon-to-carbon bond **[3]**
6/10 . . in hydrocarbons containing no six-membered aromatic rings **[3]**
6/12 . . of exclusively hydrocarbons containing a six-membered aromatic ring **[3]**

7/00 Purification, separation or stabilisation of hydrocarbons; Use of additives [5]
7/04 . by distillation **[3]**
7/05 . . with the aid of auxiliary compounds **[3]**
7/06 . . . by azeotropic distillation
7/08 . . . by extractive distillation
7/09 . by fractional condensation **[3]**
7/10 . by extraction, i.e. purification or separation of liquid hydrocarbons with the aid of liquids **[3]**
7/11 . by absorption, i.e. purification or separation of gaseous hydrocarbons with the aid of liquids **[3]**
7/12 . by adsorption, i.e. purification or separation of hydrocarbons with the aid of solids, e.g. with ion-exchangers **[3]**
7/13 . . by molecular-sieve technique **[2,3]**
7/135 . by gas-chromatography **[3]**
7/14 . by crystallisation; Purification or separation of the crystals **[3]**
7/144 . using membranes, e.g. selective permeation **[3]**
7/148 . by treatment giving rise to a chemical modification of at least one compound **[3]**
7/152 . . by forming adducts or complexes **[3]**
7/156 . . . with solutions of copper salts **[3]**
7/163 . . by hydrogenation **[3]**
7/167 . . . for removal of compounds containing a triple carbon-to-carbon bond **[3]**
7/17 . . with acids or sulfur oxides **[3]**
7/171 . . . Sulfuric acid or oleum **[7]**
7/173 . . with the aid of organo-metallic compounds **[3]**
7/177 . . by selective oligomerisation or selective polymerisation of at least one compound of the mixture **[3]**
7/20 . Use of additives, e.g. for stabilisation **[3]**

9/00 Acyclic saturated hydrocarbons
9/02 . with one to four carbon atoms **[5]**
9/04 . . Methane (production by treatment of sewage C02F 11/04) **[5]**
9/06 . . Ethane
9/08 . . Propane
9/10 . . with four carbon atoms **[5]**
9/12 . . . Iso-butane
9/14 . with five to fifteen carbon atoms
9/15 . . Straight-chain hydrocarbons **[3]**
9/16 . . Branched-chain hydrocarbons
9/18 . . . with five carbon atoms **[5]**
9/21 . . . 2,2,4-Trimethylpentane **[3]**
9/22 . with more than fifteen carbon atoms

11/00 Acyclic unsaturated hydrocarbons
11/02 . Alkenes
11/04 . . Ethene

11/06 . . Propene
11/08 . . with four carbon atoms **[5]**
11/09 . . . Isobutene **[3]**
11/10 . . with five carbon atoms **[5]**
11/107 . . with six carbon atoms **[5]**
11/113 . . . Methylpentenes **[3]**
11/12 . Alkadienes
11/14 . . Allene
11/16 . . with four carbon atoms
11/167 . . . 1,3-Butadiene **[3]**
11/173 . . with five carbon atoms **[3]**
11/18 . . . Isoprene **[3]**
11/20 . . . 1,3-Pentadiene **[3]**
11/21 . Alkatrienes; Alkatetraenes; Other alkapolyenes **[2,3]**
11/22 . containing carbon-to-carbon triple bonds
11/24 . . Acetylene (production of acetylene gas by wet methods C10H) **[5]**
11/28 . containing carbon-to-carbon double bonds and carbon-to-carbon triple bonds
11/30 . . Butenyne

13/00 Cyclic hydrocarbons containing rings other than, or in addition to, six-membered aromatic rings

13/02 . Monocyclic hydrocarbons or acyclic hydrocarbon derivatives thereof
13/04 . . with a three-membered ring
13/06 . . with a four-membered ring
13/08 . . with a five-membered ring
13/10 . . . with a cyclopentane ring
13/11 . . . . substituted by unsaturated hydrocarbon groups **[2]**
13/12 . . . with a cyclopentene ring
13/15 . . . with a cyclopentadiene ring **[3]**
13/16 . . with a six-membered ring
13/18 . . . with a cyclohexane ring
13/19 . . . . substituted by unsaturated hydrocarbon groups **[2]**
13/20 . . . with a cyclohexene ring
13/21 . . . . Menthadienes **[2]**
13/23 . . . with a cyclohexadiene ring **[3]**
13/24 . . with a seven-membered ring
13/26 . . with an eight-membered ring
13/263 . . . with a cyclo-octene or cyclo-octadiene ring **[3]**
13/267 . . . with a cyclo-octatriene or cyclo-octatetraene ring **[3]**
13/271 . . with a nine- to eleven-membered ring **[3]**
13/273 . . with a twelve-membered ring **[3]**
13/275 . . . the twelve-membered ring being unsaturated **[3]**
13/277 . . . . with a cyclododecatriene ring **[3]**
13/28 . Polycyclic hydrocarbons or acyclic hydrocarbon derivatives thereof

Note

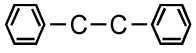
Ring systems consisting only of condensed six-membered rings with maximum number of non-cumulative double bonds are classified in group C07C 15/00. **[3]**

13/32 . . with condensed rings
13/34 . . . with a bicyclo ring system containing four carbon atoms
13/36 . . . with a bicyclo ring system containing five carbon atoms
13/38 . . . with a bicyclo ring system containing six carbon atoms
13/39 . . . with a bicyclo ring system containing seven carbon atoms **[3]**
13/40 . . . . with a bicycloheptane ring structure **[3]**
13/42 . . . . with a bicycloheptene ring structure **[3]**
13/43 . . . . . substituted by unsaturated acyclic hydrocarbon groups **[3]**
13/44 . . . with a bicyclo ring system containing eight carbon atoms
13/45 . . . with a bicyclo ring system containing nine carbon atoms **[3]**
13/465 . . . . Indenes; Completely or partially hydrogenated indenes **[3]**
13/47 . . . with a bicyclo ring system containing ten carbon atoms **[3]**
13/48 . . . . Completely or partially hydrogenated naphthalenes **[3]**
13/50 . . . . . Decahydronaphthalenes **[3]**
13/52 . . . . Azulenes; Completely or partially hydrogenated azulenes **[3]**
13/54 . . . with three condensed rings
13/547 . . . . at least one ring not being six-membered, the other rings being at the most six-membered **[3]**
13/553 . . . . . Indacenes; Completely or partially hydrogenated indacenes **[3]**
13/567 . . . . . Fluorenes; Completely or partially hydrogenated fluorenes **[3]**
13/573 . . . . with three six-membered rings **[3]**
13/58 . . . . . Completely or partially hydrogenated anthracenes **[3]**
13/60 . . . . . Completely or partially hydrogenated phenanthrenes **[3]**
13/605 . . . . with a bridged ring system **[3]**
13/61 . . . . . Bridged indenes, e.g. dicyclopentadiene **[3]**
13/615 . . . . . Adamantanes **[3]**
13/62 . . . with more than three condensed rings
13/64 . . . . with a bridged ring system **[3]**
13/66 . . . . the condensed ring system contains only four rings **[3]**
13/68 . . . . . with a bridged ring system **[3]**
13/70 . . . with a condensed ring system consisting of at least two mutually uncondensed aromatic ring systems, linked by an annular structure formed by carbon chains on non-adjacent positions of the aromatic ring, e.g. cyclophanes **[3]**
13/72 . . . Spiro hydrocarbons **[3]**

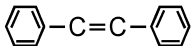
15/00 Cyclic hydrocarbons containing only six-membered aromatic rings as cyclic part [2]

15/02 . Monocyclic hydrocarbons
15/04 . . Benzene
15/06 . . Toluene
15/067 . . C_8H_{10} hydrocarbons **[3]**
15/073 . . . Ethylbenzene **[3]**
15/08 . . . Xylenes **[3]**
15/085 . . Isopropylbenzene **[3]**
15/107 . . having a saturated side-chain containing at least six carbon atoms, e.g. detergent alkylates **[3]**
15/113 . . . having at least two saturated side-chains, each containing at least six carbon atoms **[3]**
15/12 . Polycyclic non-condensed hydrocarbons
15/14 . . all phenyl groups being directly linked **[3]**

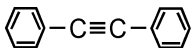
15/16 . . containing at least two phenyl groups linked by one single acyclic carbon atom
15/18 . . containing at least one group with formula



15/20 . Polycyclic condensed hydrocarbons
15/24 . . containing two rings
15/27 . . containing three rings **[3]**
15/28 . . . Anthracenes **[3]**
15/30 . . . Phenanthrenes **[3]**
15/38 . . containing four rings **[3]**
15/40 . substituted by unsaturated hydrocarbon radicals **[3]**
15/42 . . monocyclic **[3]**
15/44 . . . the hydrocarbon substituent containing a carbon-to-carbon double bond **[3]**
15/46 . . . . Styrene; Ring-alkylated styrenes **[3]**
15/48 . . . the hydrocarbon substituent containing a carbon-to-carbon triple bond **[3]**
15/50 . . polycyclic non-condensed **[3]**
15/52 . . . containing a group with formula

 **[3]**

15/54 . . . containing a group with formula

 **[3]**

15/56 . . polycyclic condensed **[3]**
15/58 . . . containing two rings **[3]**
15/60 . . . containing three rings **[3]**
15/62 . . . containing four rings **[3]**

Compounds containing carbon and halogens with or without hydrogen

17/00 Preparation of halogenated hydrocarbons
17/007 . from carbon or carbides and halogens **[6]**
17/013 . by addition of halogens **[6]**
17/02 . . to unsaturated hydrocarbons **[6]**
17/04 . . to unsaturated halogenated hydrocarbons **[6]**
17/06 . . combined with replacement of hydrogen atoms by halogens
17/07 . by addition of hydrogen halides **[6]**
17/08 . . to unsaturated hydrocarbons **[6]**
17/087 . . to unsaturated halogenated hydrocarbons **[6]**
17/093 . by replacement by halogens **[6]**
17/10 . . of hydrogen atoms (combined with addition of halogens to unsaturated hydrocarbons C07C 17/06) **[6]**
17/12 . . . in the ring of aromatic compounds **[6]**
17/14 . . . in the side-chain of aromatic compounds **[6]**
17/15 . . with oxygen as auxiliary reagent, e.g. oxychlorination **[2,6]**
17/152 . . . of hydrocarbons **[3,6]**
17/154 . . . . of saturated hydrocarbons **[3,6]**
17/156 . . . . of unsaturated hydrocarbons **[3,6]**
17/158 . . . of halogenated hydrocarbons **[3,6]**
17/16 . . of hydroxyl groups **[3,6]**
17/18 . . of oxygen atoms of carbonyl groups **[6]**
17/20 . . of halogen atoms by other halogen atoms **[6]**
17/21 . . . with simultaneous increase of the number of halogen atoms **[6]**
17/23 . by dehalogenation **[6]**
17/25 . by splitting-off hydrogen halides from halogenated hydrocarbons **[6]**
17/26 . by reactions involving an increase in the number of carbon atoms in the skeleton
17/263 . . by condensation reactions **[6]**
17/266 . . . of hydrocarbons and halogenated hydrocarbons **[6]**
17/269 . . . of only halogenated hydrocarbons **[6]**
17/272 . . by addition reactions **[6]**
17/275 . . . of hydrocarbons and halogenated hydrocarbons **[6]**
17/278 . . . of only halogenated hydrocarbons **[6]**
17/281 . . . . of only one compound **[6]**
17/30 . . by a Diels-Alder synthesis
17/32 . . by introduction of halogenated alkyl groups into ring compounds
17/35 . by reactions not affecting the number of carbon or halogen atoms in the molecules **[6]**
17/354 . . by hydrogenation **[6]**
17/357 . . by dehydrogenation **[6]**
17/358 . . by isomerisation **[6]**
17/361 . by reactions involving a decrease in the number of carbon atoms **[6]**
17/363 . . by elimination of carboxyl groups **[6]**
17/367 . . by depolymerisation **[6]**
17/37 . by disproportionation of halogenated hydrocarbons **[6]**
17/38 . Separation; Purification; Stabilisation; Use of additives
17/383 . . by distillation **[6]**
17/386 . . . with auxiliary compounds **[6]**
17/389 . . by adsorption on solids **[6]**
17/392 . . by crystallisation; Purification or separation of the crystals **[6]**
17/395 . . by treatment giving rise to a chemical modification of at least one compound **[6]**
17/42 . . Use of additives, e.g. for stabilisation **[3,6]**

19/00 Acyclic saturated compounds containing halogen atoms [5]
19/01 . containing chlorine **[6]**
19/03 . . Chloromethanes **[6]**
19/04 . . . Chloroform **[6]**
19/041 . . . Carbon tetrachloride **[6]**
19/043 . . Chloroethanes **[6]**
19/045 . . . Dichloroethanes **[3,6]**
19/05 . . . Trichloroethanes **[3,6]**
19/055 . . . Tetrachloroethanes **[3,6]**
19/07 . containing iodine **[2]**
19/075 . containing bromine **[6]**
19/08 . containing fluorine
19/10 . . and chlorine **[6]**
19/12 . . . having two carbon atoms **[6]**
19/14 . . and bromine **[6]**
19/16 . . and iodine **[6]**

21/00 Acyclic unsaturated compounds containing halogen atoms [5]
21/02 . containing carbon-to-carbon double bonds
21/04 . . Chloro-alkenes
21/06 . . . Vinyl chloride
21/067 . . . Allyl chloride; Methallyl chloride **[3]**
21/073 . . . Dichloro-alkenes **[3]**
21/08 . . . . Vinylidene chloride **[3]**
21/09 . . . . Dichloro-butenes **[3]**
21/10 . . . Trichloro-ethylene
21/12 . . . Tetrachloro-ethylene
21/14 . . containing bromine
21/16 . . . Crotyl bromide

21/17 . . containing iodine **[5]**
21/18 . . containing fluorine
21/185 . . . Tetrafluoroethene **[5]**
21/19 . . Halogenated dienes **[3]**
21/20 . . . Halogenated butadienes **[3]**
21/21 . . . . Chloroprene **[3]**
21/215 . . Halogenated polyenes with more than two carbon-to-carbon double bonds **[3]**
21/22 . containing carbon-to-carbon triple bonds

22/00 Cyclic compounds containing halogen atoms bound to an acyclic carbon atom [5]

22/02 . having unsaturation in the rings **[5]**
22/04 . . containing six-membered aromatic rings **[5]**
22/06 . . . Trichloromethylbenzene **[5]**
22/08 . . . containing fluorine **[5]**

23/00 Compounds containing at least one halogen atom bound to a ring other than a six-membered aromatic ring

23/02 . Monocyclic halogenated hydrocarbons
23/04 . . with a three-membered ring
23/06 . . with a four-membered ring
23/08 . . with a five-membered ring
23/10 . . with a six-membered ring
23/12 . . . Hexachlorocyclohexanes
23/14 . . with a seven-membered ring
23/16 . . with an eight-membered ring
23/18 . Polycyclic halogenated hydrocarbons
23/20 . . with condensed rings none of which is aromatic
23/22 . . . with a bicyclo ring system containing four carbon atoms
23/24 . . . with a bicyclo ring system containing five carbon atoms
23/26 . . . with a bicyclo ring system containing six carbon atoms
23/27 . . . with a bicyclo ring system containing seven carbon atoms **[5]**
23/28 . . . . Saturated bicyclo ring system **[5]**
23/30 . . . . Mono-unsaturated bicyclo ring system **[5]**
23/32 . . . with a bicyclo ring system containing eight carbon atoms
23/34 . . . Halogenated completely or partially hydrogenated indenes
23/36 . . . Halogenated completely or partially hydrogenated naphthalenes
23/38 . . . with three condensed rings
23/40 . . . . Halogenated completely or partially hydrogenated fluorenes
23/42 . . . . Halogenated completely or partially hydrogenated anthracenes
23/44 . . . . Halogenated completely or partially hydrogenated phenanthrenes
23/46 . . . with more than 3 condensed rings

25/00 Compounds containing at least one halogen atom bound to a six-membered aromatic ring

25/02 . Monocyclic aromatic halogenated hydrocarbons
25/06 . . Monochloro-benzene **[3]**
25/08 . . Dichloro-benzenes **[3]**
25/10 . . Trichloro-benzenes **[3]**
25/12 . . Hexachloro-benzene **[3]**
25/125 . . Halogenated xylenes **[2,3]**
25/13 . . containing fluorine **[2,3]**
25/18 . Polycyclic aromatic halogenated hydrocarbons
25/20 . . Dichloro-diphenyl-trichloro-ethane
25/22 . . with condensed rings
25/24 . Halogenated aromatic hydrocarbons with unsaturated side chains
25/28 . . Halogenated styrenes **[3]**

Compounds containing carbon and oxygen, with or without hydrogen or halogens [2]

27/00 Processes involving the simultaneous production of more than one class of oxygen-containing compounds

27/02 . Saponification of organic acid esters
27/04 . by reduction of oxygen-containing compounds (C07C 29/14 takes precedence)
27/06 . . by hydrogenation of oxides of carbon
27/08 . . . with moving catalysts
27/10 . by oxidation of hydrocarbons
27/12 . . with oxygen
27/14 . . . wholly gaseous reactions
27/16 . . with other oxidising agents
27/18 . by addition of alkynes to aldehydes, ketones, or alkylene oxides
27/20 . by oxo-reaction
27/22 . . with the use of catalysts which are specific for this process
27/24 . . with moving catalysts
27/26 . Purification; Separation; Stabilisation
27/28 . . by distillation
27/30 . . . by azeotropic distillation
27/32 . . . by extractive distillation
27/34 . . by extraction

29/00 Preparation of compounds having hydroxy or O-metal groups bound to a carbon atom not belonging to a six-membered aromatic ring

29/03 . by addition of hydroxy groups to unsaturated carbon-to-carbon bonds, e.g. with the aid of H_2O_2 **[3]**
29/04 . . by hydration of carbon-to-carbon double bonds
29/05 . . . with formation of absorption products in mineral acids and their hydrolysis **[3]**
29/06 . . . . the acid being sulfuric acid **[3]**
29/08 . . . . the acid being phosphoric acid **[3]**
29/09 . by hydrolysis (of esters of organic acids C07C 27/02) **[3]**
29/10 . . of ethers, including cyclic ethers, e.g. oxiranes
29/12 . . of esters of mineral acids **[3]**
29/124 . . . of halides **[3]**
29/128 . by alcoholysis (of esters of organic acids C07C 27/02) **[3]**
29/132 . by reduction of an oxygen-containing functional group **[3]**
29/136 . . of $\rangle C{=}O$ containing groups, e.g. $-COOH$ **[3]**
29/14 . . . of a $-CHO$ group **[3]**
29/141 . . . . with hydrogen or hydrogen-containing gases **[5]**
29/143 . . . of ketones **[5]**
29/145 . . . . with hydrogen or hydrogen-containing gases **[5]**
29/147 . . . of carboxylic acids or derivatives thereof **[5]**
29/149 . . . . with hydrogen or hydrogen-containing gases **[5]**
29/15 . by reduction of oxides of carbon exclusively **[3]**
29/151 . . with hydrogen or hydrogen-containing gases **[5]**
29/152 . . . characterised by the reactor used **[5]**
29/153 . . . characterised by the catalyst used **[5]**

29/154 . . . . containing copper, silver, gold, or compounds thereof **[5]**
29/156 . . . . containing iron group metals, platinum group metals, or compounds thereof **[5]**
29/157 . . . . . containing platinum group metals or compounds thereof **[5]**
29/158 . . . . . containing rhodium or compounds thereof **[5]**
29/159 . . with reducing agents other than hydrogen or hydrogen-containing gases **[5]**
29/16 . by oxo-reaction combined with reduction
29/17 . by hydrogenation of carbon-to-carbon double or triple bonds **[3]**
29/19 . . in six-membered aromatic rings **[3]**
29/20 . . . in non-condensed rings substituted with hydroxy groups **[3]**
29/32 . increasing the number of carbon atoms by reactions without formation of hydroxy groups **[3]**
29/34 . . by condensation involving hydroxy groups or the mineral ester groups derived therefrom, e.g. Guerbet reaction **[3]**
29/36 . increasing the number of carbon atoms by reactions with formation of hydroxy groups, which may occur via intermediates being derivatives of hydroxy groups, e.g. O-metal **[3]**
29/38 . . by reaction with aldehydes or ketones **[3]**
29/40 . . . with compounds containing carbon-to-metal bonds **[3]**
29/42 . . . with compounds containing triple carbon-to-carbon bonds, e.g. with metal-alkynes **[3]**
29/44 . increasing the number of carbon atoms by addition reactions, i.e. reactions involving at least one carbon-to-carbon double or triple bond (C07C 29/16 takes precedence) **[3]**
29/46 . . by diene-synthesis **[3]**
29/48 . by oxidation reactions with formation of hydroxy groups **[3]**
29/50 . . with molecular oxygen only **[3]**
29/52 . . . in the presence of mineral boron compounds with, when necessary, hydrolysis of the intermediate formed **[3]**
29/54 . . . starting from compounds containing carbon-to-metal bonds and followed by conversion of the O-metal to hydroxy groups **[3]**
29/56 . by isomerisation **[3]**
29/58 . by elimination of halogen, e.g. by hydrogenolysis, splitting-off (C07C 29/124 takes precedence) **[3]**
29/60 . by elimination of hydroxy groups, e.g. by dehydration (C07C 29/34 takes precedence) **[3]**
29/62 . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**
29/64 . by simultaneous introduction of hydroxy groups and halogens **[3]**
29/66 . . by addition of hypohalogenous acids, which may be formed in situ, to carbon-to-carbon unsaturated bonds **[3]**
29/68 . Preparation of metal-alcoholates (C07C 29/42, C07C 29/54 take precedence) **[3]**
29/70 . . by converting hydroxy groups to O-metal groups **[3]**
29/72 . . by oxidation of carbon-to-metal bonds **[3]**
29/74 . Separation; Purification; Stabilisation; Use of additives **[3]**
29/76 . . by physical treatment **[3]**
29/78 . . . by condensation or crystallisation **[3]**
29/80 . . . by distillation **[3]**
29/82 . . . . by azeotropic distillation **[3]**
29/84 . . . . by extractive distillation **[3]**
29/86 . . . by liquid-liquid treatment **[3]**
29/88 . . by treatment giving rise to a chemical modification of at least one compound (chemisorption C07C 29/76) **[3]**
29/90 . . . using hydrogen only **[3]**
29/92 . . . by a consecutive conversion and reconstruction **[3]**
29/94 . . Use of additives, e.g. for stabilisation **[3]**

31/00 Saturated compounds having hydroxy or O-metal groups bound to acyclic carbon atoms

31/02 . Monohydroxylic acyclic alcohols
31/04 . . Methanol
31/08 . . Ethanol
31/10 . . containing three carbon atoms
31/12 . . containing four carbon atoms
31/125 . . containing five to twenty-two carbon atoms **[3]**
31/13 . Monohydroxylic alcohols containing saturated rings **[2,3]**
31/133 . . monocyclic **[3]**
31/135 . . . with five- or six-membered rings; Naphthenic alcohols **[3]**
31/137 . . polycyclic with condensed ring systems **[3]**
31/18 . Polyhydroxylic acyclic alcohols
31/20 . . Dihydroxylic alcohols
31/22 . . Trihydroxylic alcohols, e.g. glycerol **[3]**
31/24 . . Tetrahydroxylic alcohols, e.g. pentaerythritol **[3]**
31/26 . . Hexahydroxylic alcohols
31/27 . Polyhydroxylic alcohols containing saturated rings **[3]**
31/28 . Metal alcoholates
31/30 . . Alkali-metal or alkaline-earth-metal alcoholates
31/32 . . Aluminium alcoholates
31/34 . Halogenated alcohols
31/36 . . the halogen not being fluorine **[3]**
31/38 . . containing only fluorine as halogen **[3]**
31/40 . . perhalogenated **[3]**
31/42 . . Halogenated polyhydroxylic acyclic alcohols **[3]**
31/44 . . Halogenated alcohols containing saturated rings **[3]**

33/00 Unsaturated compounds having hydroxy or O-metal groups bound to acyclic carbon atoms

Note

In this group, in condensed ring systems of six-membered aromatic rings and other rings, the double bond belonging to a benzene ring is not considered as unsaturated for the non-aromatic ring condensed thereon, e.g. the 1,2,3,4-tetrahydro- naphthalene ring is considered to be saturated outside the aromatic ring. **[3]**

33/02 . Acyclic alcohols with carbon-to-carbon double bonds
33/025 . . with only one double bond **[3]**
33/03 . . . in beta-position, e.g. allyl alcohol, methallyl alcohol **[3]**
33/035 . . . Alkenediols **[3]**
33/04 . Acyclic alcohols with carbon-to-carbon triple bonds
33/042 . . with only one triple bond **[3]**
33/044 . . . Alkynediols **[3]**
33/046 . . . . Butynediols **[3]**
33/048 . . with double and triple bonds **[3]**

33/05 . Alcohols containing rings other than six-membered aromatic rings **[2]**
33/12 . . containing five-membered rings **[3]**
33/14 . . containing six-membered rings **[3]**
33/16 . . containing rings with more than six ring members **[3]**
33/18 . Monohydroxylic alcohols containing only six-membered aromatic rings as cyclic part **[3]**
33/20 . . monocyclic **[3]**
33/22 . . . Benzylalcohol; Phenylethyl alcohol **[3]**
33/24 . . polycyclic without condensed ring systems **[3]**
33/26 . Polyhydroxylic alcohols containing only six-membered aromatic rings as cyclic part **[3]**
33/28 . Alcohols containing only six-membered aromatic rings as cyclic part with unsaturation outside the aromatic rings **[3]**
33/30 . . monocyclic **[3]**
33/32 . . . Cinnamyl alcohol **[3]**
33/34 . Monohydroxylic alcohols containing six-membered aromatic rings and other rings **[3]**
33/36 . Polyhydroxylic alcohols containing six-membered aromatic rings and other rings **[3]**
33/38 . Alcohols containing six-membered aromatic rings and other rings and having unsaturation outside the aromatic rings **[3]**
33/40 . Halogenated unsaturated alcohols **[3]**
33/42 . . acyclic **[3]**
33/44 . . containing rings other than six-membered aromatic rings **[3]**
33/46 . . containing only six-membered aromatic rings as cyclic part **[3]**
33/48 . . . with unsaturation outside the aromatic rings **[3]**
33/50 . . containing six-membered aromatic rings and other rings **[3]**

35/00 Compounds having at least one hydroxy or O-metal group bound to a carbon atom of a ring other than a six-membered aromatic ring [2]

35/02 . monocyclic
35/04 . . containing three- or four-membered rings
35/06 . . containing five-membered rings
35/08 . . containing six-membered rings
35/12 . . . Menthol
35/14 . . . with more than one hydroxy group bound to the ring
35/16 . . . . Inositol
35/17 . . . with unsaturation only outside the ring **[3]**
35/18 . . . with unsaturation at least in the ring **[3]**
35/20 . . containing seven- or eight-membered rings
35/205 . . containing nine- to twelve-membered rings, e.g. cyclododecanols **[3]**
35/21 . polycyclic, at least one hydroxy group bound to a non-condensed ring **[2]**
35/22 . polycyclic, at least one hydroxy group bound to a condensed ring system **[2]**
35/23 . . with a hydroxy group on a condensed ring system having two rings **[3]**
35/24 . . . the condensed ring system containing five carbon atoms **[3]**
35/26 . . . . Bicyclopentadienols **[3]**
35/27 . . . the condensed ring system containing six carbon atoms **[3]**
35/28 . . . the condensed ring system containing seven carbon atoms **[3]**
35/29 . . . . being a [2.2.1] system **[3]**
35/30 . . . . . Borneol; Isoborneol **[3]**
35/31 . . . the condensed ring system containing eight carbon atoms **[3]**
35/32 . . . the condensed ring system being a [4.3.0] system, e.g. indenols **[3]**
35/34 . . . the condensed ring system being a [5.3.0] system, e.g. azulenols **[3]**
35/36 . . . the condensed ring system being a [4.4.0] system, e.g. hydrogenated naphthols **[3]**
35/37 . . with a hydroxy group on a condensed ring system having three rings **[3]**
35/38 . . . derived from the fluorene skeleton **[3]**
35/40 . . . derived from the anthracene skeleton **[3]**
35/42 . . . derived from the phenanthrene skeleton **[3]**
35/44 . . with a hydroxy group on a condensed ring system having more than three rings
35/46 . O-metal derivatives of the cyclically bound hydroxy groups **[3]**
35/48 . Halogenated derivatives **[3]**
35/50 . . Alcohols with at least two rings **[3]**
35/52 . . Alcohols with a condensed ring system **[3]**

37/00 Preparation of compounds having hydroxy or O-metal groups bound to a carbon atom of a six-membered aromatic ring

37/01 . by replacing functional groups bound to a six-membered aromatic ring by hydroxy groups, e.g. by hydrolysis **[3]**
37/02 . . by substitution of halogen **[3]**
37/04 . . by substitution of SO_3H groups or a derivative thereof **[3]**
37/045 . . by substitution of a group bound to the ring by nitrogen **[3]**
37/05 . . . by substitution of a NH_2 group **[3]**
37/055 . . by substitution of a group bound to the ring by oxygen, e.g. ether group **[3]**
37/06 . by conversion of non-aromatic six-membered rings or of such rings formed in situ into aromatic six-membered rings, e.g. by dehydrogenation
37/07 . . with simultaneous reduction of C=O group in that ring **[3]**
37/08 . by decomposition of hydroperoxides, e.g. cumene hydroperoxide
37/11 . by reactions increasing the number of carbon atoms **[3]**
37/14 . . by addition reactions, i.e. reactions involving at least one carbon-to-carbon unsaturated bond **[3]**
37/16 . . by condensation involving hydroxy groups of phenols or alcohols or the ether or mineral ester group derived therefrom **[3]**
37/18 . . by condensation involving halogen atoms of halogenated compounds
37/20 . . using aldehydes or ketones
37/48 . by exchange of hydrocarbon groups which may be substituted, from other compounds, e.g. transalkylation **[3]**
37/50 . by reactions decreasing the number of carbon atoms (C07C 37/01, C07C 37/08, C07C 37/48 take precedence) **[3]**
37/52 . . by splitting polyaromatic compounds, e.g. polyphenolalkanes **[3]**
37/54 . . . by hydrolysis of lignin or sulfite waste liquor **[3]**
37/56 . . by replacing a carboxyl or aldehyde group by a hydroxy group **[3]**

37/58 . by oxidation reactions introducing directly a hydroxy group on a CH-group belonging to a six-membered aromatic ring with the aid of molecular oxygen **[3]**

37/60 . by oxidation reactions introducing directly a hydroxy group on a CH-group belonging to a six-membered aromatic ring with the aid of other oxidants than molecular oxygen or their mixtures with molecular oxygen **[3]**

37/62 . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**

37/64 . Preparation of O-metal compounds with the O-metal group linked to a carbon atom belonging to a six-membered aromatic ring **[3]**

37/66 . . by conversion of hydroxy groups to O-metal groups **[3]**

37/68 . Separation; Purification; Stabilisation; Use of additives **[3]**

37/70 . . by physical treatment **[3]**

37/72 . . . by liquid-liquid treatment **[3]**

37/74 . . . by distillation **[3]**

37/76 . . . . by steam distillation **[3]**

37/78 . . . . by azeotropic distillation **[3]**

37/80 . . . . by extractive distillation **[3]**

37/82 . . . by solid-liquid treatment; by chemisorption **[3]**

37/84 . . . by crystallisation **[3]**

37/86 . . by treatment giving rise to a chemical modification (by chemisorption C07C 37/82) **[3]**

37/88 . . Use of additives, e.g. for stabilisation **[3]**

39/00 Compounds having at least one hydroxy or O-metal group bound to a carbon atom of a six-membered aromatic ring

Note

In this group, in condensed ring systems of six-membered aromatic rings and other rings, the double bond belonging to the benzene ring is not considered as unsaturated for the non-aromatic ring condensed thereon. **[3]**

39/02 . monocyclic with no unsaturation outside the aromatic ring

39/04 . . Phenol

39/06 . . Alkylated phenols

39/07 . . . containing only methyl groups as alkyl groups, e.g. cresols, xylenols **[3]**

39/08 . . Dihydroxy benzenes; Alkylated derivatives thereof

39/10 . . Polyhydroxy benzenes; Alkylated derivatives thereof (C07C 39/08 takes precedence)

39/11 . . Alkylated hydroxy benzenes containing also acyclically bound hydroxy groups, e.g. saligenol **[3]**

39/12 . polycyclic with no unsaturation outside the aromatic rings

39/14 . . with at least one hydroxy group on a condensed ring system containing two rings **[3]**

39/15 . . with all hydroxy groups on non-condensed rings **[3]**

39/16 . . . Bis(hydroxy phenyl)alkanes; Tris(hydroxy phenyl)alkanes **[3]**

39/17 . . containing other rings in addition to the six-membered aromatic rings **[2]**

39/18 . monocyclic with unsaturation outside the aromatic ring

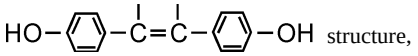
39/19 . . containing carbon-to-carbon double bonds but no carbon-to-carbon triple bonds **[3]**

39/20 . . . Hydroxy styrenes **[3]**

39/205 . polycyclic, containing only six-membered aromatic rings as cyclic part, with unsaturation outside the rings **[3]**

39/21 . . with at least one hydroxy group on a non-condensed ring **[3]**

39/215 . . . containing the



structure, e.g. diethylstilbestrol **[3]**

39/225 . . with at least one hydroxy group on a condensed ring system **[3]**

39/23 . polycyclic, containing six-membered aromatic rings and other rings, with unsaturation outside the aromatic rings **[3]**

39/235 . Metal derivatives of a hydroxy group bound to a six-membered aromatic ring **[3]**

39/24 . Halogenated derivatives

39/26 . . monocyclic monohydroxylic containing halogen bound to ring carbon atoms

39/27 . . . all halogen atoms being attached to the ring

39/28 . . . . the halogen being one chlorine atom

39/30 . . . . the halogen being two chlorine atoms

39/32 . . . . the halogen being three chlorine atoms

39/34 . . . . the halogen being four chlorine atoms

39/36 . . . . Pentachlorophenol

39/367 . . polycyclic non-condensed, containing only six-membered aromatic rings, e.g. halogenated poly-(hydroxy-phenyl)alkanes **[3]**

39/373 . . with all hydroxy groups on non-condensed rings and with unsaturation outside the aromatic rings **[3]**

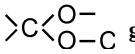
39/38 . . with at least one hydroxy group on a condensed ring system containing two rings

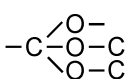
39/40 . . with at least one hydroxy group on a condensed ring system containing more than two rings **[3]**

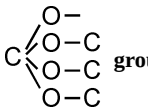
39/42 . . containing six-membered aromatic rings and other rings **[3]**

39/44 . . Metal derivatives of a hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**

41/00 Preparation of ethers; **Preparation of compounds having**

 **groups,**

 **groups or**

 **groups [3]**

41/01 . Preparation of ethers **[3]**

41/02 . . from oxiranes **[3]**

41/03 . . . by reaction of an oxirane ring with a hydroxy group **[3]**

41/05 . . by addition of compounds to unsaturated compounds **[3]**

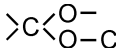
41/06 . . . by addition of organic compounds only **[3]**

41/08 . . . . to carbon-to-carbon triple bonds **[3]**

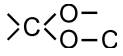
41/09 . . by dehydration of compounds containing hydroxy groups **[3]**

41/14 . . by exchange of organic parts on the ether-oxygen for other organic parts, e.g. by trans-etherification **[3]**

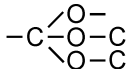
41/16 . . by reaction of esters of mineral or organic acids with hydroxy or O-metal groups **[3]**
41/18 . . by reactions not forming ether-oxygen bonds **[3]**
41/20 . . . by hydrogenation of carbon-to-carbon double or triple bonds **[3]**
41/22 . . . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**
41/24 . . . by elimination of halogen, e.g. elimination of HCl **[3]**
41/26 . . . by introduction of hydroxy or O-metal groups **[3]**
41/28 . . . from acetals, e.g. by dealcoholysis **[3]**
41/30 . . . by increasing the number of carbon atoms, e.g. by oligomerisation **[3]**
41/32 . . by isomerisation **[3]**
41/34 . . Separation; Purification; Stabilisation; Use of additives **[3]**
41/36 . . . by solid-liquid treatment; by chemisorption **[3]**
41/38 . . . by liquid-liquid treatment **[3]**
41/40 . . . by change of physical state, e.g. by crystallisation **[3]**
41/42 . . . . by distillation **[3]**
41/44 . . . by treatment giving rise to a chemical modification (by chemisorption C07C 41/36) **[3]**
41/46 . . . Use of additives, e.g. for stabilisation **[3]**
41/48 . Preparation of compounds having

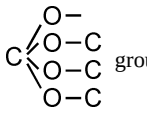
 groups **[3]**

41/50 . . by reactions producing

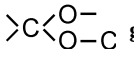
 groups **[3]**

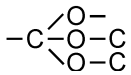
41/52 . . . by substitution of halogen only **[3]**
41/54 . . . by addition of compounds to unsaturated carbon-to-carbon bonds **[3]**
41/56 . . . by condensation of aldehydes, paraformaldehyde, or ketones **[3]**
41/58 . . Separation; Purification; Stabilisation; Use of additives **[3]**
41/60 . Preparation of compounds having

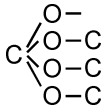
 groups or

 groups **[3]**

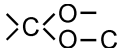
43/00 Ethers; **Compounds having**

 **groups,**

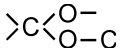
 **groups or**

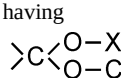
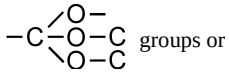
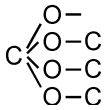
 **groups**

43/02 . Ethers
43/03 . . having all ether-oxygen atoms bound to acyclic carbon atoms **[3]**
43/04 . . . Saturated ethers **[3]**
43/06 . . . . Diethyl ether **[3]**
43/10 . . . . of polyhydroxy compounds **[3]**
43/11 . . . . . Polyethers containing $-O-(C-C-O-)_n$ units with 2 <= n <= 10 **[2,3]**
43/115 . . . . containing carbocyclic rings **[3]**
43/12 . . . . containing halogen **[3]**
43/13 . . . . containing hydroxy or O-metal groups (C07C 43/11 takes precedence) **[3]**
43/14 . . . Unsaturated ethers **[3]**
43/15 . . . . containing only non-aromatic carbon-to-carbon double bonds **[3]**
43/16 . . . . . Vinyl ethers **[3]**
43/162 . . . . containing rings other than six-membered aromatic rings **[3]**
43/164 . . . . containing six-membered aromatic rings **[3]**
43/166 . . . . . having unsaturation outside the aromatic rings **[3]**
43/168 . . . . . containing six-membered aromatic rings and other rings **[3]**
43/17 . . . . containing halogen **[2,3]**
43/172 . . . . . containing rings other than six-membered aromatic rings **[3]**
43/174 . . . . . containing six-membered aromatic rings **[3]**
43/176 . . . . . having unsaturation outside the aromatic rings **[3]**
43/178 . . . . containing hydroxy or O-metal groups **[3]**
43/18 . . having an ether-oxygen atom bound to a carbon atom of a ring other than a six-membered aromatic ring
43/184 . . . to a carbon atom of a non-condensed ring **[3]**
43/188 . . . Unsaturated ethers **[3]**
43/192 . . . containing halogen **[3]**
43/196 . . . containing hydroxy or O-metal groups **[3]**
43/20 . . having an ether-oxygen atom bound to a carbon atom of a six-membered aromatic ring
43/205 . . . the aromatic ring being a non-condensed ring **[3]**
43/21 . . . containing rings other than six-membered aromatic rings **[3]**
43/215 . . . having unsaturation outside the six-membered aromatic rings **[3]**
43/225 . . . containing halogen **[3]**
43/23 . . . containing hydroxy or O-metal groups **[3]**
43/235 . . having an ether-oxygen atom bound to a carbon atom of a six-membered aromatic ring and to a carbon atom of a ring, other than a six-membered aromatic ring **[3]**
43/243 . . . having unsaturation outside the six-membered aromatic rings **[3]**
43/247 . . . containing halogen **[3]**
43/253 . . . containing hydroxy or O-metal groups **[3]**
43/257 . . having an ether-oxygen atom bound to carbon atoms both belonging to six-membered aromatic rings **[3]**
43/263 . . . the aromatic rings being non-condensed **[3]**
43/267 . . . containing other rings **[3]**
43/275 . . . having all ether-oxygen atoms bound to carbon atoms of six-membered aromatic rings **[3]**
43/285 . . . having unsaturation outside the six-membered aromatic rings **[3]**
43/29 . . . containing halogen **[3]**
43/295 . . . containing hydroxy or O-metal groups **[3]**

43/30 . Compounds having  groups

Note

In this group, the acetal carbon atom is the carbon of the  group. **[3]**

43/303 . . having acetal carbon atoms bound to acyclic carbon atoms **[3]**
43/305 . . having acetal carbon atoms as ring members or bound to carbon atoms of rings other than six-membered aromatic rings **[3]**
43/307 . . having acetal carbon atoms bound to carbon atoms of six-membered aromatic rings **[3]**
43/313 . . containing halogen **[3]**
43/315 . . containing oxygen atoms singly bound to carbon atoms not being acetal carbon atoms **[3]**
43/317 . . having  groups, X being hydrogen or metal **[3]**
43/32 . Compounds having  groups or  groups

45/00 Preparation of compounds having 〉C=O groups bound only to carbon or hydrogen atoms; **Preparation of chelates of such compounds [2]**

45/26 . by hydration of carbon-to-carbon triple bonds **[3]**
45/27 . by oxidation **[3]**
45/28 . . of $-CH_x$-moieties **[3]**
45/29 . . of hydroxy groups **[3]**
45/30 . . with halogen containing compounds, e.g. hypohalogenation **[3]**
45/31 . . with compounds containing mercury atoms, which may be regenerated in situ, e.g. by oxygen **[3]**
45/32 . . with molecular oxygen **[3]**
45/33 . . . of CH_x-moieties **[3]**
45/34 . . . . in unsaturated compounds **[3]**
45/35 . . . . . in propene or isobutene **[3]**
45/36 . . . . . in compounds containing six-membered aromatic rings **[3]**
45/37 . . . of 〉C−O− functional groups to 〉C=O groups **[3]**
45/38 . . . . being a primary hydroxy group **[3]**
45/39 . . . . being a secondary hydroxy group **[3]**
45/40 . by oxidation with ozone; by ozonolysis **[3]**
45/41 . by hydrogenolysis or reduction of carboxylic groups or functional derivatives thereof **[3]**
45/42 . by hydrolysis **[3]**
45/43 . . of 〉CX_2 groups, X being halogen **[3]**
45/44 . by reduction and hydrolysis of nitriles **[3]**
45/45 . by condensation **[3]**
45/46 . . Friedel-Crafts reactions **[3]**
45/47 . . using phosgene **[3]**
45/48 . . involving decarboxylation **[3]**
45/49 . by reaction with carbon monoxide **[3]**
45/50 . . by oxo-reactions **[3]**
45/51 . by pyrolysis, rearrangement or decomposition **[3]**
45/52 . . by dehydration and rearrangement involving two hydroxy groups in the same molecule **[3]**
45/53 . . of hydroperoxides **[3]**
45/54 . . of compounds containing doubly bound oxygen atoms, e.g. esters **[3]**
45/55 . . of oligo- or polymeric oxo-compounds **[3]**
45/56 . from heterocyclic compounds (C07C 45/55 takes precedence) **[3]**
45/57 . . with oxygen as the only hetero atom **[3]**
45/58 . . . in three-membered rings **[3]**
45/59 . . . in five-membered rings (from ozonides C07C 45/40) **[3]**
45/60 . . . in six-membered rings **[3]**
45/61 . by reactions not involving the formation of 〉C=O groups **[3]**
45/62 . . by hydrogenation of carbon-to-carbon double or triple bonds **[3]**
45/63 . . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**
45/64 . . by introduction of functional groups containing oxygen only in singly bound form **[3]**
45/65 . . by splitting-off hydrogen atoms or functional groups; by hydrogenolysis of functional groups **[3]**
45/66 . . . by dehydration **[3]**
45/67 . . by isomerisation; by change of size of the carbon skeleton **[3]**
45/68 . . . by increase in the number of carbon atoms **[3]**
45/69 . . . . by addition to carbon-to-carbon double or triple bonds **[3]**
45/70 . . . . by reaction with functional groups containing oxygen only in singly bound form **[3]**
45/71 . . . . . being hydroxy groups **[3]**
45/72 . . . . by reaction of compounds containing 〉C=O groups with the same or other compounds containing 〉C=O groups **[3]**
45/73 . . . . . combined with hydrogenation **[3]**
45/74 . . . . . combined with dehydration **[3]**
45/75 . . . . . Reactions with formaldehyde **[3]**
45/76 . . . with the aid of ketenes **[3]**
45/77 . Preparation of chelates of aldehydes or ketones **[3]**
45/78 . Separation; Purification; Stabilisation; Use of additives **[3]**
45/79 . . by solid-liquid treatment; by chemisorption **[3]**
45/80 . . by liquid-liquid treatment **[3]**
45/81 . . by change in the physical state, e.g. crystallisation **[3]**
45/82 . . . by distillation **[3]**
45/83 . . . . by extractive distillation **[3]**
45/84 . . . . by azeotropic distillation **[3]**
45/85 . . by treatment giving rise to a chemical modification **[3]**
45/86 . . Use of additives, e.g. for stabilisation **[3]**
45/87 . Preparation of ketenes or dimeric ketenes **[3]**
45/88 . . from ketones **[3]**
45/89 . . from carboxylic acids, their anhydrides, esters or halides **[3]**
45/90 . . Separation; Purification; Stabilisation; Use of additives **[3]**

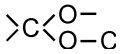
46/00 Preparation of quinones [3]

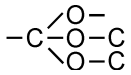
46/02 . by oxidation giving rise to quinoid structures **[3]**

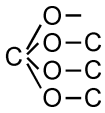
46/04 . . of unsubstituted ring carbon atoms in six-membered aromatic rings **[3]**
46/06 . . of at least one hydroxy group on a six-membered aromatic ring **[3]**
46/08 . . . with molecular oxygen **[3]**
46/10 . Separation; Purification; Stabilisation; Use of additives **[3]**

47/00 Compounds having −CHO groups

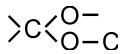
47/02 . Saturated compounds having −CHO groups bound to acyclic carbon atoms or to hydrogen
47/04 . . Formaldehyde
47/042 . . . Preparation from carbon monoxide **[3]**
47/045 . . . Preparation by depolymerisation **[3]**
47/048 . . . Preparation by oxidation of hydrocarbons **[3]**
47/052 . . . Preparation by oxidation of methanol **[3]**
47/055 . . . . using noble metals or compounds thereof as catalysts **[3]**
47/058 . . . Separation; Purification; Stabilisation; Use of additives **[3]**
47/06 . . Acetaldehyde
47/07 . . . Preparation by oxidation **[3]**
47/09 . . . Separation; Purification; Stabilisation; Use of additives **[3]**
47/105 . . containing rings **[3]**
47/11 . . . monocyclic **[3]**
47/115 . . . containing condensed ring systems **[3]**
47/12 . . containing more than one −CHO group
47/127 . . . Glyoxal **[3]**
47/133 . . . containing rings **[3]**
47/14 . . containing halogen
47/16 . . . Trichloroacetaldehyde
47/17 . . . containing rings **[3]**
47/19 . . containing hydroxy groups **[2,3]**
47/192 . . . containing rings **[3]**
47/195 . . . containing halogen **[3]**
47/198 . . containing ether groups,

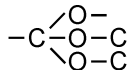
 groups,

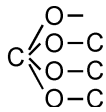
 groups, or

 groups **[3]**

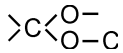
47/20 . Unsaturated compounds having −CHO groups bound to acyclic carbon atoms
47/21 . . with only carbon-to-carbon double bonds as unsaturation **[3]**
47/22 . . . Acrylaldehyde; Methacrylaldehyde **[3]**
47/222 . . with only carbon-to-carbon triple bonds as unsaturation **[3]**
47/225 . . containing rings other than six-membered aromatic rings **[3]**
47/228 . . containing six-membered aromatic rings, e.g. phenylacetaldehyde **[3]**
47/23 . . . polycyclic **[3]**
47/232 . . . having unsaturation outside the aromatic rings **[3]**
47/235 . . containing six-membered aromatic rings and other rings **[3]**
47/238 . . . having unsaturation outside the aromatic rings **[3]**
47/24 . . containing halogen
47/26 . . containing hydroxy groups **[3]**
47/263 . . . acyclic **[3]**
47/267 . . . containing rings other than six-membered aromatic rings **[3]**
47/27 . . . containing six-membered aromatic rings **[3]**
47/273 . . . containing halogen **[3]**
47/277 . . containing ether groups,

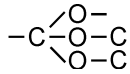
 groups,

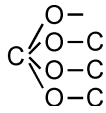
 groups, or

 groups **[3]**

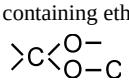
47/28 . Saturated compounds having −CHO groups bound to carbon atoms of rings other than six-membered aromatic rings
47/293 . . with a three- or four-membered ring **[3]**
47/30 . . with a five-membered ring
47/32 . . with a six-membered ring
47/33 . . with a seven- to twelve-membered ring **[3]**
47/34 . . polycyclic
47/347 . . . having a −CHO group on a condensed ring system **[3]**
47/353 . . containing halogen **[3]**
47/36 . . containing hydroxy groups
47/37 . . containing ether groups,

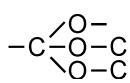
 groups,

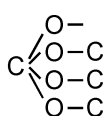
 groups, or

 groups **[3]**

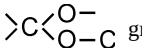
47/38 . Unsaturated compounds having −CHO groups bound to carbon atoms of rings other than six-membered aromatic rings
47/395 . . with a three- or four-membered ring **[3]**
47/40 . . with a five-membered ring **[3]**
47/42 . . with a six-membered ring **[3]**
47/43 . . with a seven- to twelve-membered ring **[3]**
47/44 . . polycyclic **[3]**
47/445 . . . containing a condensed ring system **[3]**
47/45 . . having unsaturation outside the rings **[2]**
47/453 . . containing six-membered aromatic rings **[3]**
47/457 . . containing halogen **[3]**
47/46 . . containing hydroxy groups
47/47 . . containing ether groups,

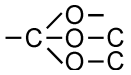
 groups,

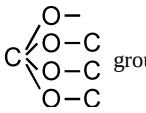
 groups, or

 groups **[3]**

47/52 . Compounds having −CHO groups bound to carbon atoms of six-membered aromatic rings
47/54 . . Benzaldehyde
47/542 . . Alkylated benzaldehydes **[3]**
47/544 . . Diformyl-benzenes; Alkylated derivatives thereof **[3]**
47/546 . . polycyclic **[3]**
47/548 . . having unsaturation outside the six-membered aromatic rings **[3]**
47/55 . . containing halogen **[2]**
47/56 . . containing hydroxy groups
47/565 . . . all hydroxy groups bound to the ring **[3]**
47/57 . . . polycyclic **[3]**
47/575 . . containing ether groups,

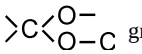
 groups,

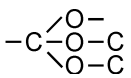
 groups, or

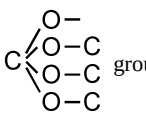
 groups **[3]**

47/58 . . . Vanillin

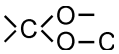
49/00 Ketones; **Ketenes**; **Dimeric ketenes**; **Ketonic chelates**
49/04 . Saturated compounds containing keto groups bound to acyclic carbon atoms
49/08 . . Acetone **[3]**
49/10 . . Methyl-ethyl ketone **[3]**
49/105 . . containing rings **[3]**
49/11 . . . monocyclic **[3]**
49/115 . . . containing condensed ring systems **[3]**
49/12 . . Ketones containing more than one keto group
49/14 . . . Acetylacetone, i.e. 2,4-pentanedione
49/15 . . . containing rings **[3]**
49/16 . . containing halogen
49/163 . . . containing rings **[3]**
49/167 . . . containing only fluorine as halogen **[3]**
49/17 . . containing hydroxy groups **[2]**
49/172 . . . containing rings **[3]**
49/173 . . . containing halogen **[3]**
49/175 . . containing ether groups,

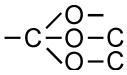
 groups,

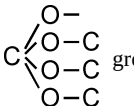
 groups, or

 groups **[2,3]**

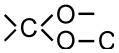
49/185 . . containing −CHO groups **[3]**
49/20 . Unsaturated compounds containing keto groups bound to acyclic carbon atoms
49/203 . . with only carbon-to-carbon double bonds as unsaturation **[3]**
49/205 . . . Methyl-vinyl ketone **[3]**
49/207 . . with only carbon-to-carbon triple bonds as unsaturation **[3]**
49/21 . . containing rings other than six-membered aromatic rings **[3]**
49/213 . . containing six-membered aromatic rings **[3]**
49/215 . . . polycyclic **[3]**
49/217 . . . having unsaturation outside the aromatic rings **[3]**
49/223 . . . . polycyclic **[3]**
49/225 . . containing six-membered aromatic rings and other rings **[3]**
49/227 . . containing halogen **[3]**
49/23 . . . containing rings other than six-membered aromatic rings **[3]**
49/233 . . . containing six-membered aromatic rings **[3]**
49/235 . . . . having unsaturation outside the aromatic rings **[3]**
49/237 . . . containing six-membered aromatic rings and other rings **[3]**
49/24 . . containing hydroxy groups
49/242 . . . containing rings other than six-membered aromatic rings **[3]**
49/245 . . . containing six-membered aromatic rings **[3]**
49/248 . . . . having unsaturation outside the aromatic rings **[3]**
49/252 . . . containing six-membered aromatic rings and other rings **[3]**
49/255 . . containing ether groups,

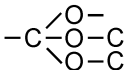
 groups,

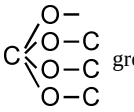
 groups, or

 groups **[3]**

49/258 . . containing −CHO groups **[3]**
49/29 . Saturated compounds containing keto groups bound to rings **[3]**
49/293 . . to a three- or four-membered ring **[3]**
49/297 . . to a five-membered ring **[3]**
49/303 . . to a six-membered ring **[3]**
49/307 . . to a seven- to twelve-membered ring **[3]**
49/313 . . polycyclic **[3]**
49/317 . . . both carbon atoms bound to the keto group belonging to rings **[3]**
49/323 . . . having keto groups bound to condensed ring systems **[3]**
49/327 . . containing halogen **[3]**
49/333 . . . polycyclic **[3]**
49/337 . . containing hydroxy groups **[3]**
49/345 . . . polycyclic **[3]**
49/35 . . containing ether groups,

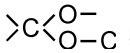
 groups,

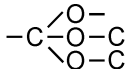
 groups, or

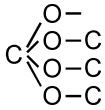
 groups **[3]**

49/355 . . containing −CHO groups **[3]**
49/385 . Saturated compounds containing a keto group being part of a ring **[3]**
49/39 . . of a three- or four-membered ring **[3]**
49/395 . . of a five-membered ring **[3]**
49/403 . . of a six-membered ring **[3]**
49/407 . . . Menthones **[3]**

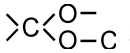
49/413 . . of a seven- to twelve-membered ring **[3]**
49/417 . . polycyclic **[3]**
49/423 . . . a keto group being part of a condensed ring system **[3]**
49/427 . . . . having two rings **[3]**
49/433 . . . . . the condensed ring system containing seven carbon atoms **[3]**
49/437 . . . . . Camphor; Fenchone **[3]**
49/443 . . . . . the condensed ring system containing eight or nine carbon atoms **[3]**
49/447 . . . . . the condensed ring system containing ten carbon atoms **[3]**
49/453 . . . . having three rings **[3]**
49/457 . . containing halogen **[3]**
49/463 . . . a keto group being part of a six-membered ring **[3]**
49/467 . . . polycyclic **[3]**
49/473 . . . . a keto group being part of a condensed ring system **[3]**
49/477 . . . . . having two rings **[3]**
49/483 . . . . . having three rings **[3]**
49/487 . . containing hydroxy groups **[3]**
49/493 . . . a keto group being part of a three- to five-membered ring **[3]**
49/497 . . . a keto group being part of a six-membered ring **[3]**
49/503 . . . a keto group being part of a seven- to twelve-membered ring **[3]**
49/507 . . . polycyclic **[3]**
49/513 . . . . a keto group being part of a condensed ring system **[3]**
49/517 . . containing ether groups,

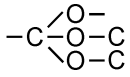
 groups,

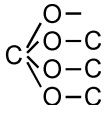
 groups, or

 groups **[3]**

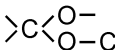
49/523 . . containing −CHO groups **[3]**
49/527 . Unsaturated compounds containing keto groups bound to rings other than six-membered aromatic rings **[3]**
49/533 . . to a three- or four-membered ring **[3]**
49/537 . . to a five-membered ring **[3]**
49/543 . . to a six-membered ring **[3]**
49/547 . . to a seven- to twelve-membered ring **[3]**
49/553 . . polycyclic **[3]**
49/557 . . having unsaturation outside the rings **[3]**
49/563 . . containing six-membered aromatic rings **[3]**
49/567 . . containing halogen **[3]**
49/573 . . containing hydroxy groups **[3]**
49/577 . . containing ether groups,

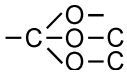
 groups,

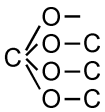
 groups, or

 groups **[3]**

49/583 . . containing −CHO groups **[3]**
49/587 . Unsaturated compounds containing a keto group being part of a ring **[3]**
49/593 . . of a three- or four-membered ring **[3]**
49/597 . . of a five-membered ring **[3]**
49/603 . . of a six-membered ring **[3]**
49/607 . . of a seven- to twelve-membered ring **[3]**
49/613 . . polycyclic **[3]**
49/617 . . . a keto group being part of a condensed ring system **[3]**
49/623 . . . . having two rings **[3]**
49/627 . . . . . the condensed ring system containing seven carbon atoms **[3]**
49/633 . . . . . the condensed ring system containing eight or nine carbon atoms **[3]**
49/637 . . . . . the condensed ring system containing ten carbon atoms **[3]**
49/643 . . . . having three rings **[3]**
49/647 . . having unsaturation outside the ring **[3]**
49/653 . . . polycyclic **[3]**
49/657 . . containing six-membered aromatic rings **[3]**
49/665 . . . a keto group being part of a condensed ring system **[3]**
49/67 . . . . having two rings, e.g. tetralones **[3]**
49/675 . . . . having three rings **[3]**
49/683 . . . having unsaturation outside the aromatic rings **[3]**
49/687 . . containing halogen **[3]**
49/693 . . . polycyclic **[3]**
49/697 . . . containing six-membered aromatic rings **[3]**
49/703 . . containing hydroxy groups **[3]**
49/707 . . . a keto group being part of a three- to five-membered ring **[3]**
49/713 . . . a keto group being part of a six-membered ring **[3]**
49/717 . . . a keto group being part of a seven- to twelve-membered ring **[3]**
49/723 . . . polycyclic **[3]**
49/727 . . . . a keto group being part of a condensed ring system **[3]**
49/733 . . . . . having two rings **[3]**
49/737 . . . . . having three rings **[3]**
49/743 . . . having unsaturation outside the rings, e.g. humulones, lupulones **[3]**
49/747 . . . containing six-membered aromatic rings **[3]**
49/753 . . containing ether groups,

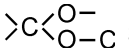
 groups,

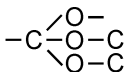
 groups, or

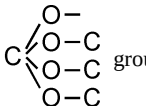
 groups **[3]**

49/755 . . . a keto group being part of a condensed ring system with two or three rings, at least one ring being a six-membered aromatic ring **[3]**
49/757 . . containing −CHO groups **[3]**
49/76 . Ketones containing a keto group bound to a six-membered aromatic ring (compounds having a keto group being part of a condensed ring system and being bound to a six-membered aromatic ring C07C 49/657 to C07C 49/757)
49/78 . . Acetophenone

49/782 . . polycyclic **[3]**
49/784 . . . with all keto groups bound to a non-condensed ring **[3]**
49/786 . . . . Benzophenone **[3]**
49/788 . . . with keto groups bound to a condensed ring system **[3]**
49/792 . . . containing rings other than six-membered aromatic rings **[3]**
49/794 . . having unsaturation outside an aromatic ring **[3]**
49/796 . . . polycyclic **[3]**
49/798 . . . containing rings other than six-membered aromatic rings **[3]**
49/80 . . containing halogen
49/807 . . . all halogen atoms bound to the ring **[3]**
49/813 . . . polycyclic **[3]**
49/82 . . containing hydroxy groups **[3]**
49/825 . . . all hydroxy groups bound to the ring **[3]**
49/83 . . . polycyclic **[3]**
49/835 . . . having unsaturation outside an aromatic ring **[3]**
49/84 . . containing ether groups,

 groups,

 groups, or

 groups **[2,3]**

49/86 . . containing $-CHO$ groups **[3]**
49/88 . Ketenes; Dimeric ketenes **[3]**
49/90 . . Ketene, i.e. C_2H_2O **[3]**
49/92 . Ketonic chelates **[3]**

50/00 **Quinones** (for quinone methides, see unsaturated ketones with a keto group being part of a ring) **[3]**

Note

In this group, quinhydrones are classified according to their quinoid part. **[3]**

50/02 . with monocyclic quinoid structure **[3]**
50/04 . . Benzoquinones, i.e. $C_6H_4O_2$ **[3]**
50/06 . . with unsaturation outside the quinoid structure **[3]**
50/08 . with polycyclic non-condensed quinoid structure **[3]**
50/10 . the quinoid structure being part of a condensed ring system containing two rings **[3]**
50/12 . . Naphthoquinones, i.e. $C_{10}H_6O_2$ **[3]**
50/14 . . with unsaturation outside the ring system, e.g. vitamin K_1 **[3]**
50/16 . the quinoid structure being part of a condensed ring system containing three rings **[3]**
50/18 . . Anthraquinones, i.e. $C_{14}H_8O_2$ **[3]**
50/20 . . with unsaturation outside the ring system **[3]**
50/22 . the quinoid structure being part of a condensed ring system containing four or more rings **[3]**
50/24 . containing halogen **[3]**
50/26 . containing groups having oxygen atoms singly bound to carbon atoms **[3]**
50/28 . . with monocyclic quinoid structure **[3]**
50/30 . . with polycyclic non-condensed quinoid structure **[3]**
50/32 . . the quinoid structure being part of a condensed ring system having two rings **[3]**
50/34 . . the quinoid structure being part of a condensed ring system having three rings **[3]**
50/36 . . the quinoid structure being part of a condensed ring system having four or more rings **[3]**
50/38 . containing $-CHO$ or non-quinoid keto groups **[3]**

51/00 **Preparation of carboxylic acids or their salts, halides, or anhydrides [2]**

51/02 . from salts of carboxylic acids
51/04 . from carboxylic acid halides
51/06 . from carboxylic acid amides
51/08 . from nitriles
51/083 . from carboxylic acid anhydrides **[3]**
51/087 . . by hydrolysis **[3]**
51/09 . from carboxylic acid esters or lactones (saponification of carboxylic acid esters C07C 27/02)
51/093 . by hydrolysis of $-CX_3$ groups, X being halogen **[3]**
51/097 . from or via nitro-substituted organic compounds **[3]**
51/10 . by reaction with carbon monoxide
51/12 . . on an oxygen-containing group in organic compounds, e.g. alcohols
51/14 . . on a carbon-to-carbon unsaturated bond in organic compounds **[3]**
51/145 . . with simultaneous oxidation **[3]**
51/15 . by reaction of organic compounds with carbon dioxide, e.g. Kolbe-Schmitt synthesis **[2]**
51/16 . by oxidation (C07C 51/145 takes precedence) **[3]**
51/21 . . with molecular oxygen **[3]**
51/215 . . . of saturated hydrocarbyl groups **[3]**
51/225 . . . . of paraffin waxes **[3]**
51/23 . . . of oxygen-containing groups to carboxyl groups **[3]**
51/235 . . . . of $-CHO$ groups or primary alcohol groups **[3]**
51/245 . . . . of keto groups or secondary alcohol groups **[3]**
51/25 . . . of unsaturated compounds containing no six-membered aromatic ring **[3]**
51/255 . . . of compounds containing six-membered aromatic rings without ring-splitting **[3]**
51/265 . . . . having alkyl side chains which are oxidised to carboxyl groups **[3]**
51/27 . . with oxides of nitrogen or nitrogen-containing mineral acids **[3]**
51/275 . . . of hydrocarbyl groups **[3]**
51/285 . . with peroxy-compounds **[3]**
51/29 . . with halogen-containing compounds which may be formed in situ **[3]**
51/295 . . with inorganic bases, e.g. by alkali fusion **[3]**
51/305 . . with sulfur or sulfur-containing compounds **[3]**
51/31 . . of cyclic compounds with ring-splitting **[3]**
51/34 . by oxidation with ozone; by hydrolysis of ozonides **[3]**
51/347 . by reactions not involving formation of carboxyl groups **[3]**
51/353 . . by isomerisation; by change of size of the carbon skeleton **[3]**
51/36 . . by hydrogenation of carbon-to-carbon unsaturated bonds **[3]**
51/363 . . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**
51/367 . . by introduction of functional groups containing oxygen only in singly bound form **[3]**

51/373 . . by introduction of functional groups containing oxygen only in doubly bound form **[3]**
51/377 . . by splitting-off hydrogen or functional groups; by hydrogenolysis of functional groups **[3]**
51/38 . . . by decarboxylation **[3]**
51/41 . Preparation of salts of carboxylic acids by conversion of the acids or their salts into salts with the same carboxylic acid part (preparation of soap C11D) **[3]**
51/42 . Separation; Purification; Stabilisation; Use of additives **[3]**
51/43 . . by change of the physical state, e.g. crystallisation **[3]**
51/44 . . . by distillation **[3]**
51/46 . . . . by azeotropic distillation **[3]**
51/47 . . by solid-liquid treatment; by chemisorption **[3]**
51/48 . . by liquid-liquid treatment
51/487 . . by treatment giving rise to chemical modification (by chemisorption C07C 51/47) **[3]**
51/493 . . . whereby carboxylic acid esters are formed **[3]**
51/50 . . Use of additives, e.g. for stabilisation **[3]**
51/54 . Preparation of carboxylic acid anhydrides (by oxidation C07C 51/16)
51/56 . . from organic acids, their salts, or their esters
51/567 . . by reactions not involving the carboxylic acid anhydride group **[3]**
51/573 . . Separation; Purification; Stabilisation; Use of additives **[3]**
51/58 . Preparation of carboxylic acid halides
51/60 . . by conversion of carboxylic acids or their anhydrides into halides with the same carboxylic acid part **[3]**
51/62 . . by reactions not involving the carboxylic acid halide group **[3]**
51/64 . . Separation; Purification; Stabilisation; Use of additives **[3]**

53/00 Saturated compounds having only one carboxyl group bound to an acyclic carbon atom or hydrogen

53/02 . Formic acid
53/04 . . Preparation from carbon monoxide
53/06 . . Salts thereof
53/08 . Acetic acid
53/10 . . Salts thereof
53/12 . Acetic anhydride (ketene C07C 49/90)
53/122 . Propionic acid **[3]**
53/124 . Acids containing four carbon atoms **[3]**
53/126 . Acids containing more than four carbon atoms **[3]**
53/128 . . the carboxyl group being bound to a carbon atom bound to at least two other carbon atoms, e.g. neo-acids **[3]**
53/132 . containing rings **[3]**
53/134 . . monocyclic **[3]**
53/136 . . containing condensed ring systems **[3]**
53/138 . . . containing an adamantane ring system **[3]**
53/15 . containing halogen **[3]**
53/16 . . Halogenated acetic acids **[3]**
53/18 . . . containing fluorine **[3]**
53/19 . . Acids containing three or more carbon atoms **[3]**
53/21 . . . containing fluorine **[3]**
53/23 . . containing rings **[3]**
53/38 . Acyl halides **[3]**
53/40 . . Acetyl halides **[3]**
53/42 . . of acids containing three or more carbon atoms **[3]**
53/44 . . containing rings **[3]**
53/46 . . containing halogen outside the carbonyl halide group **[3]**
53/48 . . . Halogenated acetyl halides **[3]**
53/50 . . . of acids containing three or more carbon atoms **[3]**

55/00 Saturated compounds having more than one carboxyl group bound to acyclic carbon atoms [2]

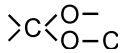
55/02 . Dicarboxylic acids
55/06 . . Oxalic acid
55/07 . . . Salts thereof **[3]**
55/08 . . Malonic acid
55/10 . . Succinic acid
55/12 . . Glutaric acid
55/14 . . Adipic acid
55/16 . . Pimelic acid
55/18 . . Azelaic acid
55/20 . . Sebacic acid
55/21 . . Dicarboxylic acids having twelve carbon atoms **[3]**
55/22 . Tricarboxylic acids
55/24 . containing more than three carboxyl groups
55/26 . containing rings **[3]**
55/28 . . monocyclic **[3]**
55/30 . . containing condensed ring systems **[3]**
55/32 . containing halogen **[3]**
55/34 . . containing rings **[3]**
55/36 . Acyl halides **[3]**
55/38 . . containing rings **[3]**
55/40 . . containing halogen outside the carbonyl halide group **[3]**

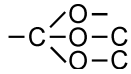
57/00 Unsaturated compounds having carboxyl groups bound to acyclic carbon atoms [2]

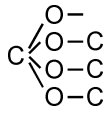
57/02 . with only carbon-to-carbon double bonds as unsaturation
57/03 . . Monocarboxylic acids **[3]**
57/04 . . . Acrylic acid; Methacrylic acid **[3]**
57/045 . . . . Preparation by oxidation in the liquid phase **[3]**
57/05 . . . . Preparation by oxidation in the gaseous phase **[3]**
57/055 . . . . . starting from unsaturated aldehydes **[3]**
57/065 . . . . Preparation by splitting-off $H-X$, X being halogen, OR, or NR_2, R being hydrogen or a hydrocarbon group **[3]**
57/07 . . . . Separation; Purification; Stabilisation; Use of additives **[3]**
57/075 . . . . . Use of additives, e.g. for stabilisation **[3]**
57/08 . . . Crotonic acid **[3]**
57/10 . . . Sorbic acid **[3]**
57/12 . . . Straight chain carboxylic acids containing eighteen carbon atoms **[3]**
57/13 . . Dicarboxylic acids **[3]**
57/145 . . . Maleic acid **[3]**
57/15 . . . Fumaric acid **[3]**
57/155 . . . Citraconic acid **[3]**
57/16 . . . Muconic acid **[3]**
57/18 . with only carbon-to-carbon triple bonds as unsaturation
57/20 . . Propiolic acid
57/22 . . Acetylene dicarboxylic acid
57/24 . . Diacetylene or polyacetylene dicarboxylic acids
57/26 . containing rings other than six-membered aromatic rings **[3]**

57/28 . . containing an adamantane ring system **[3]**
57/30 . containing six-membered aromatic rings **[3]**
57/32 . . Phenylacetic acid **[3]**
57/34 . . containing more than one carboxyl group **[3]**
57/36 . . . Phenylmalonic acid **[3]**
57/38 . . polycyclic **[3]**
57/40 . . . containing condensed ring systems **[3]**
57/42 . . having unsaturation outside the rings **[3]**
57/44 . . . Cinnamic acid **[3]**
57/46 . containing six-membered aromatic rings and other rings, e.g. cyclohexylphenylacetic acid **[3]**
57/48 . . having unsaturation outside the aromatic rings **[3]**
57/50 . . containing condensed ring systems **[3]**
57/52 . containing halogen **[3]**
57/54 . . Halogenated acrylic or methacrylic acids **[3]**
57/56 . . containing rings other than six-membered aromatic rings **[3]**
57/58 . . containing six-membered aromatic rings **[3]**
57/60 . . . having unsaturation outside the rings **[3]**
57/62 . . containing six-membered aromatic rings and other rings **[3]**
57/64 . Acyl halides **[3]**
57/66 . . with only carbon-to-carbon double bonds as unsaturation **[3]**
57/68 . . with only carbon-to-carbon triple bonds as unsaturation **[3]**
57/70 . . containing rings other than six-membered aromatic rings **[3]**
57/72 . . containing six-membered aromatic rings **[3]**
57/74 . . containing six-membered aromatic rings and other rings **[3]**
57/76 . . containing halogen outside the carbonyl halide groups **[3]**

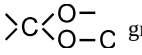
59/00 Compounds having carboxyl groups bound to acyclic carbon atoms and containing any of the groups OH, O-metal, −CHO, keto, ether,

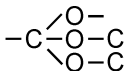
 **groups,**

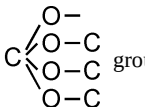
 **groups, or**

 **groups [2]**

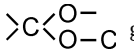
59/01 . Saturated compounds having only one carboxyl group and containing hydroxy or O-metal groups **[3]**
59/06 . . Glycolic acid **[3]**
59/08 . . Lactic acid **[3]**
59/10 . . Polyhydroxy carboxylic acids
59/105 . . . having five or more carbon atoms, e.g. aldonic acids **[3]**
59/11 . . containing rings **[3]**
59/115 . . containing halogen **[3]**
59/125 . Saturated compounds having only one carboxyl group and containing ether groups,

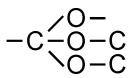
 groups,

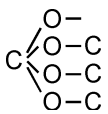
 groups, or

 groups **[3]**

59/13 . . containing rings **[3]**
59/135 . . containing halogen **[3]**
59/147 . Saturated compounds having only one carboxyl group and containing −CHO groups **[3]**
59/153 . . Glyoxylic acid **[3]**
59/185 . Saturated compounds having only one carboxyl group and containing keto groups **[3]**
59/19 . . Pyruvic acid **[3]**
59/195 . . Acetoacetic acid **[3]**
59/205 . . containing rings **[3]**
59/21 . . containing halogen **[3]**
59/215 . . containing singly bound oxygen-containing groups **[3]**
59/225 . . containing −CHO groups **[3]**
59/235 . Saturated compounds having more than one carboxyl group **[3]**
59/245 . . containing hydroxy or O-metal groups **[3]**
59/255 . . . Tartaric acid **[3]**
59/265 . . . Citric acid **[3]**
59/285 . . . Polyhydroxy dicarboxylic acids having five or more carbon atoms, e.g. saccharic acids **[3]**
59/29 . . . containing rings **[3]**
59/295 . . . containing halogen **[3]**
59/305 . . containing ether groups,

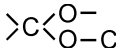
 groups,

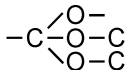
 groups, or

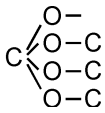
 groups **[3]**

59/31 . . . containing rings **[3]**
59/315 . . . containing halogen **[3]**
59/325 . . containing −CHO groups **[3]**
59/347 . . containing keto groups **[3]**
59/353 . . . containing rings **[3]**
59/40 . Unsaturated compounds **[3]**
59/42 . . containing hydroxy or O-metal groups **[3]**
59/44 . . . Ricinoleic acid **[3]**
59/46 . . . containing rings other than six-membered aromatic rings **[3]**
59/48 . . . containing six-membered aromatic rings **[3]**
59/50 . . . . Mandelic acid **[3]**
59/52 . . . a hydroxy or O-metal group being bound to a carbon atom of a six-membered aromatic ring **[3]**
59/54 . . . containing six-membered aromatic rings and other rings **[3]**
59/56 . . . containing halogen **[3]**

59/58 . . containing ether groups,

 groups,

 groups, or

 groups **[3]**

59/60 . . . the non-carboxylic part of the ether being unsaturated **[3]**

59/62 . . . containing rings other than six-membered aromatic rings **[3]**

59/64 . . . containing six-membered aromatic rings **[3]**

59/66 . . . . the non-carboxylic part of the ether containing six-membered aromatic rings **[3]**

59/68 . . . . . the oxygen atom of the ether group being bound to a non-condensed six-membered aromatic ring **[3]**

59/70 . . . . . Ethers of hydroxy-acetic acid **[3]**

59/72 . . . containing six-membered aromatic rings and other rings **[3]**

59/74 . . containing −CHO groups **[3]**

59/76 . . containing keto groups **[3]**

59/80 . . . containing rings other than six-membered aromatic rings **[3]**

59/82 . . . . the keto group being part of a ring **[3]**

59/84 . . . containing six-membered aromatic rings **[3]**

59/86 . . . containing six-membered aromatic rings and other rings **[3]**

59/88 . . . containing halogen **[3]**

59/90 . . . containing singly bound oxygen-containing groups **[3]**

59/92 . . . containing −CHO groups **[3]**

61/00 Compounds having carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings

61/04 . Saturated compounds having a carboxyl group bound to a three- or four-membered ring **[3]**

61/06 . Saturated compounds having a carboxyl group bound to a five-membered ring **[3]**

61/08 . Saturated compounds having a carboxyl group bound to a six-membered ring **[3]**

61/09 . . Completely hydrogenated benzenedicarboxylic acids **[2,3]**

61/10 . Saturated compounds having a carboxyl group bound to a seven- to twelve-membered ring **[3]**

61/12 . Saturated polycyclic compounds **[3]**

61/125 . . having a carboxyl group bound to a condensed ring system **[3]**

61/13 . . . having two rings **[3]**

61/135 . . . having three rings **[3]**

61/15 . Saturated compounds containing halogen **[3]**

61/16 . Unsaturated compounds **[3]**

61/20 . . having a carboxyl group bound to a five-membered ring **[3]**

61/22 . . having a carboxyl group bound to a six-membered ring **[3]**

61/24 . . . Partially hydrogenated benzenedicarboxylic acids **[3]**

61/26 . . having a carboxyl group bound to a seven- to twelve-membered ring **[3]**

61/28 . . polycyclic **[3]**

61/29 . . . having a carboxyl group bound to a condensed ring system **[3]**

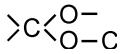
61/35 . . having unsaturation outside the rings **[3]**

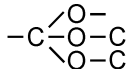
61/37 . . . Chrysanthemumic acid **[3]**

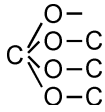
61/39 . . containing six-membered aromatic rings **[3]**

61/40 . . containing halogen **[3]**

62/00 Compounds having carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings and containing any of the groups OH, O-metal, −CHO, keto, ether,

 **groups,**

 **groups, or**

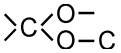
 **groups [3]**

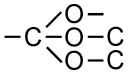
62/02 . Saturated compounds containing hydroxy or O-metal groups **[3]**

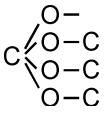
62/04 . . with a six-membered ring **[3]**

62/06 . . polycyclic **[3]**

62/08 . Saturated compounds containing ether groups,

 groups,

 groups, or

 groups **[3]**

62/10 . . with a six-membered ring **[3]**

62/12 . . polycyclic **[3]**

62/14 . . . having a carboxyl group on a condensed ring system **[3]**

62/16 . Saturated compounds containing −CHO groups **[3]**

62/18 . Saturated compounds containing keto groups **[3]**

62/20 . . with a six-membered ring **[3]**

62/22 . . polycyclic **[3]**

62/24 . . the keto group being part of a ring **[3]**

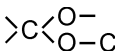
62/26 . . containing singly bound oxygen-containing groups **[3]**

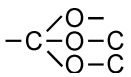
62/28 . . containing −CHO groups **[3]**

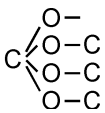
62/30 . Unsaturated compounds **[3]**

62/32 . . containing hydroxy or O-metal groups **[3]**

62/34 . . containing ether groups,

 groups,

 groups, or

 groups **[3]**

62/36 . . containing −CHO groups **[3]**

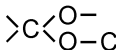
62/38 . . containing keto groups **[3]**

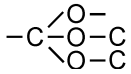
63/00 Compounds having carboxyl groups bound to carbon atoms of six-membered aromatic rings [2]

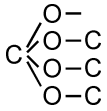
63/04 . Monocyclic monocarboxylic acids

63/06 . . Benzoic acid
63/08 . . . Salts thereof
63/10 . . . Halides thereof
63/14 . Monocyclic dicarboxylic acids
63/15 . . all carboxyl groups bound to carbon atoms of the six-membered aromatic ring **[3]**
63/16 . . . 1,2-Benzenedicarboxylic acid **[3]**
63/20 . . . . Salts thereof **[3]**
63/22 . . . . Halides thereof **[3]**
63/24 . . . 1,3-Benzenedicarboxylic acid **[3]**
63/26 . . . 1,4-Benzenedicarboxylic acid **[3]**
63/28 . . . . Salts thereof **[3]**
63/30 . . . . Halides thereof **[3]**
63/307 . Monocyclic tricarboxylic acids **[3]**
63/313 . Monocyclic acids containing more than three carboxyl groups **[3]**
63/33 . Polycyclic acids **[2,3]**
63/331 . . with all carboxyl groups bound to non-condensed rings **[3]**
63/333 . . . 4,4'-Diphenyldicarboxylic acids **[2,3]**
63/337 . . with carboxyl groups bound to condensed ring systems **[2,3]**
63/34 . . . containing two rings **[3]**
63/36 . . . . containing one carboxyl group **[3]**
63/38 . . . . containing two carboxyl groups both bound to carbon atoms of the condensed ring system **[3]**
63/40 . . . . containing three or more carboxyl groups all bound to carbon atoms of the condensed ring system **[3]**
63/42 . . . containing three or more rings **[3]**
63/44 . . . . containing one carboxyl group **[3]**
63/46 . . . . containing two carboxyl groups both bound to carbon atoms of the condensed ring system **[3]**
63/48 . . . . containing three or more carboxyl groups all bound to carbon atoms of the condensed ring system **[3]**
63/49 . . containing rings other than six-membered aromatic rings **[3]**
63/64 . Monocyclic acids with unsaturation outside the aromatic ring **[3]**
63/66 . Polycyclic acids with unsaturation outside the aromatic rings **[3]**
63/68 . containing halogen **[3]**
63/70 . . Monocarboxylic acids **[3]**
63/72 . . Polycyclic acids **[3]**
63/74 . . having unsaturation outside the aromatic rings **[3]**

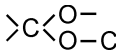
65/00 Compounds having carboxyl groups bound to carbon atoms of six-membered aromatic rings and containing any of the groups OH, O-metal, −CHO, keto, ether,

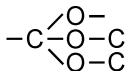
 **groups,**

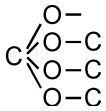
 **groups, or**

 **groups**

65/01 . containing hydroxy or O-metal groups **[3]**
65/03 . . monocyclic and having all hydroxy or O-metal groups bound to the ring **[3]**
65/05 . . . o-Hydroxy carboxylic acids **[3]**
65/10 . . . . Salicylic acid **[3]**
65/105 . . polycyclic **[3]**
65/11 . . . with carboxyl groups on a condensed ring system containing two rings **[3]**
65/15 . . . with carboxyl groups on a condensed ring system containing more than two rings **[3]**
65/17 . . containing rings other than six-membered aromatic rings **[3]**
65/19 . . having unsaturation outside the aromatic ring **[3]**
65/21 . containing ether groups,

 groups,

 groups, or

 groups **[3]**

65/24 . . polycyclic **[3]**
65/26 . . . containing rings other than six-membered aromatic rings **[3]**
65/28 . . having unsaturation outside the aromatic rings **[3]**
65/30 . containing −CHO groups **[3]**
65/32 . containing keto groups **[3]**
65/34 . . polycyclic **[3]**
65/36 . . . containing rings other than six-membered aromatic rings **[3]**
65/38 . . having unsaturation outside the aromatic rings **[3]**
65/40 . . containing singly bound oxygen-containing groups **[3]**
65/42 . . containing −CHO groups **[3]**

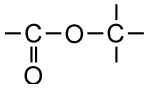
66/00 Quinone carboxylic acids [2]
66/02 . Anthraquinone carboxylic acids **[2]**

67/00 Preparation of carboxylic acid esters

Note

In this group, lactones used as reactants are considered as being esters. **[3]**

67/02 . by interreacting ester groups, i.e. transesterification
67/03 . by reacting an ester group with a hydroxy group **[2]**
67/035 . by reacting carboxylic acids or symmetrical anhydrides with saturated hydrocarbons **[3]**
67/04 . by reacting carboxylic acids or symmetrical anhydrides onto unsaturated carbon-to-carbon bonds **[2]**
67/05 . . with oxidation **[2,3]**
67/055 . . . in the presence of platinum group metals or their compounds **[3]**
67/08 . by reacting carboxylic acids or symmetrical anhydrides with the hydroxy or O-metal group of organic compounds **[2]**
67/10 . by reacting carboxylic acids or symmetrical anhydrides with ester groups or with a carbon-halogen bond **[2]**
67/11 . . being mineral ester groups **[3]**
67/12 . from asymmetrical anhydrides **[2]**
67/14 . from carboxylic acid halides **[2]**
67/16 . from carboxylic acids, esters or anhydrides wherein one oxygen atom has been replaced by a sulfur, selenium or tellurium atom **[2]**

67/18 . by conversion of a group containing nitrogen into an ester group **[2]**
67/20 . . from amides or lactams **[2]**
67/22 . . from nitriles **[2]**
67/24 . by reacting carboxylic acids or derivatives thereof with a carbon-to-oxygen ether bond, e.g. acetal, tetrahydrofuran **[2]**
67/26 . . with an oxirane ring **[2]**
67/27 . from ortho-esters **[3]**
67/28 . by modifying the hydroxylic moiety of the ester, such modification not being an introduction of an ester group **[2]**
67/283 . . by hydrogenation of unsaturated carbon-to-carbon bonds **[3]**
67/287 . . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**
67/29 . . by introduction of oxygen-containing functional groups **[3]**
67/293 . . by isomerisation; by change of size of the carbon skeleton **[3]**
67/297 . . by splitting-off hydrogen or functional groups; by hydrogenolysis of functional groups **[3]**
67/30 . by modifying the acid moiety of the ester, such modification not being an introduction of an ester group **[2]**
67/303 . . by hydrogenation of unsaturated carbon-to-carbon bonds **[3]**
67/307 . . by introduction of halogen; by substitution of halogen atoms by other halogen atoms **[3]**
67/31 . . by introduction of functional groups containing oxygen only in singly bound form **[3]**
67/313 . . by introduction of doubly bound oxygen containing functional groups, e.g. carboxyl groups **[3]**
67/317 . . by splitting-off hydrogen or functional groups; by hydrogenolysis of functional groups **[3]**
67/32 . . . Decarboxylation **[2,3]**
67/327 . . . by elimination of functional groups containing oxygen only in singly bound form **[3]**
67/333 . . by isomerisation; by change of size of the carbon skeleton (introduction or elimination of carboxyl groups C07C 67/313, C07C 67/32) **[3]**
67/34 . . . Migration of  groups in the molecule **[2,3]**
67/343 . . . by increase in the number of carbon atoms **[3]**
67/347 . . . . by addition to unsaturated carbon-to-carbon bonds **[3]**
67/36 . by reaction with carbon monoxide or formates (C07C 67/02, C07C 67/03, C07C 67/10 take precedence) **[2]**
67/37 . . by reaction of ethers with carbon monoxide **[2]**
67/38 . . by addition to an unsaturated carbon-to-carbon bond **[2]**
67/39 . by oxidation of groups which are precursors for the acid moiety of the ester **[3]**
67/40 . . by oxidation of primary alcohols **[2,3]**
67/42 . . by oxidation of secondary alcohols or ketones **[2,3]**
67/44 . by oxidation-reduction of aldehydes, e.g. Tishchenko reaction **[2]**
67/46 . from ketenes or polyketenes **[2]**
67/465 . by oligomerisation **[3]**
67/47 . by telomerisation (macromolecular compounds C08) **[3]**
67/475 . by splitting of carbon-to-carbon bonds and redistribution, e.g. disproportionation or migration of  groups between different molecules **[3]**
67/48 . Separation; Purification; Stabilisation; Use of additives **[2,3]**
67/52 . . by change in the physical state, e.g. crystallisation **[3]**
67/54 . . . by distillation **[3]**
67/56 . . by solid-liquid treatment; by chemisorption **[3]**
67/58 . . by liquid-liquid treatment **[3]**
67/60 . . by treatment giving rise to chemical modification (by chemisorption C07C 67/56) **[3]**
67/62 . . Use of additives, e.g. for stabilisation **[3]**

68/00 Preparation of esters of carbonic or haloformic acids [2]

68/02 . from phosgene or haloformates **[2]**
68/04 . from carbon dioxide or inorganic carbonates **[2]**
68/06 . from organic carbonates **[2]**
68/08 . Purification; Separation; Stabilisation **[2]**

69/00 Esters of carboxylic acids; **Esters of carbonic or haloformic acids**

Note

Attention is drawn to Note (6) following the title of this subclass. **[5]**

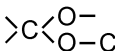
69/003 . Esters of saturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom **[3]**
69/007 . Esters of unsaturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom **[3]**
69/01 . . Vinyl esters **[3]**
69/013 . Esters of alcohols having the esterified hydroxy group bound to a carbon atom of a ring other than a six-membered aromatic ring **[3]**
69/017 . Esters of hydroxy compounds having the esterified hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**

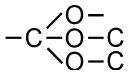
Note

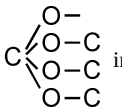
Esters having a variably-specified acid moiety, i.e. covered by more than one of groups C07C 69/02, C07C 69/34, C07C 69/52, C07C 69/608, C07C 69/612, C07C 69/62, C07C 69/66, C07C 69/74, C07C 69/76, C07C 69/95, C07C 69/96, are covered by groups C07C 69/003 to C07C 69/017 according to their hydroxylic moiety. **[3]**

69/02 . Esters of acyclic saturated monocarboxylic acids having the carboxyl group bound to an acyclic carbon atom or to hydrogen
69/025 . . esterified with unsaturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom **[3]**
69/03 . . esterified with alcohols having the esterified hydroxy group bound to a carbon atom of a ring other than a six-membered aromatic ring **[3]**
69/035 . . esterified with a hydroxy compound having the esterified hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**
69/04 . . Formic acid esters
69/06 . . . of monohydroxylic compounds
69/07 . . . . of unsaturated alcohols **[2]**

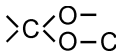
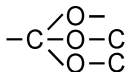
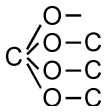
69/08 . . . of dihydroxylic compounds
69/10 . . . of trihydroxylic compounds
69/12 . . Acetic acid esters
69/14 . . . of monohydroxylic compounds
69/145 . . . . of unsaturated alcohols **[2]**
69/15 . . . . . Vinyl acetate **[2]**
69/155 . . . . . Allyl acetate **[2]**
69/157 . . . . . containing six-membered aromatic rings **[3]**
69/16 . . . of dihydroxylic compounds
69/18 . . . of trihydroxylic compounds
69/21 . . . of hydroxy compounds with more than three hydroxy groups **[2]**
69/22 . . having three or more carbon atoms in the acid moiety
69/24 . . . esterified with monohydroxylic compounds
69/26 . . . . Synthetic waxes
69/28 . . . esterified with dihydroxylic compounds
69/30 . . . esterified with trihydroxylic compounds
69/33 . . . esterified with hydroxy compounds having more than three hydroxy groups **[2]**
69/34 . Esters of acyclic saturated polycarboxylic acids having an esterified carboxyl group bound to an acyclic carbon atom **[3]**
69/347 . . esterified with unsaturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom **[3]**
69/353 . . esterified with a hydroxy compound having the esterified hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**
69/36 . . Oxalic acid esters **[3]**
69/38 . . Malonic acid esters **[3]**
69/40 . . Succinic acid esters **[3]**
69/42 . . Glutaric acid esters **[3]**
69/44 . . Adipic acid esters **[3]**
69/46 . . Pimelic acid esters **[3]**
69/48 . . Azelaic acid esters **[3]**
69/50 . . Sebacic acid esters **[3]**
69/52 . Esters of acyclic unsaturated carboxylic acids having the esterified carboxyl group bound to an acyclic carbon atom **[3]**
69/527 . . of unsaturated hydroxy compounds **[3]**
69/533 . . Monocarboxylic acid esters having only one carbon-to-carbon double bond **[3]**
69/54 . . . Acrylic acid esters; Methacrylic acid esters **[3]**
69/56 . . . Crotonic acid esters; Vinyl acetic acid esters **[3]**
69/58 . . . Esters of straight chain acids with eighteen carbon atoms in the acid moiety **[3]**
69/587 . . Monocarboxylic acid esters having at least two carbon-to-carbon double bonds **[3]**
69/593 . . Dicarboxylic acid esters having only one carbon-to-carbon double bond **[3]**
69/60 . . . Maleic acid esters; Fumaric acid esters **[3]**
69/602 . . Dicarboxylic acid esters having at least two carbon-to-carbon double bonds **[3]**
69/604 . . Polycarboxylic acid esters, the acid moiety containing more than two carboxyl groups **[3]**
69/606 . . having only carbon-to-carbon triple bonds as unsaturation in the carboxylic acid moiety **[3]**
69/608 . Esters of carboxylic acids having a carboxyl group bound to an acyclic carbon atom and having a ring other than a six-membered aromatic ring in the acid moiety **[3]**
69/612 . Esters of carboxylic acids having a carboxyl group bound to an acyclic carbon atom and having a six-membered aromatic ring in the acid moiety **[3]**
69/614 . . of phenylacetic acid **[3]**
69/616 . . polycyclic **[3]**
69/618 . . having unsaturation outside the six-membered aromatic ring **[3]**
69/62 . Halogen-containing esters **[2]**
69/63 . . of saturated acids **[2]**
69/635 . . . containing rings in the acid moiety **[3]**
69/65 . . of unsaturated acids **[2]**
69/653 . . . Acrylic acid esters; Methacrylic acid esters; Haloacrylic acid esters; Halomethacrylic acid esters **[3]**
69/657 . . . Maleic acid esters; Fumaric acid esters; Halomaleic acid esters; Halofumaric acid esters **[3]**
69/66 . Esters of carboxylic acids having esterified carboxyl groups bound to acyclic carbon atoms and having any of the groups OH, O-metal, −CHO, keto, ether, acyloxy,

 groups,

 groups, or

 in the acid moiety

69/67 . . of saturated acids **[2]**
69/675 . . . of saturated hydroxy-carboxylic acids **[3]**
69/68 . . . . Lactic acid esters **[3]**
69/70 . . . . Tartaric acid esters **[3]**
69/704 . . . . Citric acid esters **[3]**
69/708 . . . Ethers **[3]**
69/712 . . . . the hydroxy group of the ester being etherified with a hydroxy compound having the hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**
69/716 . . . Esters of keto-carboxylic acids **[3]**
69/72 . . . . Acetoacetic acid esters **[3]**
69/73 . . of unsaturated acids **[2]**
69/732 . . . of unsaturated hydroxy carboxylic acids **[3]**
69/734 . . . Ethers **[3]**
69/736 . . . . the hydroxy group of the ester being etherified with a hydroxy compound having the hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**
69/738 . . . Esters of keto-carboxylic acids **[3]**
69/74 . Esters of carboxylic acids having an esterified carboxyl group bound to a carbon atom of a ring other than a six-membered aromatic ring
69/743 . . of acids with a three-membered ring and with unsaturation outside the ring **[3]**
69/747 . . . Chrysanthemumic acid esters **[3]**
69/75 . . of acids with a six-membered ring **[3]**
69/753 . . of polycyclic acids **[3]**

69/757 . . having any of the groups OH, O-metal, −CHO, keto, ether, acyloxy,  groups,  groups, or  in the acid moiety **[3]**

69/76 . Esters of carboxylic acids having an esterified carboxyl group bound to a carbon atom of a six-membered aromatic ring

69/767 . . esterified with unsaturated alcohols having the esterified hydroxy group bound to an acyclic carbon atom **[3]**

69/773 . . esterified with a hydroxy compound having the esterified hydroxy group bound to a carbon atom of a six-membered aromatic ring **[3]**

69/78 . . Benzoic acid esters

69/80 . . Phthalic acid esters **[2]**

69/82 . . . Terephthalic acid esters

69/83 . . . of unsaturated alcohols **[2]**

69/84 . . of monocyclic hydroxy carboxylic acids, the hydroxy groups and the carboxyl groups of which are bound to carbon atoms of a six-membered aromatic ring

69/86 . . . with esterified hydroxyl groups

69/88 . . . with esterified carboxyl groups

69/90 . . . with esterified hydroxyl and carboxyl groups

69/92 . . . with etherified hydroxyl groups **[2]**

69/94 . . of polycyclic hydroxy carboxylic acids, the hydroxy groups and the carboxyl groups of which are bound to carbon atoms of six-membered aromatic rings **[2]**

69/95 . Esters of quinone carboxylic acids **[2]**

69/96 . Esters of carbonic or haloformic acids **[2]**

71/00 Esters of oxyacids of halogens

Compounds containing carbon and nitrogen with or without hydrogen, halogens or oxygen [5]

201/00 Preparation of esters of nitric or nitrous acid or of compounds containing nitro or nitroso groups bound to a carbon skeleton [5]

201/02 . Preparation of esters of nitric acid **[5]**

201/04 . Preparation of esters of nitrous acid **[5]**

201/06 . Preparation of nitro compounds **[5]**

201/08 . . by substitution of hydrogen atoms by nitro groups **[5]**

201/10 . . by substitution of functional groups by nitro groups **[5]**

201/12 . . by reactions not involving the formation of nitro groups **[5]**

201/14 . . by formation of nitro groups together with reactions not involving the formation of nitro groups **[5]**

201/16 . . Separation; Purification; Stabilisation; Use of additives **[5]**

203/00 Esters of nitric or nitrous acid [5]

203/02 . Esters of nitric acid **[5]**

203/04 . . having nitrate groups bound to acyclic carbon atoms **[5]**

203/06 . . . Glycerol trinitrate **[5]**

203/08 . . having nitrate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

203/10 . . having nitrate groups bound to carbon atoms of six-membered aromatic rings **[5]**

205/00 Compounds containing nitro groups bound to a carbon skeleton [5]

205/01 . having nitro groups bound to acyclic carbon atoms **[5]**

205/02 . . of a saturated carbon skeleton **[5]**

205/03 . . of an unsaturated carbon skeleton **[5]**

205/04 . . . containing six-membered aromatic rings **[5]**

205/05 . having nitro groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

205/06 . having nitro groups bound to carbon atoms of six-membered aromatic rings **[5]**

205/07 . the carbon skeleton being further substituted by halogen atoms **[5]**

205/08 . . having nitro groups bound to acyclic carbon atoms **[5]**

205/09 . . . of an unsaturated carbon skeleton **[5]**

205/10 . . having nitro groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

205/11 . . having nitro groups bound to carbon atoms of six-membered aromatic rings **[5]**

205/12 . . . the six-membered aromatic ring or a condensed ring system containing that ring being substituted by halogen atoms **[5]**

205/13 . the carbon skeleton being further substituted by hydroxy groups **[5]**

205/14 . . having nitro groups and hydroxy groups bound to acyclic carbon atoms **[5]**

205/15 . . . of a saturated carbon skeleton **[5]**

205/16 . . . of a carbon skeleton containing six-membered aromatic rings **[5]**

205/17 . . having nitro groups bound to acyclic carbon atoms and hydroxy groups bound to carbon atoms of six-membered aromatic rings **[5]**

205/18 . . having nitro groups or hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

205/19 . . having nitro groups bound to carbon atoms of six-membered aromatic rings and hydroxy groups bound to acyclic carbon atoms **[5]**

205/20 . . having nitro groups and hydroxy groups bound to carbon atoms of six-membered aromatic rings **[5]**

205/21 . . . having nitro groups and hydroxy groups bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**

205/22 . . . . having one nitro group bound to the ring **[5]**

205/23 . . . . having two nitro groups bound to the ring **[5]**

205/24 . . . . having three, and only three, nitro groups bound to the ring **[5]**

205/25 . . . having nitro groups bound to carbon atoms of six-membered aromatic rings being part of a condensed ring system **[5]**

205/26 . . and being further substituted by halogen atoms **[5]**

205/27 . the carbon skeleton being further substituted by etherified hydroxy groups **[5]**

205/28 . . having nitro groups and etherified hydroxy groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

205/29 . . . the carbon skeleton being saturated **[5]**

205/30 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a six-membered aromatic ring **[5]**
205/31 . . . the carbon skeleton containing six-membered aromatic rings **[5]**
205/32 . . having nitro groups bound to acyclic carbon atoms and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
205/33 . . having nitro groups or etherified hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**
205/34 . . having nitro groups bound to carbon atoms of six-membered aromatic rings and etherified hydroxy groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
205/35 . . having nitro groups and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
205/36 . . . to carbon atoms of the same non-condensed six-membered aromatic ring or to carbon atoms of six-membered aromatic rings being part of the same condensed ring system **[5]**
205/37 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to an acyclic carbon atom **[5]**
205/38 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a six-membered aromatic ring, e.g. nitrodiphenyl ethers **[5]**
205/39 . the carbon skeleton being further substituted by esterified hydroxy groups **[5]**
205/40 . . having nitro groups and esterified hydroxy groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
205/41 . . having nitro groups or esterified hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**
205/42 . . having nitro groups or esterified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
205/43 . . . to carbon atoms of the same non-condensed six-membered aromatic ring or to carbon atoms of six-membered aromatic rings being part of the same condensed ring system **[5]**
205/44 . the carbon skeleton being further substituted by −CHO groups **[5]**
205/45 . the carbon skeleton being further substituted by at least one doubly-bound oxygen atom, not being part of a −CHO group **[5]**
205/46 . . the carbon skeleton containing carbon atoms of quinone rings **[5]**
205/47 . . . Anthraquinones containing nitro groups **[5]**
205/48 . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
205/49 . the carbon skeleton being further substituted by carboxyl groups **[5]**
205/50 . . having nitro groups and carboxyl groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
205/51 . . . the carbon skeleton being saturated **[5]**
205/52 . . . . Nitro-acetic acids **[5]**
205/53 . . . the carbon skeleton containing six-membered aromatic rings **[5]**
205/54 . . having nitro groups bound to acyclic carbon atoms and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
205/55 . . having nitro groups or carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**
205/56 . . having nitro groups bound to carbon atoms of six-membered aromatic rings and carboxyl groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
205/57 . . having nitro groups and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
205/58 . . . the carbon skeleton being further substituted by halogen atoms **[5]**
205/59 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
205/60 . . . . in ortho-position to the carboxyl group, e.g. nitro-salicylic acids **[5]**
205/61 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms **[5]**

207/00 Compounds containing nitroso groups bound to a carbon skeleton [5]
207/02 . the carbon skeleton not being further substituted **[5]**
207/04 . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**

209/00 Preparation of compounds containing amino groups bound to a carbon skeleton [5]
209/02 . by substitution of hydrogen atoms by amino groups **[5]**
209/04 . by substitution of functional groups by amino groups **[5]**
209/06 . . by substitution of halogen atoms **[5]**
209/08 . . . with formation of amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**
209/10 . . . with formation of amino groups bound to carbon atoms of six-membered aromatic rings or from amines having nitrogen atoms bound to carbon atoms of six-membered aromatic rings **[5]**
209/12 . . . with formation of quaternary ammonium compounds **[5]**
209/14 . . by substitution of hydroxy groups or of etherified or esterified hydroxy groups **[5]**
209/16 . . . with formation of amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**
209/18 . . . with formation of amino groups bound to carbon atoms of six-membered aromatic rings or from amines having nitrogen atoms bound to carbon atoms of six-membered aromatic rings **[5]**
209/20 . . . with formation of quaternary ammonium compounds **[5]**
209/22 . . by substitution of other functional groups **[5]**
209/24 . by reductive alkylation of ammonia, amines or compounds having groups reducible to amino groups, with carbonyl compounds **[5]**
209/26 . . by reduction with hydrogen **[5]**
209/28 . . by reduction with other reducing agents **[5]**
209/30 . by reduction of nitrogen-to-oxygen or nitrogen-to-nitrogen bonds **[5]**

209/32 . . by reduction of nitro groups **[5]**
209/34 . . . by reduction of nitro groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**
209/36 . . . by reduction of nitro groups bound to carbon atoms of six-membered aromatic rings **[5]**
209/38 . . by reduction of nitroso groups **[5]**
209/40 . . by reduction of hydroxylamino or oxyimino groups **[5]**
209/42 . . by reduction of nitrogen-to-nitrogen bonds **[5]**
209/44 . by reduction of carboxylic acids or esters thereof in presence of ammonia or amines, or by reduction of nitriles, carboxylic acid amides, imines or imino-ethers **[5]**
209/46 . . by reduction of carboxylic acids or esters thereof in presence of ammonia or amines **[5]**
209/48 . . by reduction of nitriles **[5]**
209/50 . . by reduction of carboxylic acid amides **[5]**
209/52 . . by reduction of imines or imino-ethers (C07C 209/24 takes precedence) **[5]**
209/54 . by rearrangement reactions **[5]**
209/56 . . from carboxylic acids involving a Hofmann, Curtius, Schmidt, or Lossen-type rearrangement **[5]**
209/58 . . from or via amides **[5]**
209/60 . by condensation or addition reactions, e.g. Mannich reaction, addition of ammonia or amines to alkenes or to alkynes or addition of compounds containing an active hydrogen atom to Schiff's bases, quinone imines, or aziranes **[5]**
209/62 . by cleaving carbon-to-nitrogen, sulfur-to-nitrogen, or phosphorus-to-nitrogen bonds, e.g. hydrolysis of amides, N-dealkylation of amines or quaternary ammonium compounds (C07C 209/24 takes precedence) **[5]**
209/64 . by disproportionation **[5]**
209/66 . from or via metallo-organic compounds **[5]**
209/68 . from amines, by reactions not involving amino groups, e.g. reduction of unsaturated amines, aromatisation, or substitution of the carbon skeleton **[5]**
209/70 . . by reduction of unsaturated amines **[5]**
209/72 . . . by reduction of six-membered aromatic rings **[5]**
209/74 . . by halogenation, hydrohalogenation, dehalogenation, or dehydrohalogenation **[5]**
209/76 . . by nitration **[5]**
209/78 . . from carbonyl compounds, e.g. from formaldehyde, and amines having amino groups bound to carbon atoms of six-membered aromatic rings, with formation of methylene-diarylamines **[5]**
209/80 . by photochemical reactions; by using free radicals **[5]**
209/82 . Purification; Separation; Stabilisation; Use of additives **[5]**
209/84 . . Purification **[5]**
209/86 . . Separation **[5]**
209/88 . . . Separation of optical isomers **[5]**
209/90 . . Stabilisation; Use of additives **[5]**

211/00 Compounds containing amino groups bound to a carbon skeleton [5]

211/01 . having amino groups bound to acyclic carbon atoms **[5]**
211/02 . . of an acyclic saturated carbon skeleton **[5]**
211/03 . . . Monoamines **[5]**
211/04 . . . . Mono-, di- or tri-methylamine **[5]**
211/05 . . . . Mono-, di- or tri-ethylamine **[5]**
211/06 . . . . containing only n- or iso-propyl groups **[5]**
211/07 . . . . containing one, two or three alkyl groups, each having the same number of carbon atoms in excess of three **[5]**
211/08 . . . . containing alkyl groups having a different number of carbon atoms **[5]**
211/09 . . . Diamines **[5]**
211/10 . . . . Diaminoethanes **[5]**
211/11 . . . . Diaminopropanes **[5]**
211/12 . . . . 1,6-Diaminohexanes **[5]**
211/13 . . . Amines containing three or more amino groups bound to the carbon skeleton **[5]**
211/14 . . . Amines containing amino groups bound to at least two aminoalkyl groups, e.g. diethylenetriamines **[5]**
211/15 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/16 . . of a saturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**
211/17 . . . containing only non-condensed rings **[5]**
211/18 . . . containing at least two amino groups bound to the carbon skeleton **[5]**
211/19 . . . containing condensed ring systems **[5]**
211/20 . . of an acyclic unsaturated carbon skeleton **[5]**
211/21 . . . Monoamines **[5]**
211/22 . . . containing at least two amino groups bound to the carbon skeleton **[5]**
211/23 . . . the carbon skeleton containing carbon-to-carbon triple bonds **[5]**
211/24 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/25 . . of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**
211/26 . . of an unsaturated carbon skeleton containing at least one six-membered aromatic ring **[5]**
211/27 . . . having amino groups linked to the six-membered aromatic ring by saturated carbon chains **[5]**
211/28 . . . having amino groups linked to the six-membered aromatic ring by unsaturated carbon chains **[5]**
211/29 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/30 . . . the six-membered aromatic ring being part of a condensed ring system formed by two rings **[5]**
211/31 . . . the six-membered aromatic ring being part of a condensed ring system formed by at least three rings **[5]**
211/32 . . . . containing dibenzocycloheptane or dibenzocycloheptene ring systems or condensed derivatives thereof **[5]**
211/33 . having amino groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
211/34 . . of a saturated carbon skeleton **[5]**
211/35 . . . containing only non-condensed rings **[5]**
211/36 . . . containing at least two amino groups bound to the carbon skeleton **[5]**
211/37 . . . being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/38 . . . containing condensed ring systems **[5]**
211/39 . . of an unsaturated carbon skeleton **[5]**
211/40 . . . containing only non-condensed rings **[5]**
211/41 . . . containing condensed ring systems **[5]**
211/42 . . . . with six-membered aromatic rings being part of the condensed ring systems **[5]**

211/43 . having amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
211/44 . . having amino groups bound to only one six-membered aromatic ring **[5]**
211/45 . . . Monoamines **[5]**
211/46 . . . . Aniline **[5]**
211/47 . . . . Toluidines; Homologues thereof **[5]**
211/48 . . . . N-alkylated amines **[5]**
211/49 . . . having at least two amino groups bound to the carbon skeleton **[5]**
211/50 . . . . with at least two amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
211/51 . . . . . Phenylenediamines **[5]**
211/52 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/53 . . . having the nitrogen atom of at least one of the amino groups further bound to a hydrocarbon radical substituted by amino groups **[5]**
211/54 . . having amino groups bound to two or three six-membered aromatic rings **[5]**
211/55 . . . Diphenylamines **[5]**
211/56 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/57 . . having amino groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems of the carbon skeleton **[5]**
211/58 . . . Naphthylamines; N-substituted derivatives thereof **[5]**
211/59 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**
211/60 . . . containing a ring other than a six-membered aromatic ring forming part of at least one of the condensed ring systems **[5]**
211/61 . . . with at least one of the condensed ring systems formed by three or more rings **[5]**
211/62 . Quaternary ammonium compounds **[5]**
211/63 . . having quaternised nitrogen atoms bound to acyclic carbon atoms **[5]**
211/64 . . having quaternised nitrogen atoms bound to carbon atoms of six-membered aromatic rings **[5]**
211/65 . Metal complexes of amines **[5]**

213/00 Preparation of compounds containing amino and hydroxy, amino and etherified hydroxy or amino and esterified hydroxy groups bound to the same carbon skeleton [5]

213/02 . by reactions involving the formation of amino groups from compounds containing hydroxy groups or etherified or esterified hydroxy groups **[5]**
213/04 . by reaction of ammonia or amines with olefin oxides or halohydrins **[5]**
213/06 . from hydroxy amines by reactions involving the etherification or esterification of hydroxy groups **[5]**
213/08 . by reactions not involving the formation of amino groups, hydroxy groups or etherified or esterified hydroxy groups **[5]**
213/10 . Separation; Purification; Stabilisation; Use of additives **[5]**

215/00 Compounds containing amino and hydroxy groups bound to the same carbon skeleton [5]

215/02 . having hydroxy groups and amino groups bound to acyclic carbon atoms of the same carbon skeleton **[5]**
215/04 . . the carbon skeleton being saturated **[5]**
215/06 . . . and acyclic **[5]**
215/08 . . . . with only one hydroxy group and one amino group bound to the carbon skeleton **[5]**
215/10 . . . . with one amino group and at least two hydroxy groups bound to the carbon skeleton **[5]**
215/12 . . . . the nitrogen atom of the amino group being further bound to hydrocarbon groups substituted by hydroxy groups **[5]**
215/14 . . . . the nitrogen atom of the amino group being further bound to hydrocarbon groups substituted by amino groups **[5]**
215/16 . . . . the nitrogen atom of the amino group being further bound to carbon atoms of six-membered aromatic rings **[5]**
215/18 . . . . with hydroxy groups and at least two amino groups bound to the carbon skeleton **[5]**
215/20 . . . the carbon skeleton being saturated and containing rings **[5]**
215/22 . . the carbon skeleton being unsaturated **[5]**
215/24 . . . and acyclic **[5]**
215/26 . . . and containing rings other than six-membered aromatic rings **[5]**
215/28 . . . and containing six-membered aromatic rings **[5]**
215/30 . . . . containing hydroxy groups and carbon atoms of six-membered aromatic rings bound to the same carbon atom of the carbon skeleton **[5]**
215/32 . . . . . containing hydroxy groups and carbon atoms of two six-membered aromatic rings bound to the same carbon atom of the carbon skeleton **[5]**
215/34 . . . . containing hydroxy groups and carbon atoms of six-membered aromatic rings bound to the same carbon atom of the carbon skeleton and at least one hydroxy group bound to another carbon atom of the carbon skeleton **[5]**
215/36 . . . . . 1-Aryl-2-amino-1,3-propane diols **[5]**
215/38 . . . . with rings other than six-membered aromatic rings being part of the carbon skeleton **[5]**
215/40 . . with quaternised nitrogen atoms bound to carbon atoms of the carbon skeleton **[5]**
215/42 . having amino groups or hydroxy groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**
215/44 . . bound to carbon atoms of the same ring or condensed ring system **[5]**
215/46 . having hydroxy groups bound to carbon atoms of at least one six-membered aromatic ring and amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**
215/48 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains not further substituted by hydroxy groups **[5]**
215/50 . . . with amino groups and the six-membered aromatic ring, or the condensed ring system containing that ring, bound to the same carbon atom of the carbon chain **[5]**
215/52 . . . linked by carbon chains having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**
215/54 . . . linked by carbon chains having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

215/56 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains further substituted by hydroxy groups **[5]**

215/58 . . . with hydroxy groups and the six-membered aromatic ring, or the condensed ring system containing that ring, bound to the same carbon atom of the carbon chain **[5]**

215/60 . . . . the chain having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

215/62 . . . . the chain having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

215/64 . . with rings other than six-membered aromatic rings being part of the carbon skeleton **[5]**

215/66 . . with quaternised amino groups bound to the carbon skeleton **[5]**

215/68 . having amino groups bound to carbon atoms of six-membered aromatic rings and hydroxy groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

215/70 . . with rings other than six-membered aromatic rings being part of the carbon skeleton **[5]**

215/72 . . with quaternised amino groups bound to the carbon skeleton **[5]**

215/74 . having hydroxy groups and amino groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**

215/76 . . of the same non-condensed six-membered aromatic ring **[5]**

215/78 . . . containing at least two hydroxy groups bound to the carbon skeleton **[5]**

215/80 . . . containing at least two amino groups bound to the carbon skeleton **[5]**

215/82 . . . having the nitrogen atom of at least one of the amino groups further bound to a carbon atom of another six-membered aromatic ring **[5]**

215/84 . . having amino groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems **[5]**

215/86 . . . being formed by two rings **[5]**

215/88 . . . being formed by at least three rings **[5]**

215/90 . . with quaternised amino groups bound to the carbon skeleton **[5]**

217/00 Compounds containing amino and etherified hydroxy groups bound to the same carbon skeleton [5]

217/02 . having etherified hydroxy groups and amino groups bound to acyclic carbon atoms of the same carbon skeleton **[5]**

217/04 . . the carbon skeleton being acyclic and saturated **[5]**

217/06 . . . having only one etherified hydroxy group and one amino group bound to the carbon skeleton, which is not further substituted **[5]**

217/08 . . . . the oxygen atom of the etherified hydroxy group being further bound to an acyclic carbon atom **[5]**

217/10 . . . . . to an acyclic carbon atom of a hydrocarbon radical containing six-membered aromatic rings **[5]**

217/12 . . . . the oxygen atom of the etherified hydroxy group being further bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

217/14 . . . . the oxygen atom of the etherified hydroxy group being further bound to a carbon atom of a six-membered aromatic ring **[5]**

217/16 . . . . . the six-membered aromatic ring or condensed ring system containing that ring not being further substituted **[5]**

217/18 . . . . . the six-membered aromatic ring or condensed ring system containing that ring being further substituted **[5]**

217/20 . . . . . by halogen atoms, by trihalomethyl, nitro or nitroso groups, or by singly-bound oxygen atoms **[5]**

217/22 . . . . . by carbon atoms having at least two bonds to oxygen atoms **[5]**

217/24 . . . . . the six-membered aromatic ring being part of a condensed ring system containing rings other than six-membered aromatic rings **[5]**

217/26 . . . having only one etherified hydroxy group and one amino group bound to the carbon skeleton, which is further substituted by halogen atoms or by nitro or nitroso groups **[5]**

217/28 . . . having one amino group and at least two singly-bound oxygen atoms, with at least one being part of an etherified hydroxy group, bound to the carbon skeleton, e.g. ethers of polyhydroxy amines **[5]**

217/30 . . . . having the oxygen atom of at least one of the etherified hydroxy groups further bound to a carbon atom of a six-membered aromatic ring **[5]**

217/32 . . . . . the six-membered aromatic ring or condensed ring system containing that ring being further substituted **[5]**

217/34 . . . . . by halogen atoms, by trihalomethyl, nitro or nitroso groups, or by singly-bound oxygen atoms **[5]**

217/36 . . . . . by carbon atoms having at least two bonds to oxygen atoms **[5]**

217/38 . . . . . the six-membered aromatic ring being part of a condensed ring system containing rings other than six-membered aromatic rings **[5]**

217/40 . . . . having at least two singly-bound oxygen atoms, with at least one being part of an etherified hydroxy group, bound to the same carbon atom of the carbon skeleton, e.g. amino-ketals, ortho esters **[5]**

217/42 . . . having etherified hydroxy groups and at least two amino groups bound to the carbon skeleton **[5]**

217/44 . . the carbon skeleton being saturated and containing rings **[5]**

217/46 . . the carbon skeleton being acyclic and unsaturated **[5]**

217/48 . . the carbon skeleton being unsaturated and containing rings **[5]**

217/50 . . Ethers of hydroxy amines of undetermined structure, e.g. obtained by reactions of epoxides with hydroxy amines **[5]**

217/52 . having etherified hydroxy groups or amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

217/54 . having etherified hydroxy groups bound to carbon atoms of at least one six-membered aromatic ring and amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

217/56 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains not further substituted by singly-bound oxygen atoms **[5]**

217/58 . . . with amino groups and the six-membered aromatic ring, or the condensed ring system containing that ring, bound to the same carbon atom of the carbon chain **[5]**

217/60 . . . linked by carbon chains having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

217/62 . . . linked by carbon chains having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

217/64 . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains further substituted by singly-bound oxygen atoms **[5]**

217/66 . . . with singly-bound oxygen atoms and six-membered aromatic rings bound to the same carbon atom of the carbon chain **[5]**

217/68 . . . . with singly-bound oxygen atoms, six-membered aromatic rings and amino groups bound to the same carbon atom of the carbon chain **[5]**

217/70 . . . . linked by carbon chains having two carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

217/72 . . . . linked by carbon chains having at least three carbon atoms between the amino groups and the six-membered aromatic ring or the condensed ring system containing that ring **[5]**

217/74 . . with rings other than six-membered aromatic rings being part of the carbon skeleton **[5]**

217/76 . having amino groups bound to carbon atoms of six-membered aromatic rings and etherified hydroxy groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

217/78 . having amino groups and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**

217/80 . . having amino groups and etherified hydroxy groups bound to carbon atoms of non-condensed six-membered aromatic rings **[5]**

217/82 . . . of the same non-condensed six-membered aromatic ring **[5]**

217/84 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to an acyclic carbon atom **[5]**

217/86 . . . . . to an acyclic carbon atom of a hydrocarbon radical containing six-membered aromatic rings **[5]**

217/88 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

217/90 . . . . the oxygen atom of at least one of the etherified hydroxy groups being further bound to a carbon atom of a six-membered aromatic ring, e.g. amino-diphenylethers **[5]**

217/92 . . . . the nitrogen atom of at least one of the amino groups being further bound to a carbon atom of a six-membered aromatic ring **[5]**

217/94 . . having amino groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems and etherified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**

219/00 Compounds containing amino and esterified hydroxy groups bound to the same carbon skeleton [5]

219/02 . having esterified hydroxy groups and amino groups bound to acyclic carbon atoms of the same carbon skeleton **[5]**

219/04 . . the carbon skeleton being acyclic and saturated **[5]**

219/06 . . . having the hydroxy groups esterified by carboxylic acids having the esterifying carboxyl groups bound to hydrogen atoms or to acyclic carbon atoms of an acyclic saturated carbon skeleton **[5]**

219/08 . . . having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to an acyclic carbon atom of an acyclic unsaturated carbon skeleton **[5]**

219/10 . . . having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to an acyclic carbon atom of a carbon skeleton containing rings **[5]**

219/12 . . . having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

219/14 . . . having at least one of the hydroxy groups esterified by a carboxylic acid having the esterifying carboxyl group bound to a carbon atom of a six-membered aromatic ring **[5]**

219/16 . . . having at least one of the hydroxy groups esterified by an inorganic acid or a derivative thereof **[5]**

219/18 . . the carbon skeleton being saturated and containing rings **[5]**

219/20 . . the carbon skeleton being unsaturated **[5]**

219/22 . . . and containing six-membered aromatic rings **[5]**

219/24 . having esterified hydroxy groups or amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

219/26 . having esterified hydroxy groups bound to carbon atoms of at least one six-membered aromatic ring and amino groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

219/28 . . having amino groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

219/30 . . . with amino groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by carbon chains further substituted by singly-bound oxygen atoms **[5]**

219/32 . having amino groups bound to carbon atoms of six-membered aromatic rings and esterified hydroxy groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**

219/34 . having amino groups and esterified hydroxy groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**

221/00 Preparation of compounds containing amino groups and doubly-bound oxygen atoms bound to the same carbon skeleton [5]

223/00 Compounds containing amino and −CHO groups bound to the same carbon skeleton [5]

223/02 . having amino groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

223/04 . having amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**

223/06 . having amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**

225/00 Compounds containing amino groups and doubly-bound oxygen atoms bound to the same carbon skeleton, at least one of the doubly-bound oxygen atoms not being part of a −CHO group, e.g. amino ketones [5]

225/02 . having amino groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

225/04 . . the carbon skeleton being saturated **[5]**

225/06 . . . and acyclic **[5]**

225/08 . . . and containing rings **[5]**

225/10 . . . . with doubly-bound oxygen atoms bound to carbon atoms not being part of rings **[5]**

225/12 . . . . with doubly-bound oxygen atoms bound to carbon atoms being part of rings **[5]**

225/14 . . the carbon skeleton being unsaturated **[5]**

225/16 . . . and containing six-membered aromatic rings **[5]**

225/18 . . . . the carbon skeleton containing also rings other than six-membered aromatic rings **[5]**

225/20 . having amino groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**

225/22 . having amino groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**

225/24 . the carbon skeleton containing carbon atoms of quinone rings **[5]**

225/26 . . having amino groups bound to carbon atoms of quinone rings or of condensed ring systems containing quinone rings **[5]**

225/28 . . . of non-condensed quinone rings **[5]**

225/30 . . . of condensed quinone ring systems formed by two rings **[5]**

225/32 . . . of condensed quinone ring systems formed by at least three rings **[5]**

225/34 . . . . Amino anthraquinones **[5]**

225/36 . . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**

227/00 Preparation of compounds containing amino and carboxyl groups bound to the same carbon skeleton [5]

227/02 . Formation of carboxyl groups in compounds containing amino groups, e.g. by oxidation of amino alcohols **[5]**

227/04 . Formation of amino groups in compounds containing carboxyl groups **[5]**

227/06 . . by addition or substitution reactions, without increasing the number of carbon atoms in the carbon skeleton of the acid **[5]**

227/08 . . . by reaction of ammonia or amines with acids containing functional groups **[5]**

227/10 . . with simultaneously increasing the number of carbon atoms in the carbon skeleton **[5]**

227/12 . Formation of amino and carboxyl groups **[5]**

227/14 . from compounds containing already amino and carboxyl groups or derivatives thereof **[5]**

227/16 . . by reactions not involving the amino or carboxyl groups **[5]**

227/18 . . by reactions involving amino or carboxyl groups, e.g. hydrolysis of esters or amides, by formation of halides, salts or esters **[5]**

227/20 . . . by hydrolysis of N-acylated amino acids or derivatives thereof, e.g. hydrolysis of carbamates **[5]**

227/22 . from lactams, cyclic ketones or cyclic oximes, e.g. by reaction involving Beckmann rearrangement **[5]**

227/24 . from hydantoins **[5]**

227/26 . from compounds containing carboxyl groups by reaction with HCN, or a salt thereof, and amines, or from aminonitriles **[5]**

227/28 . from natural products **[5]**

227/30 . Preparation of optical isomers **[5]**

227/32 . . by stereospecific synthesis **[5]**

227/34 . . by separation of optical isomers **[5]**

227/36 . Racemisation of optical isomers **[5]**

227/38 . Separation; Purification; Stabilisation; Use of additives (separation of optical isomers C07C 227/34) **[5]**

227/40 . . Separation; Purification **[5]**

227/42 . . . Crystallisation **[5]**

227/44 . . Stabilisation; Use of additives **[5]**

229/00 Compounds containing amino and carboxyl groups bound to the same carbon skeleton [5]

229/02 . having amino and carboxyl groups bound to acyclic carbon atoms of the same carbon skeleton **[5]**

229/04 . . the carbon skeleton being acyclic and saturated **[5]**

229/06 . . . having only one amino and one carboxyl group bound to the carbon skeleton **[5]**

229/08 . . . . the nitrogen atom of the amino group being further bound to hydrogen atoms **[5]**

229/10 . . . . the nitrogen atom of the amino group being further bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**

229/12 . . . . . to carbon atoms of acyclic carbon skeletons **[5]**

229/14 . . . . . to carbon atoms of carbon skeletons containing rings **[5]**

229/16 . . . . . to carbon atoms of hydrocarbon radicals substituted by amino or carboxyl groups, e.g. ethylenediamine-tetra-acetic acid, iminodiacetic acids **[5]**

229/18 . . . . the nitrogen atom of the amino group being further bound to carbon atoms of six-membered aromatic rings **[5]**

229/20 . . . the carbon skeleton being further substituted by halogen atoms or by nitro or nitroso groups **[5]**

229/22 . . . the carbon skeleton being further substituted by oxygen atoms **[5]**

229/24 . . . having more than one carboxyl group bound to the carbon skeleton, e.g. aspartic acid **[5]**
229/26 . . . having more than one amino group bound to the carbon skeleton, e.g. lysine **[5]**
229/28 . . the carbon skeleton being saturated and containing rings **[5]**
229/30 . . the carbon skeleton being acyclic and unsaturated **[5]**
229/32 . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**
229/34 . . the carbon skeleton containing six-membered aromatic rings **[5]**
229/36 . . . with at least one amino group and one carboxyl group bound to the same carbon atom of the carbon skeleton **[5]**
229/38 . having amino groups bound to acyclic carbon atoms and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**
229/40 . having amino groups bound to carbon atoms of at least one six-membered aromatic ring and carboxyl groups bound to acyclic carbon atoms of the same carbon skeleton **[5]**
229/42 . . with carboxyl groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by saturated carbon chains **[5]**
229/44 . . with carboxyl groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by unsaturated carbon chains **[5]**
229/46 . having amino or carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings of the same carbon skeleton **[5]**
229/48 . . with amino groups and carboxyl groups bound to carbon atoms of the same non-condensed ring **[5]**
229/50 . . with amino groups and carboxyl groups bound to carbon atoms being part of the same condensed ring system **[5]**
229/52 . having amino and carboxyl groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**
229/54 . . with amino and carboxyl groups bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**
229/56 . . . with amino and carboxyl groups bound in ortho- position **[5]**
229/58 . . . . having the nitrogen atom of at least one of the amino groups further bound to a carbon atom of a six-membered aromatic ring, e.g. N-phenyl-anthranilic acids **[5]**
229/60 . . . with amino and carboxyl groups bound in meta- or para- positions **[5]**
229/62 . . . with amino groups and at least two carboxyl groups bound to carbon atoms of the same six-membered aromatic ring **[5]**
229/64 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
229/66 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms **[5]**
229/68 . . with amino and carboxyl groups bound to carbon atoms of six-membered aromatic rings being part of the same condensed ring system **[5]**
229/70 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
229/72 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms **[5]**
229/74 . . . . the condensed ring system being formed by at least three rings, e.g. amino anthraquinone carboxylic acids **[5]**
229/76 . Metal complexes of amino carboxylic acids **[5]**

231/00 Preparation of carboxylic acid amides [5]
231/02 . from carboxylic acids or from esters, anhydrides, or halides thereof by reaction with ammonia or amines **[5]**
231/04 . from ketenes by reaction with ammonia or amines **[5]**
231/06 . from nitriles by transformation of cyano groups into carboxamide groups **[5]**
231/08 . from amides by reaction at nitrogen atoms of carboxamide groups **[5]**
231/10 . from compounds not provided for in groups C07C 231/02 to C07C 231/08 **[5]**
231/12 . by reactions not involving the formation of carboxamide groups **[5]**
231/14 . by formation of carboxamide groups together with reactions not involving the carboxamide groups **[5]**
231/16 . Preparation of optical isomers **[5]**
231/18 . . by stereospecific synthesis **[5]**
231/20 . . by separation of optical isomers **[5]**
231/22 . Separation; Purification; Stabilisation; Use of additives (separation of optical isomers C07C 231/20) **[5]**
231/24 . . Separation; Purification **[5]**

233/00 Carboxylic acid amides [5]
233/01 . having carbon atoms of carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
233/02 . . having nitrogen atoms of carboxamide groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals **[5]**
233/03 . . . with carbon atoms of carboxamide groups bound to hydrogen atoms **[5]**
233/04 . . . with carbon atoms of carboxamide groups bound to carbon atoms of an acyclic saturated carbon skeleton **[5]**
233/05 . . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
233/06 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**
233/07 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**
233/08 . . . with carbon atoms of carboxamide groups bound to acyclic carbon atoms of a saturated carbon skeleton containing rings **[5]**
233/09 . . . with carbon atoms of carboxamide groups bound to carbon atoms of an acyclic unsaturated carbon skeleton **[5]**
233/10 . . . with carbon atoms of carboxamide groups bound to carbon atoms of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**
233/11 . . . with carbon atoms of carboxamide groups bound to carbon atoms of an unsaturated carbon skeleton containing six-membered aromatic rings **[5]**
233/12 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by halogen atoms or by nitro or nitroso groups **[5]**

233/13 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/14 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/15 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/16 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**

233/17 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/18 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton **[5]**

233/19 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings **[5]**

233/20 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton **[5]**

233/21 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

233/22 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings **[5]**

233/23 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/24 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/25 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton **[5]**

233/26 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings **[5]**

233/27 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton **[5]**

233/28 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

233/29 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings **[5]**

233/30 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by doubly-bound oxygen atoms **[5]**

233/31 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/32 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/33 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/34 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by amino groups **[5]**

233/35 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/36 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton **[5]**

233/37 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings **[5]**

233/38 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton **[5]**

233/39 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

233/40 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings **[5]**

233/41 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/42 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/43 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of a saturated carbon skeleton **[5]**

233/44 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an unsaturated carbon skeleton **[5]**

233/45 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

233/46 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/47 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of an acyclic saturated carbon skeleton **[5]**

233/48 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a saturated carbon skeleton containing rings **[5]**

233/49 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an acyclic unsaturated carbon skeleton **[5]**

233/50 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

233/51 . . . . having the carbon atom of the carboxamide group bound to an acyclic carbon atom of a carbon skeleton containing six-membered aromatic rings **[5]**

233/52 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/53 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/54 . . . . having the carbon atom of the carboxamide group bound to a hydrogen atom or to a carbon atom of a saturated carbon skeleton **[5]**

233/55 . . . . having the carbon atom of the carboxamide group bound to a carbon atom of an unsaturated carbon skeleton **[5]**

233/56 . . having carbon atoms of carboxamide groups bound to carbon atoms of carboxyl groups, e.g. oxamides **[5]**

233/57 . having carbon atoms of carboxamide groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

233/58 . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals **[5]**

233/59 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by halogen atoms or by nitro or nitroso groups **[5]**

233/60 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**

233/61 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by doubly-bound oxygen atoms **[5]**

233/62 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by amino groups **[5]**

233/63 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

233/64 . having carbon atoms of carboxamide groups bound to carbon atoms of six-membered aromatic rings **[5]**

233/65 . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals **[5]**

233/66 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by halogen atoms or by nitro or nitroso groups **[5]**

233/67 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**

233/68 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/69 . . . . of an acyclic saturated carbon skeleton **[5]**

233/70 . . . . of a saturated carbon skeleton containing rings **[5]**

233/71 . . . . of an acyclic unsaturated carbon skeleton **[5]**

233/72 . . . . of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

233/73 . . . . of a carbon skeleton containing six-membered aromatic rings **[5]**

233/74 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/75 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/76 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by doubly-bound oxygen atoms **[5]**

233/77 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by amino groups **[5]**

233/78 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/79 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a ring other than a six-membered aromatic ring **[5]**

233/80 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by a carbon atom of a six-membered aromatic ring **[5]**

233/81 . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

233/82 . . . with the substituted hydrocarbon radical bound to the nitrogen atom of the carboxamide group by an acyclic carbon atom **[5]**

233/83 . . . . of an acyclic saturated carbon skeleton **[5]**

233/84 . . . . of a saturated carbon skeleton containing rings **[5]**

233/85 . . . . of an acyclic unsaturated carbon skeleton **[5]**

233/86 . . . . of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

233/87 . . . . of a carbon skeleton containing six-membered aromatic rings **[5]**

233/88 . having nitrogen atoms of carboxamide groups bound to an acyclic carbon atom and to a carbon atom of a six-membered aromatic ring wherein at least one ortho-hydrogen atom has been replaced **[5]**

233/89 . having nitrogen atoms of carboxamide groups quaternised **[5]**

233/90 . having nitrogen atoms of carboxamide groups further acylated **[5]**

233/91 . . with carbon atoms of the carboxamide groups bound to acyclic carbon atoms **[5]**

233/92 . . with at least one carbon atom of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/00 Carboxylic acid amides, the carbon skeleton of the acid part being further substituted by oxygen atoms [5]

235/02 . having carbon atoms of carboxamide groups bound to acyclic carbon atoms and singly-bound oxygen atoms bound to the same carbon skeleton **[5]**

235/04 . . the carbon skeleton being acyclic and saturated **[5]**

235/06 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

235/08 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**

235/10 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

235/12 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

235/14 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

235/16 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/18 . . . having at least one of the singly-bound oxygen atoms further bound to a carbon atom of a six-membered aromatic ring, e.g. phenoxyacetamides **[5]**

235/20 . . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

235/22 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

235/24 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/26 . . the carbon skeleton being saturated and containing rings **[5]**

235/28 . . the carbon skeleton being acyclic and unsaturated **[5]**

235/30 . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**

235/32 . . the carbon skeleton containing six-membered aromatic rings **[5]**

235/34 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

235/36 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

235/38 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/40 . having carbon atoms of carboxamide groups bound to carbon atoms of rings other than six-membered aromatic rings and singly-bound oxygen atoms bound to the same carbon skeleton **[5]**

235/42 . having carbon atoms of carboxamide groups bound to carbon atoms of six-membered aromatic rings and singly-bound oxygen atoms bound to the same carbon skeleton **[5]**

235/44 . . with carbon atoms of carboxamide groups and singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**

235/46 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

235/48 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**

235/50 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

235/52 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

235/54 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

235/56 . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/58 . . . with carbon atoms of carboxamide groups and singly-bound oxygen atoms, bound in ortho-position to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**

235/60 . . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

235/62 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

235/64 . . . . having the nitrogen atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/66 . . with carbon atoms of carboxamide groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems and singly-bound oxygen atoms, bound to the same carbon skeleton **[5]**

235/68 . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom and to a carbon atom of a six-membered aromatic ring wherein at least one ortho-hydrogen atom has been replaced **[5]**

235/70 . having carbon atoms of carboxamide groups and doubly-bound oxygen atoms bound to the same carbon skeleton **[5]**

235/72 . . with the carbon atoms of the carboxamide groups bound to acyclic carbon atoms **[5]**

235/74 . . . of a saturated carbon skeleton **[5]**

235/76 . . . of an unsaturated carbon skeleton **[5]**

235/78 . . . . the carbon skeleton containing rings **[5]**

235/80 . . . having carbon atoms of carboxamide groups and keto groups bound to the same carbon atom, e.g. acetoacetamides **[5]**

235/82 . . with the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

235/84 . . with the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

235/86 . having the nitrogen atom of at least one of the carboxamide groups quaternised **[5]**

235/88 . having the nitrogen atom of at least one of the carboxamide groups further acylated **[5]**

237/00 Carboxylic acid amides, the carbon skeleton of the acid part being further substituted by amino groups [5]

237/02 . having the carbon atoms of the carboxamide groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

237/04 . . the carbon skeleton being acyclic and saturated **[5]**

237/06 . . . having the nitrogen atoms of the carboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

237/08 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**

237/10 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

237/12 . . . having the nitrogen atom of at least one of the carboxamide groups bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

237/14 . . the carbon skeleton being saturated and containing rings **[5]**

237/16 . . the carbon skeleton being acyclic and unsaturated **[5]**

237/18 . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**

237/20 . . the carbon skeleton containing six-membered aromatic rings **[5]**

237/22 . . having nitrogen atoms of amino groups bound to the carbon skeleton of the acid part, further acylated **[5]**

237/24 . having the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton **[5]**

237/26 . . of a ring being part of a condensed ring system formed by at least four rings, e.g. tetracycline **[5]**

237/28 . having the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a non-condensed six-membered aromatic ring of the carbon skeleton **[5]**

237/30 . . having the nitrogen atom of the carboxamide group bound to hydrogen atoms or to acyclic carbon atoms **[5]**

237/32 . . having the nitrogen atom of the carboxamide group bound to an acyclic carbon atom of a hydrocarbon radical substituted by oxygen atoms **[5]**

237/34 . . having the nitrogen atom of the carboxamide group bound to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

237/36 . . having the nitrogen atom of the carboxamide group bound to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**

237/38 . . having the nitrogen atom of the carboxamide group bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

237/40 . . having the nitrogen atom of the carboxamide group bound to a carbon atom of a six-membered aromatic ring **[5]**

237/42 . . having nitrogen atoms of amino groups bound to the carbon skeleton of the acid part, further acylated **[5]**

237/44 . . having carbon atoms of carboxamide groups, amino groups and singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**

237/46 . . having carbon atoms of carboxamide groups, amino groups and at least three atoms of bromine or iodine, bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**

237/48 . having the carbon atom of at least one of the carboxamide groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system of the same carbon skeleton **[5]**

237/50 . having the nitrogen atom of at least one of the carboxamide groups quaternised **[5]**

237/52 . having the nitrogen atom of at least one of the carboxamide groups further acylated **[5]**

239/00 Compounds containing nitrogen-to-halogen bonds; Hydroxylamino compounds or ethers or esters thereof [5]

239/02 . Compounds containing nitrogen-to-halogen bonds **[5]**

239/04 . . N-halogenated amines **[5]**

239/06 . . N-halogenated carboxamides **[5]**

239/08 . Hydroxylamino compounds or their ethers or esters **[5]**

239/10 . . having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of unsubstituted hydrocarbon radicals or of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups **[5]**

239/12 . . having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**

239/14 . . having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by doubly-bound oxygen atoms **[5]**

239/16 . . having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

239/18 . . having nitrogen atoms of hydroxylamino groups further bound to carbon atoms of hydrocarbon radicals substituted by carboxyl groups **[5]**

239/20 . . having oxygen atoms of hydroxylamino groups etherified **[5]**

239/22 . . having oxygen atoms of hydroxylamino groups esterified **[5]**

241/00 Preparation of compounds containing chains of nitrogen atoms singly-bound to each other, e.g. hydrazines, triazanes [5]

241/02 . Preparation of hydrazines **[5]**

241/04 . Preparation of hydrazides **[5]**

243/00 Compounds containing chains of nitrogen atoms singly-bound to each other, e.g. hydrazines, triazanes [5]

243/02 . N-nitro compounds **[5]**
243/04 . N-nitroso compounds **[5]**
243/06 . . N-nitroso-amines **[5]**
243/08 . . N-nitroso-carboxamides **[5]**
243/10 . Hydrazines **[5]**
243/12 . . having nitrogen atoms of hydrazine groups bound to acyclic carbon atoms **[5]**
243/14 . . . of a saturated carbon skeleton **[5]**
243/16 . . . of an unsaturated carbon skeleton **[5]**
243/18 . . . . containing rings **[5]**
243/20 . . having nitrogen atoms of hydrazine groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
243/22 . . having nitrogen atoms of hydrazine groups bound to carbon atoms of six-membered aromatic rings **[5]**
243/24 . Hydrazines having nitrogen atoms of hydrazine groups acylated by carboxylic acids **[5]**
243/26 . . with acylating carboxyl groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
243/28 . . . to hydrogen atoms or to carbon atoms of a saturated carbon skeleton **[5]**
243/30 . . . to carbon atoms of an unsaturated carbon skeleton **[5]**
243/32 . . . . the carbon skeleton containing rings **[5]**
243/34 . . . to carbon atoms of a carbon skeleton further substituted by nitrogen atoms **[5]**
243/36 . . with acylating carboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
243/38 . . with acylating carboxyl groups bound to carbon atoms of six-membered aromatic rings **[5]**
243/40 . Hydrazines having nitrogen atoms of hydrazine groups being quaternised **[5]**
243/42 . Hydrazines having nitrogen atoms of hydrazine groups further singly-bound to hetero atoms **[5]**

245/00 Compounds containing chains of at least two nitrogen atoms with at least one nitrogen-to-nitrogen multiple bond (azoxy compound C07C 291/08) **[5]**

245/02 . Azo compounds, i.e. compounds having the free valencies of $-N=N-$ groups attached to different atoms, e.g. diazohydroxides **[5]**
245/04 . . with nitrogen atoms of azo groups bound to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**
245/06 . . with nitrogen atoms of azo groups bound to carbon atoms of six-membered aromatic rings **[5]**
245/08 . . . with the two nitrogen atoms of azo groups bound to carbon atoms of six-membered aromatic rings, e.g. azobenzene **[5]**
245/10 . . . with nitrogen atoms of azo groups bound to carbon atoms of six-membered aromatic rings being part of condensed ring systems **[5]**
245/12 . Diazo compounds, i.e. compounds having the free valencies of $\rangle N_2$ groups attached to the same carbon atom **[5]**
245/14 . . having diazo groups bound to acyclic carbon atoms of a carbon skeleton **[5]**
245/16 . . . Diazomethane **[5]**
245/18 . . . the carbon skeleton being further substituted by carboxyl groups **[5]**
245/20 . Diazonium compounds **[5]**
245/22 . containing chains of three or more nitrogen atoms with one or more nitrogen-to-nitrogen double bonds **[5]**
245/24 . . Chains of only three nitrogen atoms, e.g. diazoamines **[5]**

247/00 Compounds containing azido groups [5]

247/02 . with azido groups bound to acyclic carbon atoms of a carbon skeleton **[5]**
247/04 . . being saturated **[5]**
247/06 . . . and containing rings **[5]**
247/08 . . being unsaturated **[5]**
247/10 . . . and containing rings **[5]**
247/12 . . being further substituted by carboxyl groups **[5]**
247/14 . with azido groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
247/16 . with azido groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**
247/18 . . being further substituted by carboxyl groups **[5]**
247/20 . with azido groups acylated by carboxylic acids **[5]**
247/22 . . with the acylating carboxyl groups bound to hydrogen atoms, to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**
247/24 . . with at least one of the acylating carboxyl groups bound to a carbon atom of a six-membered aromatic ring **[5]**

249/00 Preparation of compounds containing nitrogen atoms doubly-bound to a carbon skeleton (of diazo compounds C07C 245/12) **[5]**

249/02 . of compounds containing imino groups **[5]**
249/04 . of oximes **[5]**
249/06 . . by nitrosation of hydrocarbons or substituted hydrocarbons **[5]**
249/08 . . by reaction of hydroxylamines with carbonyl compounds **[5]**
249/10 . . from nitro compounds or salts thereof **[5]**
249/12 . . by reactions not involving the formation of oxyimino groups **[5]**
249/14 . . Separation; Purification; Stabilisation; Use of additives **[5]**
249/16 . of hydrazones **[5]**

251/00 Compounds containing nitrogen atoms doubly-bound to a carbon skeleton (diazo compounds C07C 245/12) **[5]**

251/02 . containing imino groups **[5]**
251/04 . . having carbon atoms of imino groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
251/06 . . . to carbon atoms of a saturated carbon skeleton **[5]**
251/08 . . . . being acyclic **[5]**
251/10 . . . to carbon atoms of an unsaturated carbon skeleton **[5]**
251/12 . . . . being acyclic **[5]**
251/14 . . . . containing rings other than six-membered aromatic rings **[5]**
251/16 . . . . containing six-membered aromatic rings **[5]**
251/18 . . having carbon atoms of imino groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
251/20 . . having carbon atoms of imino groups being part of rings other than six-membered aromatic rings **[5]**
251/22 . . . Quinone imines **[5]**
251/24 . . having carbon atoms of imino groups bound to carbon atoms of six-membered aromatic rings **[5]**

251/26 . . having nitrogen atoms of imino groups further bound to halogen atoms **[5]**
251/28 . . having nitrogen atoms of imino groups acylated **[5]**
251/30 . . having nitrogen atoms of imino groups quaternised **[5]**
251/32 . Oximes **[5]**
251/34 . . with oxygen atoms of oxyimino groups bound to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals **[5]**
251/36 . . . with the carbon atoms of the oxyimino groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
251/38 . . . . to carbon atoms of a saturated carbon skeleton **[5]**
251/40 . . . . to carbon atoms of an unsaturated carbon skeleton **[5]**
251/42 . . . with the carbon atom of at least one of the oxyimino groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**
251/44 . . . with the carbon atom of at least one of the oxyimino groups being part of a ring other than a six-membered aromatic ring **[5]**
251/46 . . . . Quinone oximes **[5]**
251/48 . . . with the carbon atom of at least one of the oxyimino groups bound to a carbon atom of a six-membered aromatic ring **[5]**
251/50 . . having oxygen atoms of oxyimino groups bound to carbon atoms of substituted hydrocarbon radicals **[5]**
251/52 . . . of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups **[5]**
251/54 . . . of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**
251/56 . . . of hydrocarbon radicals substituted by doubly-bound oxygen atoms **[5]**
251/58 . . . of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**
251/60 . . . of hydrocarbon radicals substituted by carboxyl groups **[5]**
251/62 . . having oxygen atoms of oxyimino groups esterified **[5]**
251/64 . . . by carboxylic acids **[5]**
251/66 . . . . with the esterifying carboxyl groups bound to hydrogen atoms, to acyclic carbon atoms or to carbon atoms of rings other than six-membered aromatic rings **[5]**
251/68 . . . . with at least one of the esterifying carboxyl groups bound to a carbon atom of a six-membered aromatic ring **[5]**
251/70 . . Metal complexes of oximes **[5]**
251/72 . Hydrazones **[5]**
251/74 . . having doubly-bound carbon atoms of hydrazone groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
251/76 . . . to carbon atoms of a saturated carbon skeleton **[5]**
251/78 . . . to carbon atoms of an unsaturated carbon skeleton **[5]**
251/80 . . . . the carbon skeleton containing rings **[5]**
251/82 . . having doubly-bound carbon atoms of hydrazone groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
251/84 . . having doubly-bound carbon atoms of hydrazone groups being part of rings other than six-membered aromatic rings **[5]**
251/86 . . having doubly-bound carbon atoms of hydrazone groups bound to carbon atoms of six-membered aromatic rings **[5]**
251/88 . . having also the other nitrogen atom doubly-bound to a carbon atom, e.g. azines **[5]**

253/00 **Preparation of carboxylic acid nitriles** (of cyanogen or compounds thereof C01C 3/00) **[5]**
253/02 . by reaction of nitrogen oxide with organic compounds **[5]**
253/04 . by reaction of cyanogen halides, e.g. ClCN, with organic compounds **[5]**
253/06 . from N-formylated amino compounds **[5]**
253/08 . by addition of hydrogen cyanide or salts thereof to unsaturated compounds **[5]**
253/10 . . to compounds containing carbon-to-carbon double bonds **[5]**
253/12 . . to compounds containing carbon-to-carbon triple bonds **[5]**
253/14 . by reaction of cyanides with halogen-containing compounds with replacement of halogen atoms by cyano groups **[5]**
253/16 . by reaction of cyanides with lactones or compounds containing hydroxy groups or etherified or esterified hydroxy groups **[5]**
253/18 . by reaction of ammonia or amines with compounds containing carbon-to-carbon multiple bonds other than in six-membered aromatic rings **[5]**
253/20 . by dehydratation of carboxylic acid amides **[5]**
253/22 . by reaction of ammonia with carboxylic acids with replacement of carboxyl groups by cyano groups **[5]**
253/24 . by ammoxidation of hydrocarbons or substituted hydrocarbons **[5]**
253/26 . . containing carbon-to-carbon multiple bonds, e.g. unsaturated aldehydes **[5]**
253/28 . . containing six-membered aromatic rings, e.g. styrene **[5]**
253/30 . by reactions not involving the formation of cyano groups **[5]**
253/32 . Separation; Purification; Stabilisation; Use of additives **[5]**
253/34 . . Separation; Purification **[5]**

255/00 **Carboxylic acid nitriles** (cyanogen or compounds thereof C01C 3/00) **[5]**
255/01 . having cyano groups bound to acyclic carbon atoms **[5]**
255/02 . . of an acyclic and saturated carbon skeleton **[5]**
255/03 . . . Mononitriles **[5]**
255/04 . . . containing two cyano groups bound to the carbon skeleton **[5]**
255/05 . . . containing at least three cyano groups bound to the carbon skeleton **[5]**
255/06 . . of an acyclic and unsaturated carbon skeleton **[5]**
255/07 . . . Mononitriles **[5]**
255/08 . . . . Acrylonitrile; Methacrylonitrile **[5]**
255/09 . . . containing at least two cyano groups bound to the carbon skeleton **[5]**
255/10 . . containing cyano groups and halogen atoms, or nitro or nitroso groups, bound to the same acyclic carbon skeleton **[5]**
255/11 . . containing cyano groups and singly-bound oxygen atoms bound to the same saturated acyclic carbon skeleton **[5]**

255/12 . . . containing cyano groups and hydroxy groups bound to the carbon skeleton **[5]**
255/13 . . . containing cyano groups and etherified hydroxy groups bound to the carbon skeleton **[5]**
255/14 . . . containing cyano groups and esterified hydroxy groups bound to the carbon skeleton **[5]**
255/15 . . containing cyano groups and singly-bound oxygen atoms bound to the same unsaturated acyclic carbon skeleton **[5]**
255/16 . . containing cyano groups and singly-bound oxygen atoms bound to the same carbon atom of an acyclic carbon skeleton **[5]**
255/17 . . containing cyano groups and doubly-bound oxygen atoms bound to the same acyclic carbon skeleton **[5]**
255/18 . . containing cyano groups bound to carbon atoms of carboxyl groups **[5]**
255/19 . . containing cyano groups and carboxyl groups, other than cyano groups, bound to the same saturated acyclic carbon skeleton **[5]**
255/20 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
255/21 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms **[5]**
255/22 . . . containing cyano groups and at least two carboxyl groups bound to the carbon skeleton **[5]**
255/23 . . containing cyano groups and carboxyl groups, other than cyano groups, bound to the same unsaturated acyclic carbon skeleton **[5]**
255/24 . . containing cyano groups and singly-bound nitrogen atoms, not being further bound to other hetero atoms, bound to the same saturated acyclic carbon skeleton **[5]**
255/25 . . . Aminoacetonitriles **[5]**
255/26 . . . containing cyano groups, amino groups and singly-bound oxygen atoms bound to the carbon skeleton **[5]**
255/27 . . . containing cyano groups, amino groups and doubly-bound oxygen atoms bound to the carbon skeleton **[5]**
255/28 . . . containing cyano groups, amino groups and carboxyl groups, other than cyano groups, bound to the carbon skeleton **[5]**
255/29 . . . containing cyano groups and acylated amino groups bound to the carbon skeleton **[5]**
255/30 . . containing cyano groups and singly-bound nitrogen atoms, not being further bound to other hetero atoms, bound to the same unsaturated acyclic carbon skeleton **[5]**
255/31 . . having cyano groups bound to acyclic carbon atoms of a carbon skeleton containing rings other than six-membered aromatic rings **[5]**
255/32 . . having cyano groups bound to acyclic carbon atoms of a carbon skeleton containing at least one six-membered aromatic ring **[5]**
255/33 . . . with cyano groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by saturated carbon chains **[5]**
255/34 . . . with cyano groups linked to the six-membered aromatic ring, or to the condensed ring system containing that ring, by unsaturated carbon chains **[5]**
255/35 . . . the carbon skeleton being further substituted by halogen atoms, or by nitro or nitroso groups **[5]**
255/36 . . . the carbon skeleton being further substituted by hydroxy groups **[5]**
255/37 . . . the carbon skeleton being further substituted by etherified hydroxy groups **[5]**
255/38 . . . the carbon skeleton being further substituted by esterified hydroxy groups **[5]**
255/39 . . . . with hydroxy groups esterified by derivatives of 2,2-dimethylcyclopropane carboxylic acids, e.g. chrysanthemumic acids **[5]**
255/40 . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms **[5]**
255/41 . . . the carbon skeleton being further substituted by carboxyl groups, other than cyano groups **[5]**
255/42 . . . the carbon skeleton being further substituted by singly-bound nitrogen atoms, not being further bound to other hetero atoms **[5]**
255/43 . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
255/44 . . . . at least one of the singly-bound nitrogen atoms being acylated **[5]**
255/45 . having cyano groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
255/46 . . to carbon atoms of non-condensed rings **[5]**
255/47 . . to carbon atoms of rings being part of condensed ring systems **[5]**
255/48 . . to carbon atoms of 2,2-dimethylcyclopropane rings, e.g. nitrile of chrysanthemumic acids **[5]**
255/49 . having cyano groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**
255/50 . . to carbon atoms of non-condensed six-membered aromatic rings **[5]**
255/51 . . . containing at least two cyano groups bound to the carbon skeleton **[5]**
255/52 . . to carbon atoms of six-membered aromatic rings being part of condensed ring systems **[5]**
255/53 . . containing cyano groups and hydroxy groups bound to the carbon skeleton **[5]**
255/54 . . containing cyano groups and etherified hydroxy groups bound to the carbon skeleton **[5]**
255/55 . . containing cyano groups and esterified hydroxy groups bound to the carbon skeleton **[5]**
255/56 . . containing cyano groups and doubly-bound oxygen atoms bound to the carbon skeleton **[5]**
255/57 . . containing cyano groups and carboxyl groups, other than cyano groups, bound to the carbon skeleton **[5]**
255/58 . . containing cyano groups and singly-bound nitrogen atoms, not being further bound to other hetero atoms, bound to the carbon skeleton **[5]**
255/59 . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**
255/60 . . . at least one of the singly-bound nitrogen atoms being acylated **[5]**
255/61 . containing cyano groups and nitrogen atoms being part of imino groups bound to the same carbon skeleton **[5]**
255/62 . containing cyano groups and oxygen atoms being part of oxyimino groups bound to the same carbon skeleton **[5]**
255/63 . containing cyano groups and nitrogen atoms further bound to other hetero atoms, other than oxygen atoms of nitro or nitroso groups, bound to the same carbon skeleton **[5]**
255/64 . . with the nitrogen atoms further bound to oxygen atoms **[5]**
255/65 . . with the nitrogen atoms further bound to nitrogen atoms **[5]**

255/66 . . . having cyano groups and nitrogen atoms being part of hydrazine or hydrazone groups bound to the same carbon skeleton **[5]**

255/67 . . . having cyano groups and azido groups bound to the same carbon skeleton **[5]**

257/00 Compounds containing carboxyl groups, the doubly-bound oxygen atom of a carboxyl group being replaced by a doubly-bound nitrogen atom, this nitrogen atom not being further bound to an oxygen atom, e.g. imino-ethers, amidines [5]

257/02 . with replacement of the other oxygen atom of the carboxyl group by halogen atoms, e.g. imino-halides **[5]**

257/04 . without replacement of the other oxygen atom of the carboxyl group, e.g. imino-ethers **[5]**

257/06 . . having carbon atoms of imino-carboxyl groups bound to hydrogen atoms, to acyclic carbon atoms, or to carbon atoms of rings other than six-membered aromatic rings **[5]**

257/08 . . having carbon atoms of imino-carboxyl groups bound to carbon atoms of six-membered aromatic rings **[5]**

257/10 . with replacement of the other oxygen atom of the carboxyl group by nitrogen atoms, e.g. amidines **[5]**

257/12 . . having carbon atoms of amidino groups bound to hydrogen atoms **[5]**

257/14 . . having carbon atoms of amidino groups bound to acyclic carbon atoms **[5]**

257/16 . . having carbon atoms of amidino groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

257/18 . . having carbon atoms of amidino groups bound to carbon atoms of six-membered aromatic rings **[5]**

257/20 . . having nitrogen atoms of amidino groups acylated **[5]**

257/22 . . having nitrogen atoms of amidino groups further bound to nitrogen atoms, e.g. hydrazidines **[5]**

259/00 Compounds containing carboxyl groups, an oxygen atom of a carboxyl group being replaced by a nitrogen atom, this nitrogen atom being further bound to an oxygen atom and not being part of nitro or nitroso groups [5]

259/02 . with replacement of the other oxygen atom of the carboxyl group by halogen atoms **[5]**

259/04 . without replacement of the other oxygen atom of the carboxyl group, e.g. hydroxamic acids **[5]**

259/06 . . having carbon atoms of hydroxamic groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

259/08 . . having carbon atoms of hydroxamic groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

259/10 . . having carbon atoms of hydroxamic groups bound to carbon atoms of six-membered aromatic rings **[5]**

259/12 . with replacement of the other oxygen atom of the carboxyl group by nitrogen atoms, e.g. N-hydroxyamidines **[5]**

259/14 . . having carbon atoms of hydroxyamidine groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

259/16 . . having carbon atoms of hydroxyamidine groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

259/18 . . having carbon atoms of hydroxyamidine groups bound to carbon atoms of six-membered aromatic rings **[5]**

259/20 . . with at least one nitrogen atom of hydroxyamidine groups bound to another nitrogen atom **[5]**

261/00 Derivatives of cyanic acid [5]

261/02 . Cyanates **[5]**

261/04 . Cyanamides (unsubstituted cyanamide C01C 3/16) **[5]**

263/00 Preparation of derivatives of isocyanic acid [5]

263/02 . by reaction of halides with isocyanic acid or its derivatives **[5]**

263/04 . from or via carbamates or carbamoyl halides **[5]**

263/06 . from or via ureas **[5]**

263/08 . from or via heterocyclic compounds, e.g. pyrolysis of furoxans **[5]**

263/10 . by reaction of amines with carbonyl halides, e.g. with phosgene **[5]**

263/12 . from or via nitrogen analogues of carboxylic acids, e.g. from hydroxamic acids, involving a Hofmann, Curtius or Lossen-type rearrangement (C07C 209/56 takes precedence) **[5]**

263/14 . by catalytic reaction of nitro compounds with carbon monoxide **[5]**

263/16 . by reactions not involving the formation of isocyanate groups **[5]**

263/18 . Separation; Purification; Stabilisation; Use of additives **[5]**

263/20 . . Separation; Purification **[5]**

265/00 Derivatives of isocyanic acid [5]

265/02 . having isocyanate groups bound to acyclic carbon atoms **[5]**

265/04 . . of a saturated carbon skeleton **[5]**

265/06 . . of an unsaturated carbon skeleton **[5]**

265/08 . . . the carbon skeleton containing rings **[5]**

265/10 . having isocyanate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

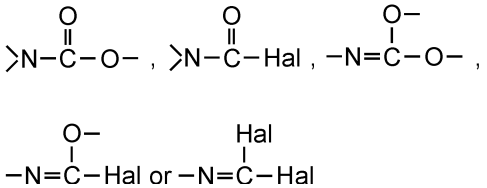
265/12 . having isocyanate groups bound to carbon atoms of six-membered aromatic rings **[5]**

265/14 . containing at least two isocyanate groups bound to the same carbon skeleton **[5]**

265/16 . having isocyanate groups acylated **[5]**

267/00 Carbodiimides [5]

269/00 Preparation of derivatives of carbamic acid, i.e. compounds containing any of the groups



the nitrogen atom not being part of nitro or nitroso groups [5]

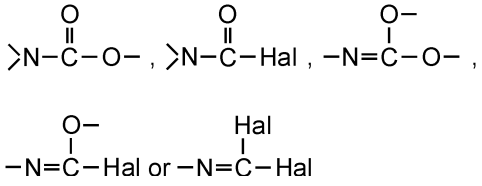
269/02 . from isocyanates with formation of carbamate groups **[5]**

269/04 . from amines with formation of carbamate groups **[5]**

269/06 . by reactions not involving the formation of carbamate groups **[5]**

269/08 . Separation; Purification; Stabilisation; Use of additives **[5]**

271/00 Derivatives of carbamic acid, i.e. compounds containing any of the groups



the nitrogen atom not being part of nitro or nitroso groups [5]

271/02 . Carbamic acids; Salts of carbamic acids (unsubstituted carbamic acid or salts thereof C01B 21/12) **[5]**

271/04 . Carbamic acid halides **[5]**

271/06 . Esters of carbamic acids **[5]**

271/08 . . having oxygen atoms of carbamate groups bound to acyclic carbon atoms **[5]**

271/10 . . . with the nitrogen atoms of the carbamate groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

271/12 . . . . to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals **[5]**

271/14 . . . . to carbon atoms of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups **[5]**

271/16 . . . . to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**

271/18 . . . . to carbon atoms of hydrocarbon radicals substituted by doubly-bound oxygen atoms **[5]**

271/20 . . . . to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

271/22 . . . . to carbon atoms of hydrocarbon radicals substituted by carboxyl groups **[5]**

271/24 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

271/26 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a six-membered aromatic ring **[5]**

271/28 . . . . to a carbon atom of a non-condensed six-membered aromatic ring **[5]**

271/30 . . . . to a carbon atom of a six-membered aromatic ring being part of a condensed ring system **[5]**

271/32 . . having oxygen atoms of carbamate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

271/34 . . . with the nitrogen atoms of the carbamate groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

271/36 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

271/38 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a six-membered aromatic ring **[5]**

271/40 . . having oxygen atoms of carbamate groups bound to carbon atoms of six-membered aromatic rings **[5]**

271/42 . . . with the nitrogen atoms of the carbamate groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

271/44 . . . . to hydrogen atoms or to carbon atoms of unsubstituted hydrocarbon radicals **[5]**

271/46 . . . . to carbon atoms of hydrocarbon radicals substituted by halogen atoms or by nitro or nitroso groups **[5]**

271/48 . . . . to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**

271/50 . . . . to carbon atoms of hydrocarbon radicals substituted by doubly-bound oxygen atoms **[5]**

271/52 . . . . to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**

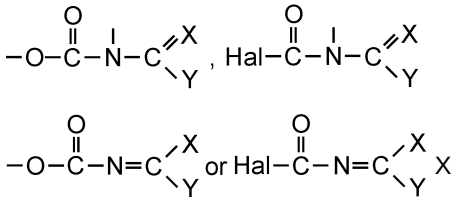
271/54 . . . . to carbon atoms of hydrocarbon radicals substituted by carboxyl groups **[5]**

271/56 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

271/58 . . . with the nitrogen atom of at least one of the carbamate groups bound to a carbon atom of a six-membered aromatic ring **[5]**

271/60 . having oxygen atoms of carbamate groups bound to nitrogen atoms **[5]**

271/62 . Compounds containing any of the groups

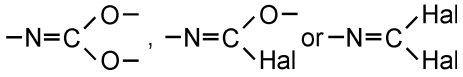


being a hetero atom, Y being any atom, e.g. N-acylcarbamates **[5]**

271/64 . . Y being a hydrogen or a carbon atom, e.g. benzoylcarbamates **[5]**

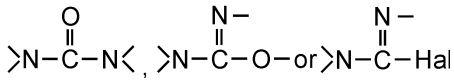
271/66 . . Y being a hetero atom **[5]**

271/68 . Compounds containing any of the groups



[5]

273/00 Preparation of urea or its derivatives, i.e. compounds containing any of the groups



the nitrogen atoms not being part of nitro or nitroso groups [5]

273/02 . of urea, its salts, complexes or addition compounds **[5]**

273/04 . . from carbon dioxide and ammonia **[5]**

273/06 . . from cyanamide or calcium cyanamide **[5]**

273/08 . . from ammoniacal liquor **[5]**

273/10 . . combined with the synthesis of ammonia **[5]**

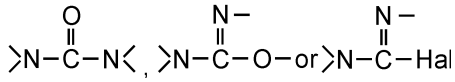
273/12 . . combined with the synthesis of melamine **[5]**

273/14 . . Separation; Purification; Stabilisation; Use of additives **[5]**

273/16 . . . Separation; Purification **[5]**

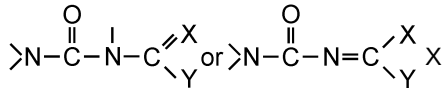
273/18 . of substituted ureas **[5]**

275/00 Derivatives of urea, i.e. compounds containing any of the groups



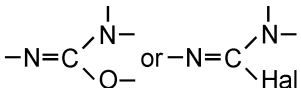
the nitrogen atoms not being part of nitro or nitroso groups [5]

275/02 . Salts; Complexes; Addition compounds **[5]**
275/04 . having nitrogen atoms of urea groups bound to acyclic carbon atoms **[5]**
275/06 . . of an acyclic and saturated carbon skeleton **[5]**
275/08 . . . being further substituted by halogen atoms, or by nitro or nitroso groups **[5]**
275/10 . . . being further substituted by singly-bound oxygen atoms **[5]**
275/12 . . . being further substituted by doubly-bound oxygen atoms **[5]**
275/14 . . . being further substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**
275/16 . . . being further substituted by carboxyl groups **[5]**
275/18 . . of a saturated carbon skeleton containing rings **[5]**
275/20 . . of an unsaturated carbon skeleton **[5]**
275/22 . . . containing rings other than six-membered aromatic rings **[5]**
275/24 . . . containing six-membered aromatic rings **[5]**
275/26 . having nitrogen atoms of urea groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
275/28 . having nitrogen atoms of urea groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**
275/30 . . being further substituted by halogen atoms, or by nitro or nitroso groups **[5]**
275/32 . . being further substituted by singly-bound oxygen atoms **[5]**
275/34 . . . having nitrogen atoms of urea groups and singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**
275/36 . . . . with at least one of the oxygen atoms further bound to a carbon atom of a six-membered aromatic ring, e.g. N-aryloxyphenylureas **[5]**
275/38 . . being further substituted by doubly-bound oxygen atoms **[5]**
275/40 . . being further substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**
275/42 . . being further substituted by carboxyl groups **[5]**
275/44 . having nitrogen atoms of urea groups doubly-bound to carbon atoms **[5]**
275/46 . containing any of the groups



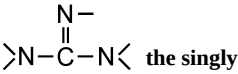
being a hetero atom, Y being any atom, e.g. acylureas **[5]**

275/48 . . Y being a hydrogen or a carbon atom **[5]**
275/50 . . . Y being a hydrogen or an acyclic carbon atom **[5]**
275/52 . . . Y being a carbon atom of a ring other than a six-membered aromatic ring **[5]**
275/54 . . . Y being a carbon atom of a six-membered aromatic ring, e.g. benzoylureas **[5]**
275/56 . . . X being a nitrogen atom **[5]**
275/58 . . Y being a hetero atom **[5]**
275/60 . . . Y being an oxygen atom, e.g. allophanic acids **[5]**
275/62 . . . Y being a nitrogen atom, e.g. biuret **[5]**
275/64 . having nitrogen atoms of urea groups singly-bound to oxygen atoms **[5]**
275/66 . having nitrogen atoms of urea groups bound to halogen atoms or to nitro or nitroso groups **[5]**
275/68 . . N-nitroso ureas **[5]**
275/70 . Compounds containing any of the groups



e.g. isoureas **[5]**

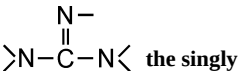
277/00 Preparation of guanidine or its derivatives, i.e. compounds containing the group



the singly-bound nitrogen atoms not being part of nitro or nitroso groups [5]

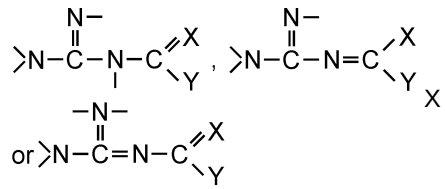
277/02 . of guanidine from cyanamide, calcium cyanamide or dicyandiamides **[5]**
277/04 . of guanidine from ammonium thiocyanate **[5]**
277/06 . Purification or separation of guanidine **[5]**
277/08 . of substituted guanidines **[5]**

279/00 Derivatives of guanidine, i.e. compounds containing the group



the singly-bound nitrogen atoms not being part of nitro or nitroso groups [5]

279/02 . Guanidine; Salts, complexes or addition compounds thereof **[5]**
279/04 . having nitrogen atoms of guanidine groups bound to acyclic carbon atoms of a carbon skeleton **[5]**
279/06 . . being further substituted by halogen atoms, or by nitro or nitroso groups **[5]**
279/08 . . being further substituted by singly-bound oxygen atoms **[5]**
279/10 . . being further substituted by doubly-bound oxygen atoms **[5]**
279/12 . . being further substituted by nitrogen atoms not being part of nitro or nitroso groups **[5]**
279/14 . . being further substituted by carboxyl groups **[5]**
279/16 . having nitrogen atoms of guanidine groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
279/18 . having nitrogen atoms of guanidine groups bound to carbon atoms of six-membered aromatic rings **[5]**
279/20 . containing any of the groups



being a hetero atom, Y being any atom, e.g. acylguanidines **[5]**

279/22 . . Y being a hydrogen or a carbon atom, e.g. benzoylguanidines **[5]**
279/24 . . Y being a hetero atom **[5]**
279/26 . . . X and Y being nitrogen atoms, i.e. biguanides **[5]**
279/28 . having nitrogen atoms of guanidine groups bound to cyano groups, e.g. cyanoguanidines, dicyandiamides **[5]**

279/30 . having nitrogen atoms of guanidine groups bound to nitro or nitroso groups **[5]**

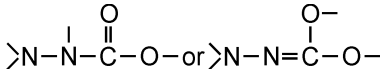
279/32 . . N-nitroguanidines **[5]**

279/34 . . . N-nitroguanidine **[5]**

279/36 . . . Substituted N-nitroguanidines **[5]**

281/00 Derivatives of carbonic acid containing functional groups covered by groups C07C 269/00 to C07C 279/00 in which at least one nitrogen atom of these functional groups is further bound to another nitrogen atom not being part of a nitro or nitroso group [5]

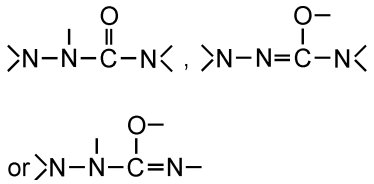
281/02 . Compounds containing any of the groups



e.g. carbazates **[5]**

281/04 . . the other nitrogen atom being further doubly-bound to a carbon atom **[5]**

281/06 . Compounds containing any of the groups



e.g. semicarbazides **[5]**

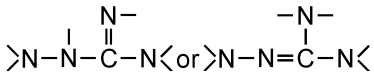
281/08 . . the other nitrogen atom being further doubly-bound to a carbon atom, e.g. semicarbazones **[5]**

281/10 . . . the carbon atom being further bound to an acyclic carbon atom or to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

281/12 . . . the carbon atom being part of a ring other than a six-membered aromatic ring **[5]**

281/14 . . . the carbon atom being further bound to a carbon atom of a six-membered aromatic ring **[5]**

281/16 . Compounds containing any of the groups



e.g. aminoguanidine **[5]**

281/18 . . the other nitrogen atom being further doubly-bound to a carbon atom, e.g. guanylhydrazones **[5]**

281/20 . the two nitrogen atoms of the functional groups being doubly-bound to each other, e.g. azoformamide **[5]**

291/00 Compounds containing carbon and nitrogen and having functional groups not covered by groups C07C 201/00 to C07C 281/00 [5]

291/02 . containing nitrogen-oxide bonds **[5]**

291/04 . . containing amino-oxide bonds **[5]**

291/06 . . Nitrile oxides **[5]**

291/08 . . Azoxy compounds **[5]**

291/10 . Isocyanides **[5]**

291/12 . Fulminates **[5]**

291/14 . containing at least one carbon atom bound to a nitro or nitroso group and doubly-bound to a hetero atom **[5]**

Compounds containing carbon together with sulfur, selenium or tellurium, with or without hydrogen, halogens, oxygen or nitrogen [5]

301/00 Esters of sulfurous acid [5]

301/02 . having sulfite groups bound to carbon atoms of six-membered aromatic rings **[5]**

303/00 Preparation of esters or amides of sulfuric acids; Preparation of sulfonic acids or of their esters, halides, anhydrides or amides [5]

303/02 . of sulfonic acids or halides thereof **[5]**

303/04 . . by substitution of hydrogen atoms by sulfo or halosulfonyl groups **[5]**

303/06 . . . by reaction with sulfuric acid or sulfur trioxide **[5]**

303/08 . . . by reaction with halogenosulfonic acids **[5]**

303/10 . . . by reaction with sulfur dioxide and halogen or by reaction with sulfuryl halides **[5]**

303/12 . . . by reaction with thionylhalides **[5]**

303/14 . . by sulfoxidation, i.e. by reaction with sulfur dioxide and oxygen with formation of sulfo or halosulfonyl groups **[5]**

303/16 . . by oxidation of thiols, sulfides, hydropolysulfides, or polysulfides with formation of sulfo or halosulfonyl groups **[5]**

303/18 . . by reaction of sulfides with compounds having functional groups with formation of sulfo or halosulfonyl groups **[5]**

303/20 . . by addition of sulfurous acid or salts thereof to compounds having carbon-to-carbon multiple bonds **[5]**

303/22 . . from sulfonic acids by reactions not involving the formation of sulfo or halosulfonyl groups **[5]**

303/24 . of esters of sulfuric acids **[5]**

303/26 . of esters of sulfonic acids **[5]**

303/28 . . by reaction of hydroxy compounds with sulfonic acids or derivatives thereof **[5]**

303/30 . . by reactions not involving the formation of esterified sulfo groups **[5]**

303/32 . of salts of sulfonic acids **[5]**

303/34 . of amides of sulfuric acids **[5]**

303/36 . of amides of sulfonic acids **[5]**

303/38 . . by reaction of ammonia or amines with sulfonic acids, or with esters, anhydrides, or halides thereof **[5]**

303/40 . . by reactions not involving the formation of sulfonamide groups **[5]**

303/42 . Separation; Purification; Stabilisation; Use of additives **[5]**

303/44 . . Separation; Purification **[5]**

303/46 . . . from by-products of refining mineral oils with sulfuric acid **[5]**

305/00 Esters of sulfuric acids [5]

305/02 . having oxygen atoms of sulfate groups bound to acyclic carbon atoms of a carbon skeleton **[5]**

305/04 . . being acyclic and saturated **[5]**

305/06 . . . Hydrogenosulfates **[5]**

305/08 . . . Dialkylsulfates; Substituted dialkylsulfates **[5]**

305/10 . . . being further substituted by singly-bound oxygen atoms **[5]**

305/12 . . being saturated and containing rings **[5]**

305/14 . . being acyclic and unsaturated **[5]**

305/16 . . being unsaturated and containing rings **[5]**

305/18 . . . containing six-membered aromatic rings **[5]**

305/20 . having oxygen atoms of sulfate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

305/22 . having oxygen atoms of sulfate groups bound to carbon atoms of six-membered aromatic rings **[5]**

305/24 . . of non-condensed six-membered aromatic rings **[5]**

305/26 . Halogenosulfates, i.e. monoesters of halogenosulfuric acids **[5]**

307/00 Amides of sulfuric acids, i.e. compounds having singly-bound oxygen atoms of sulfate groups replaced by nitrogen atoms, not being part of nitro or nitroso groups [5]

307/02 . Monoamides of sulfuric acids or esters thereof, e.g. sulfamic acids **[5]**

307/04 . Diamides of sulfuric acids **[5]**

307/06 . . having nitrogen atoms of the sulfamide groups bound to acyclic carbon atoms **[5]**

307/08 . . having nitrogen atoms of the sulfamide groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

307/10 . . having nitrogen atoms of the sulfamide groups bound to carbon atoms of six-membered aromatic rings **[5]**

309/00 Sulfonic acids; **Halides, esters, or anhydrides thereof [5]**

309/01 . Sulfonic acids **[5]**

309/02 . . having sulfo groups bound to acyclic carbon atoms **[5]**

309/03 . . . of an acyclic saturated carbon skeleton **[5]**

309/04 . . . . containing only one sulfo group **[5]**

309/05 . . . . containing at least two sulfo groups bound to the carbon skeleton **[5]**

309/06 . . . . containing halogen atoms, or nitro or nitroso groups bound to the carbon skeleton **[5]**

309/07 . . . . containing oxygen atoms bound to the carbon skeleton **[5]**

309/08 . . . . . containing hydroxy groups bound to the carbon skeleton **[5]**

309/09 . . . . . containing etherified hydroxy groups bound to the carbon skeleton **[5]**

309/10 . . . . . . with the oxygen atom of at least one of the etherified hydroxy groups further bound to an acyclic carbon atom **[5]**

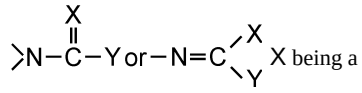
309/11 . . . . . . with the oxygen atom of at least one of the etherified hydroxy groups further bound to a carbon atom of a six-membered aromatic ring **[5]**

309/12 . . . . . containing esterified hydroxy groups bound to the carbon skeleton **[5]**

309/13 . . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton **[5]**

309/14 . . . . . containing amino groups bound to the carbon skeleton **[5]**

309/15 . . . . . . the nitrogen atom of at least one of the amino groups being part of any of the groups



X being a hetero atom, Y being any atom **[5]**

309/16 . . . . . containing doubly-bound nitrogen atoms bound to the carbon skeleton **[5]**

309/17 . . . . . containing carboxyl groups bound to the carbon skeleton **[5]**

309/18 . . . . . containing amino groups bound to the same carbon skeleton **[5]**

309/19 . . . of a saturated carbon skeleton containing rings **[5]**

309/20 . . . of an acyclic unsaturated carbon skeleton **[5]**

309/21 . . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton **[5]**

309/22 . . . . containing carboxyl groups bound to the carbon skeleton **[5]**

309/23 . . . of an unsaturated carbon skeleton containing rings other than six-membered aromatic rings **[5]**

309/24 . . . of a carbon skeleton containing six-membered aromatic rings **[5]**

309/25 . . having sulfo groups bound to carbon atoms of rings other than six-membered aromatic rings of a carbon skeleton **[5]**

309/26 . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton **[5]**

309/27 . . . containing carboxyl groups bound to the carbon skeleton **[5]**

309/28 . . having sulfo groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**

309/29 . . . of non-condensed six-membered aromatic rings **[5]**

309/30 . . . . of six-membered aromatic rings substituted by alkyl groups **[5]**

309/31 . . . . . by alkyl groups containing at least three carbon atoms **[5]**

309/32 . . . . containing at least two non-condensed six-membered aromatic rings in the carbon skeleton **[5]**

309/33 . . . of six-membered aromatic rings being part of condensed ring systems **[5]**

309/34 . . . . formed by two rings **[5]**

309/35 . . . . . Naphthalene sulfonic acids **[5]**

309/36 . . . . . substituted by alkyl groups **[5]**

309/37 . . . . . by alkyl groups containing at least three carbon atoms **[5]**

309/38 . . . . formed by at least three rings **[5]**

309/39 . . . containing halogen atoms bound to the carbon skeleton **[5]**

309/40 . . . containing nitro or nitroso groups bound to the carbon skeleton **[5]**

309/41 . . . containing singly-bound oxygen atoms bound to the carbon skeleton **[5]**

309/42 . . . . having the sulfo groups bound to carbon atoms of non-condensed six-membered aromatic rings **[5]**

309/43 . . . . having at least one of the sulfo groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system **[5]**

309/44 . . . containing doubly-bound oxygen atoms bound to the carbon skeleton **[5]**

309/45 . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton **[5]**

309/46 . . . . having the sulfo groups bound to carbon atoms of non-condensed six-membered aromatic rings **[5]**

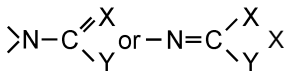
309/47 . . . . having at least one of the sulfo groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system **[5]**

309/48 . . . . the carbon skeleton being further substituted by halogen atoms **[5]**

309/49 . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**

309/50 . . . . . having at least one of the sulfo groups bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system **[5]**

309/51 . . . . at least one of the nitrogen atoms being part of any of the groups

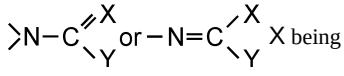


X being a hetero atom, Y being any atom **[5]**

309/52 . . . . the carbon skeleton being further substituted by doubly-bound oxygen atoms **[5]**

309/53 . . . . . the carbon skeleton containing carbon atoms of quinone rings **[5]**

309/54 . . . . . at least one of the nitrogen atoms being part of any of the groups



X being a hetero atom, Y being any atom **[5]**

309/55 . . . . . Y being a hydrogen or a carbon atom **[5]**

309/56 . . . . . Y being a hetero atom **[5]**

309/57 . . . containing carboxyl groups bound to the carbon skeleton **[5]**

309/58 . . . . Carboxylic acid groups or esters thereof **[5]**

309/59 . . . . Nitrogen analogues of carboxyl groups **[5]**

309/60 . . . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**

309/61 . . . . the carbon skeleton being further substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

309/62 . . Sulfonated fats, oils or waxes of undetermined constitution **[5]**

309/63 . Esters of sulfonic acids **[5]**

309/64 . . having sulfur atoms of esterified sulfo groups bound to acyclic carbon atoms **[5]**

309/65 . . . of a saturated carbon skeleton **[5]**

309/66 . . . . Methanesulfonates **[5]**

309/67 . . . of an unsaturated carbon skeleton **[5]**

309/68 . . . of a carbon skeleton substituted by singly-bound oxygen atoms **[5]**

309/69 . . . of a carbon skeleton substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

309/70 . . . of a carbon skeleton substituted by carboxyl groups **[5]**

309/71 . . having sulfur atoms of esterified sulfo groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

309/72 . . having sulfur atoms of esterified sulfo groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**

309/73 . . . to carbon atoms of non-condensed six-membered aromatic rings **[5]**

309/74 . . . to carbon atoms of six-membered aromatic rings being part of condensed ring systems **[5]**

309/75 . . . containing singly-bound oxygen atoms bound to the carbon skeleton **[5]**

309/76 . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton **[5]**

309/77 . . . containing carboxyl groups bound to the carbon skeleton **[5]**

309/78 . Halides of sulfonic acids **[5]**

309/79 . . having halosulfonyl groups bound to acyclic carbon atoms **[5]**

309/80 . . . of a saturated carbon skeleton **[5]**

309/81 . . . of an unsaturated carbon skeleton **[5]**

309/82 . . . of a carbon skeleton substituted by singly-bound oxygen atoms **[5]**

309/83 . . . of a carbon skeleton substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

309/84 . . . of a carbon skeleton substituted by carboxyl groups **[5]**

309/85 . . having halosulfonyl groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

309/86 . . having halosulfonyl groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**

309/87 . . . containing singly-bound oxygen atoms bound to the carbon skeleton **[5]**

309/88 . . . containing nitrogen atoms, not being part of nitro or nitroso groups, bound to the carbon skeleton **[5]**

309/89 . . . containing carboxyl groups bound to the carbon skeleton **[5]**

311/00 Amides of sulfonic acids, i.e. compounds having singly-bound oxygen atoms of sulfo groups replaced by nitrogen atoms, not being part of nitro or nitroso groups [5]

311/01 . Sulfonamides having sulfur atoms of sulfonamide groups bound to acyclic carbon atoms **[5]**

311/02 . . of an acyclic saturated carbon skeleton **[5]**

311/03 . . . having the nitrogen atoms of the sulfonamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

311/04 . . . . to acyclic carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**

311/05 . . . . to acyclic carbon atoms of hydrocarbon radicals substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

311/06 . . . . to acyclic carbon atoms of hydrocarbon radicals substituted by carboxyl groups **[5]**

311/07 . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

311/08 . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**

311/09 . . . the carbon skeleton being further substituted by at least two halogen atoms **[5]**

311/10 . . of a saturated carbon skeleton containing rings **[5]**

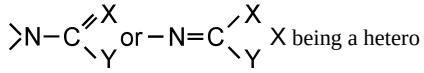
311/11 . . of an acyclic unsaturated carbon skeleton **[5]**

311/12 . . of an unsaturated carbon skeleton containing rings **[5]**

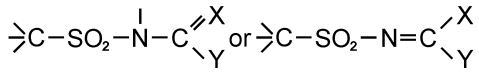
311/13 . . . the carbon skeleton containing six-membered aromatic rings **[5]**

311/14 . Sulfonamides having sulfur atoms of sulfonamide groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

311/15 . Sulfonamides having sulfur atoms of sulfonamide groups bound to carbon atoms of six-membered aromatic rings **[5]**
311/16 . . having the nitrogen atom of at least one of the sulfonamide groups bound to hydrogen atoms or to an acyclic carbon atom **[5]**
311/17 . . . to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**
311/18 . . . to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**
311/19 . . . to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**
311/20 . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**
311/21 . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**
311/22 . Sulfonamides, the carbon skeleton of the acid part being further substituted by singly-bound oxygen atoms **[5]**
311/23 . . having the sulfur atoms of the sulfonamide groups bound to acyclic carbon atoms **[5]**
311/24 . . . of an acyclic saturated carbon skeleton **[5]**
311/25 . . . of a saturated carbon skeleton containing rings **[5]**
311/26 . . . of an acyclic unsaturated carbon skeleton **[5]**
311/27 . . . of an unsaturated carbon skeleton containing rings **[5]**
311/28 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**
311/29 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**
311/30 . Sulfonamides, the carbon skeleton of the acid part being further substituted by singly-bound nitrogen atoms, not being part of nitro or nitroso groups **[5]**
311/31 . . having the sulfur atoms of the sulfonamide groups bound to acyclic carbon atoms **[5]**
311/32 . . . of an acyclic saturated carbon skeleton **[5]**
311/33 . . . of a saturated carbon skeleton containing rings **[5]**
311/34 . . . of an acyclic unsaturated carbon skeleton **[5]**
311/35 . . . of an unsaturated carbon skeleton containing rings **[5]**
311/36 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**
311/37 . . having the sulfur atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**
311/38 . . . having sulfur atoms of sulfonamide groups and amino groups bound to carbon atoms of six-membered aromatic rings of the same carbon skeleton **[5]**
311/39 . . . . having the nitrogen atom of at least one of the sulfonamide groups bound to hydrogen atoms or to an acyclic carbon atom **[5]**
311/40 . . . . . to an acyclic carbon atom of a hydrocarbon radical substituted by singly-bound oxygen atoms **[5]**
311/41 . . . . . to an acyclic carbon atom of a hydrocarbon radical substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**
311/42 . . . . . to an acyclic carbon atom of a hydrocarbon radical substituted by carboxyl groups **[5]**
311/43 . . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**
311/44 . . . . having the nitrogen atom of at least one of the sulfonamide groups bound to a carbon atom of a six-membered aromatic ring **[5]**
311/45 . . at least one of the singly-bound nitrogen atoms being part of any of the groups



X being a hetero atom, Y being any atom, e.g. N-acylaminosulfonamides **[5]**
311/46 . . . Y being a hydrogen or a carbon atom **[5]**
311/47 . . . Y being a hetero atom **[5]**
311/48 . having nitrogen atoms of sulfonamide groups further bound to another hetero atom **[5]**
311/49 . . to nitrogen atoms **[5]**
311/50 . Compounds containing any of the groups



X being a hetero atom, Y being any atom **[5]**
311/51 . . Y being a hydrogen or a carbon atom **[5]**
311/52 . . Y being a hetero atom **[5]**
311/53 . . . X and Y not being nitrogen atoms, e.g. N-sulfonylcarbamic acid **[5]**
311/54 . . . either X or Y, but not both, being nitrogen atoms, e.g. N-sulfonylurea **[5]**
311/55 . . . . having sulfur atoms of the sulfonylurea groups bound to acyclic carbon atoms **[5]**
311/56 . . . . having sulfur atoms of the sulfonylurea groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
311/57 . . . . having sulfur atoms of the sulfonylurea groups bound to carbon atoms of six-membered aromatic rings **[5]**
311/58 . . . . . having nitrogen atoms of the sulfonylurea groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**
311/59 . . . . . having nitrogen atoms of the sulfonylurea groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
311/60 . . . . . having nitrogen atoms of the sulfonylurea groups bound to carbon atoms of six-membered aromatic rings **[5]**
311/61 . . . . . having nitrogen atoms of the sulfonylurea groups further bound to another hetero atom **[5]**
311/62 . . . . . having nitrogen atoms of the sulfonylurea groups further acylated **[5]**
311/63 . . . . N-sulfonylisoureas **[5]**
311/64 . . . X and Y being nitrogen atoms, e.g. N-sulfonylguanidine **[5]**
311/65 . N-sulfonylisocyanates **[5]**

313/00 **Sulfinic acids**; **Sulfenic acids**; **Halides, esters or anhydrides thereof**; **Amides of sulfinic or sulfenic acids, i.e. compounds having singly-bound oxygen atoms of sulfinic or sulfenic groups replaced by nitrogen atoms, not being part of nitro or nitroso groups [5]**

313/02 . Sulfinic acids; Derivatives thereof **[5]**

313/04 . . Sulfinic acids; Esters thereof **[5]**

313/06 . . Sulfinamides **[5]**

313/08 . Sulfenic acids; Derivatives thereof **[5]**

313/10 . . Sulfenic acids; Esters thereof **[5]**

313/12 . . . having sulfur atoms of sulfenic groups bound to acyclic carbon atoms **[5]**

313/14 . . . having sulfur atoms of sulfenic groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

313/16 . . . having sulfur atoms of sulfenic groups bound to carbon atoms of six-membered aromatic rings **[5]**

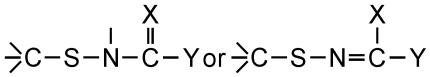
313/18 . . Sulfenamides **[5]**

313/20 . . . having sulfur atoms of sulfenamide groups bound to acyclic carbon atoms **[5]**

313/22 . . . having sulfur atoms of sulfenamide groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

313/24 . . . having sulfur atoms of sulfenamide groups bound to carbon atoms of six-membered aromatic rings **[5]**

313/26 . . . Compounds containing any of the groups



X being a hetero atom, Y being any atom **[5]**

313/28 . . . . Y being a hydrogen or a carbon atom **[5]**

313/30 . . . . Y being a hetero atom **[5]**

313/32 . . . . . X and Y not being nitrogen atoms, e.g. N-sulfenylcarbamic acid **[5]**

313/34 . . . . . either X or Y, but not both, being nitrogen atoms, e.g. N-sulfenylureas **[5]**

313/36 . . . having nitrogen atoms of sulfenamide groups further bound to other hetero atoms **[5]**

313/38 . . . N-sulfenylisocyanates **[5]**

315/00 **Preparation of sulfones**; **Preparation of sulfoxides [5]**

315/02 . by formation of sulfone or sulfoxide groups by oxidation of sulfides, or by formation of sulfone groups by oxidation of sulfoxides **[5]**

315/04 . by reactions not involving the formation of sulfone or sulfoxide groups **[5]**

315/06 . Separation; Purification; Stabilisation; Use of additives **[5]**

317/00 **Sulfones**; **Sulfoxides [5]**

317/02 . having sulfone or sulfoxide groups bound to acyclic carbon atoms **[5]**

317/04 . . of an acyclic saturated carbon skeleton **[5]**

317/06 . . of a saturated carbon skeleton containing rings **[5]**

317/08 . . of an acyclic unsaturated carbon skeleton **[5]**

317/10 . . of an unsaturated carbon skeleton containing rings **[5]**

317/12 . having sulfone or sulfoxide groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

317/14 . having sulfone or sulfoxide groups bound to carbon atoms of six-membered aromatic rings **[5]**

317/16 . having sulfone or sulfoxide groups and singly-bound oxygen atoms bound to the same carbon skeleton **[5]**

317/18 . . with sulfone or sulfoxide groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

317/20 . . with sulfone or sulfoxide groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**

317/22 . . with sulfone or sulfoxide groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**

317/24 . having sulfone or sulfoxide groups and doubly-bound oxygen atoms bound to the same carbon skeleton **[5]**

317/26 . having sulfone or sulfoxide groups and nitrogen atoms, not being part of nitro or nitroso groups, bound to the same carbon skeleton **[5]**

317/28 . . with sulfone or sulfoxide groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

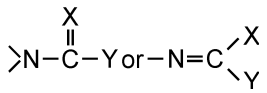
317/30 . . with sulfone or sulfoxide groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**

317/32 . . with sulfone or sulfoxide groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**

317/34 . . . having sulfone or sulfoxide groups and amino groups bound to carbon atoms of six-membered aromatic rings being part of the same non-condensed ring or of a condensed ring system containing that ring **[5]**

317/36 . . . . with the nitrogen atoms of the amino groups bound to hydrogen atoms or to carbon atoms **[5]**

317/38 . . . . with the nitrogen atom of at least one amino group being part of any of the groups



X being a hetero atom, Y being any atom, e.g. N-acylaminosulfones **[5]**

317/40 . . . . . Y being a hydrogen or a carbon atom **[5]**

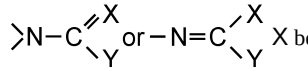
317/42 . . . . . Y being a hetero atom **[5]**

317/44 . having sulfone or sulfoxide groups and carboxyl groups bound to the same carbon skeleton **[5]**

317/46 . . the carbon skeleton being further substituted by singly-bound oxygen atoms **[5]**

317/48 . . the carbon skeleton being further substituted by singly-bound nitrogen atoms, not being part of nitro or nitroso groups **[5]**

317/50 . . . at least one of the nitrogen atoms being part of any of the groups



X being a hetero atom, Y being any atom **[5]**

319/00 **Preparation of thiols, sulfides, hydropolysulfides or polysulfides [5]**

319/02 . of thiols **[5]**

319/04 . . by addition of hydrogen sulfide or its salts to unsaturated compounds **[5]**

319/06 . . from sulfides, hydropolysulfides or polysulfides **[5]**

319/08 . . by replacement of hydroxy groups or etherified or esterified hydroxy groups **[5]**

319/10 . . . by replacement of hydroxy groups or etherified or esterified hydroxy groups bound to carbon atoms of six-membered aromatic rings **[5]**

319/12 . . by reactions not involving the formation of mercapto groups **[5]**

319/14 . of sulfides **[5]**

319/16 . . by addition of hydrogen sulfide or its salts to unsaturated compounds **[5]**
319/18 . . by addition of thiols to unsaturated compounds **[5]**
319/20 . . by reactions not involving the formation of sulfide groups **[5]**
319/22 . of hydropolysulfides or polysulfides **[5]**
319/24 . . by reactions involving the formation of sulfur-to-sulfur bonds **[5]**
319/26 . Separation; Purification; Stabilisation; Use of additives **[5]**
319/28 . . Separation; Purification **[5]**
319/30 . . . from the by-products of refining mineral oils **[5]**

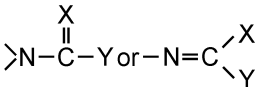
321/00 Thiols, sulfides, hydropolysulfides or polysulfides [5]
321/02 . Thiols having mercapto groups bound to acyclic carbon atoms **[5]**
321/04 . . of an acyclic saturated carbon skeleton **[5]**
321/06 . . of a saturated carbon skeleton containing rings **[5]**
321/08 . . of an acyclic unsaturated carbon skeleton **[5]**
321/10 . . of an unsaturated carbon skeleton containing rings **[5]**
321/12 . Sulfides, hydropolysulfides, or polysulfides having thio groups bound to acyclic carbon atoms **[5]**
321/14 . . of an acyclic saturated carbon skeleton **[5]**
321/16 . . of a saturated carbon skeleton containing rings **[5]**
321/18 . . of an acyclic unsaturated carbon skeleton **[5]**
321/20 . . of an unsaturated carbon skeleton containing rings **[5]**
321/22 . Thiols, sulfides, hydropolysulfides, or polysulfides having thio groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**
321/24 . Thiols, sulfides, hydropolysulfides, or polysulfides having thio groups bound to carbon atoms of six-membered aromatic rings **[5]**
321/26 . . Thiols **[5]**
321/28 . . Sulfides, hydropolysulfides, or polysulfides having thio groups bound to carbon atoms of six-membered aromatic rings **[5]**
321/30 . . . Sulfides having the sulfur atom of at least one thio group bound to two carbon atoms of six-membered aromatic rings **[5]**

323/00 Thiols, sulfides, hydropolysulfides or polysulfides substituted by halogen, oxygen or nitrogen atoms, or by sulfur atoms not being part of thio groups [5]
323/01 . containing thio groups and halogen atoms, or nitro or nitroso groups bound to the same carbon skeleton **[5]**
323/02 . . having sulfur atoms of thio groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
323/03 . . . the carbon skeleton being acyclic and saturated **[5]**
323/04 . . . the carbon skeleton being saturated and containing rings **[5]**
323/05 . . . the carbon skeleton being acyclic and unsaturated **[5]**
323/06 . . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**
323/07 . . . the carbon skeleton containing six-membered aromatic rings **[5]**
323/08 . . having sulfur atoms of thio groups bound to carbon atoms of rings other than six-membered aromatic rings of the carbon skeleton **[5]**
323/09 . . having sulfur atoms of thio groups bound to carbon atoms of six-membered aromatic rings of the carbon skeleton **[5]**
323/10 . containing thio groups and singly-bound oxygen atoms bound to the same carbon skeleton **[5]**
323/11 . . having the sulfur atoms of the thio groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
323/12 . . . the carbon skeleton being acyclic and saturated **[5]**
323/13 . . . the carbon skeleton being saturated and containing rings **[5]**
323/14 . . . the carbon skeleton being acyclic and unsaturated **[5]**
323/15 . . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**
323/16 . . . the carbon skeleton containing six-membered aromatic rings **[5]**
323/17 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton **[5]**
323/18 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a six-membered aromatic ring of the carbon skeleton **[5]**
323/19 . . . with singly-bound oxygen atoms bound to acyclic carbon atoms of the carbon skeleton **[5]**
323/20 . . . with singly-bound oxygen atoms bound to carbon atoms of the same non-condensed six-membered aromatic ring **[5]**
323/21 . . . with the sulfur atom of the thio group bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system **[5]**
323/22 . containing thio groups and doubly-bound oxygen atoms bound to the same carbon skeleton **[5]**
323/23 . containing thio groups and nitrogen atoms, not being part of nitro or nitroso groups, bound to the same carbon skeleton **[5]**
323/24 . . having the sulfur atoms of the thio groups bound to acyclic carbon atoms of the carbon skeleton **[5]**
323/25 . . . the carbon skeleton being acyclic and saturated **[5]**
323/26 . . . the carbon skeleton being saturated and containing rings **[5]**
323/27 . . . the carbon skeleton being acyclic and unsaturated **[5]**
323/28 . . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**
323/29 . . . the carbon skeleton containing six-membered aromatic rings **[5]**
323/30 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton **[5]**
323/31 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a six-membered aromatic ring of the carbon skeleton **[5]**
323/32 . . . having at least one of the nitrogen atoms bound to an acyclic carbon atom of the carbon skeleton **[5]**
323/33 . . . having at least one of the nitrogen atoms bound to a carbon atom of the same non-condensed six-membered aromatic ring **[5]**
323/34 . . . . the thio group being a mercapto group **[5]**
323/35 . . . . the thio group being a sulfide group **[5]**
323/36 . . . . . the sulfur atom of the sulfide group being further bound to an acyclic carbon atom **[5]**

323/37 . . . . . the sulfur atom of the sulfide group being further bound to a carbon atom of a six-membered aromatic ring **[5]**

323/38 . . . with the sulfur atom of the thio group bound to a carbon atom of a six-membered aromatic ring being part of a condensed ring system **[5]**

323/39 . . at least one of the nitrogen atoms being part of any of the groups



X being a hetero atom, Y being any atom **[5]**

323/40 . . . Y being a hydrogen or a carbon atom **[5]**

323/41 . . . . Y being a hydrogen or an acyclic carbon atom **[5]**

323/42 . . . . Y being a carbon atom of a six-membered aromatic ring **[5]**

323/43 . . . Y being a hetero atom **[5]**

323/44 . . . . X or Y being nitrogen atoms **[5]**

323/45 . . having at least one of the nitrogen atoms doubly-bound to the carbon skeleton **[5]**

323/46 . . having at least one of the nitrogen atoms, not being part of nitro or nitroso groups, further bound to other hetero atoms **[5]**

323/47 . . . to oxygen atoms **[5]**

323/48 . . . to nitrogen atoms **[5]**

323/49 . . . to sulfur atoms **[5]**

323/50 . containing thio groups and carboxyl groups bound to the same carbon skeleton **[5]**

323/51 . . having the sulfur atoms of the thio groups bound to acyclic carbon atoms of the carbon skeleton **[5]**

323/52 . . . the carbon skeleton being acyclic and saturated **[5]**

323/53 . . . the carbon skeleton being saturated and containing rings **[5]**

323/54 . . . the carbon skeleton being acyclic and unsaturated **[5]**

323/55 . . . the carbon skeleton being unsaturated and containing rings other than six-membered aromatic rings **[5]**

323/56 . . . the carbon skeleton containing six-membered aromatic rings **[5]**

323/57 . . . the carbon skeleton being further substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

323/58 . . . . with amino groups bound to the carbon skeleton **[5]**

323/59 . . . . . with acylated amino groups bound to the carbon skeleton **[5]**

323/60 . . . with the carbon atom of at least one of the carboxyl groups bound to nitrogen atoms **[5]**

323/61 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a ring other than a six-membered aromatic ring of the carbon skeleton **[5]**

323/62 . . having the sulfur atom of at least one of the thio groups bound to a carbon atom of a six-membered aromatic ring of the carbon skeleton **[5]**

323/63 . . . the carbon skeleton being further substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

323/64 . containing thio groups and sulfur atoms, not being part of thio groups, bound to the same carbon skeleton **[5]**

323/65 . . containing sulfur atoms of sulfone or sulfoxide groups bound to the carbon skeleton **[5]**

323/66 . . containing sulfur atoms of sulfo, esterified sulfo or halosulfonyl groups, bound to the carbon skeleton **[5]**

323/67 . . containing sulfur atoms of sulfonamide groups, bound to the carbon skeleton **[5]**

325/00 Thioaldehydes; **Thioketones**; **Thioquinones**; **Oxides thereof** **[5]**

325/02 . Thioketones; Oxides thereof **[5]**

325/04 . Thioquinones; Oxides thereof **[5]**

327/00 Thiocarboxylic acids **[5]**

327/02 . Monothiocarboxylic acids **[5]**

327/04 . . having carbon atoms of thiocarboxyl groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

327/06 . . . to hydrogen atoms or to carbon atoms of an acyclic saturated carbon skeleton **[5]**

327/08 . . . to carbon atoms of a saturated carbon skeleton containing rings **[5]**

327/10 . . . to carbon atoms of an acyclic unsaturated carbon skeleton **[5]**

327/12 . . . to carbon atoms of an unsaturated carbon skeleton containing rings **[5]**

327/14 . . having carbon atoms of thiocarboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

327/16 . . having carbon atoms of thiocarboxyl groups bound to carbon atoms of six-membered aromatic rings **[5]**

327/18 . Dithiocarboxylic acids **[5]**

327/20 . Esters of monothiocarboxylic acids **[5]**

327/22 . . having carbon atoms of esterified thiocarboxyl groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

327/24 . . having carbon atoms of esterified thiocarboxyl groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

327/26 . . having carbon atoms of esterified thiocarboxyl groups bound to carbon atoms of six-membered aromatic rings **[5]**

327/28 . . having sulfur atoms of esterified thiocarboxyl groups bound to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**

327/30 . . having sulfur atoms of esterified thiocarboxyl groups bound to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

327/32 . . having sulfur atoms of esterified thiocarboxyl groups bound to carbon atoms of hydrocarbon radicals substituted by carboxyl groups **[5]**

327/34 . . . with amino groups bound to the same hydrocarbon radicals **[5]**

327/36 . Esters of dithiocarboxylic acids **[5]**

327/38 . Amides of thiocarboxylic acids **[5]**

327/40 . . having carbon atoms of thiocarboxamide groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

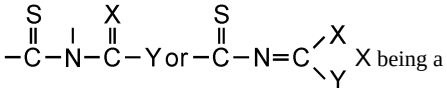
327/42 . . . to hydrogen atoms or to carbon atoms of a saturated carbon skeleton **[5]**

327/44 . . . to carbon atoms of an unsaturated carbon skeleton **[5]**

327/46 . . having carbon atoms of thiocarboxamide groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

327/48 . . having carbon atoms of thiocarboxamide groups bound to carbon atoms of six-membered aromatic rings **[5]**

327/50 . . Compounds containing any of the groups



X being a hetero atom, Y being any atom **[5]**

327/52 . . . Y being a hydrogen or a carbon atom **[5]**

327/54 . . . Y being a hetero atom **[5]**

327/56 . . having nitrogen atoms of thiocarboxamide groups further bound to another hetero atom **[5]**

327/58 . Derivatives of thiocarboxylic acids, the doubly-bound oxygen atoms being replaced by nitrogen atoms, e.g. imino-thio ethers **[5]**

327/60 . Thiocarboxylic acids having sulfur atoms of thiocarboxyl groups further doubly-bound to oxygen atoms **[5]**

329/00 Thiocarbonic acids; **Halides, esters or anhydrides thereof [5]**

329/02 . Monothiocarbonic acids; Derivatives thereof **[5]**

329/04 . . Esters of monothiocarbonic acids **[5]**

329/06 . . . having sulfur atoms of thiocarbonic groups bound to acyclic carbon atoms **[5]**

329/08 . . . having sulfur atoms of thiocarbonic groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

329/10 . . . having sulfur atoms of thiocarbonic groups bound to carbon atoms of six-membered aromatic rings **[5]**

329/12 . Dithiocarbonic acids; Derivatives thereof **[5]**

329/14 . . Esters of dithiocarbonic acids **[5]**

329/16 . . . having sulfur atoms of dithiocarbonic groups bound to acyclic carbon atoms **[5]**

329/18 . . . having sulfur atoms of dithiocarbonic groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

329/20 . . . having sulfur atoms of dithiocarbonic groups bound to carbon atoms of six-membered aromatic rings **[5]**

331/00 Derivatives of thiocyanic acid or of isothiocyanic acid [5]

331/02 . Thiocyanates **[5]**

331/04 . . having sulfur atoms of thiocyanate groups bound to acyclic carbon atoms **[5]**

331/06 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

331/08 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of six-membered aromatic rings **[5]**

331/10 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of hydrocarbon radicals substituted by singly-bound oxygen atoms **[5]**

331/12 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of hydrocarbon radicals substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

331/14 . . having sulfur atoms of thiocyanate groups bound to carbon atoms of hydrocarbon radicals substituted by carboxyl groups **[5]**

331/16 . Isothiocyanates **[5]**

331/18 . . having isothiocyanate groups bound to acyclic carbon atoms **[5]**

331/20 . . . of a saturated carbon skeleton **[5]**

331/22 . . . of an unsaturated carbon skeleton **[5]**

331/24 . . . . the carbon skeleton containing six-membered aromatic rings **[5]**

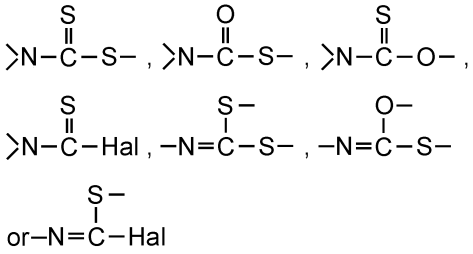
331/26 . . having isothiocyanate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

331/28 . . having isothiocyanate groups bound to carbon atoms of six-membered aromatic rings **[5]**

331/30 . . containing at least two isothiocyanate groups bound to the same carbon skeleton **[5]**

331/32 . . having isothiocyanate groups acylated **[5]**

333/00 Derivatives of thiocarbamic acids, i.e. compounds containing any of the groups



the nitrogen atom not being part of nitro or nitroso groups [5]

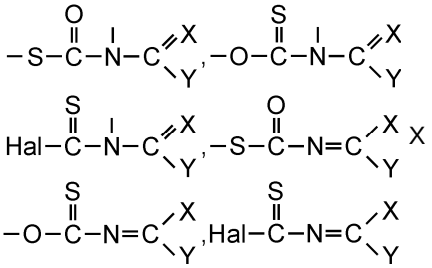
333/02 . Monothiocarbamic acids; Derivatives thereof **[5]**

333/04 . . having nitrogen atoms of thiocarbamic groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

333/06 . . having nitrogen atoms of thiocarbamic groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

333/08 . . having nitrogen atoms of thiocarbamic groups bound to carbon atoms of six-membered aromatic rings **[5]**

333/10 . . having nitrogen atoms of thiocarbamic groups being part of any of the groups



being a hetero atom, Y being any atom, e.g., N-acyl-thiocarbamates **[5]**

333/12 . . having nitrogen atoms of thiocarbamic groups bound to other hetero atoms **[5]**

333/14 . Dithiocarbamic acids; Derivatives thereof **[5]**

333/16 . . Salts of dithiocarbamic acids **[5]**

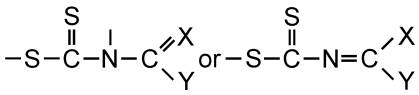
333/18 . . Esters of dithiocarbamic acids **[5]**

333/20 . . . having nitrogen atoms of dithiocarbamate groups bound to hydrogen atoms or to acyclic carbon atoms **[5]**

333/22 . . . having nitrogen atoms of dithiocarbamate groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

333/24 . . . having nitrogen atoms of dithiocarbamate groups bound to carbon atoms of six-membered aromatic rings **[5]**

333/26 . . . containing any of the groups



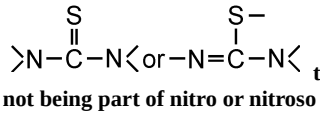
X being a hetero atom, Y being any atom, e.g. N-acyldithiocarbamates **[5]**

333/28 . . . having nitrogen atoms of dithiocarbamate groups bound to other hetero atoms **[5]**

333/30 . . having sulfur atoms of dithiocarbamic groups bound to other sulfur atoms **[5]**

333/32 . . . Thiuramsulfides; Thiurampolysulfides **[5]**

335/00 Thioureas, i.e. compounds containing any of the groups



the nitrogen atoms not being part of nitro or nitroso groups [5]

335/02 . Thiourea **[5]**

335/04 . Derivatives of thiourea **[5]**

335/06 . . having nitrogen atoms of thiourea groups bound to acyclic carbon atoms **[5]**

335/08 . . . of a saturated carbon skeleton **[5]**

335/10 . . . of an unsaturated carbon skeleton **[5]**

335/12 . . . . the carbon skeleton containing six-membered aromatic rings **[5]**

335/14 . . having nitrogen atoms of thiourea groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

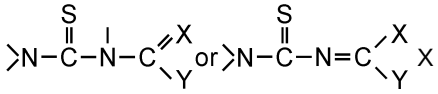
335/16 . . having nitrogen atoms of thiourea groups bound to carbon atoms of six-membered aromatic rings of a carbon skeleton **[5]**

335/18 . . . being further substituted by singly-bound oxygen atoms **[5]**

335/20 . . . being further substituted by nitrogen atoms, not being part of nitro or nitroso groups **[5]**

335/22 . . . being further substituted by carboxyl groups **[5]**

335/24 . . containing any of the groups



being a hetero atom, Y being any atom **[5]**

335/26 . . . Y being a hydrogen or a carbon atom, e.g. benzoylthioureas **[5]**

335/28 . . . Y being a hetero atom, e.g. thiobiuret **[5]**

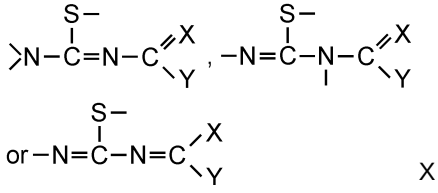
335/30 . Isothioureas **[5]**

335/32 . . having sulfur atoms of isothiourea groups bound to acyclic carbon atoms **[5]**

335/34 . . having sulfur atoms of isothiourea groups bound to carbon atoms of rings other than six-membered aromatic rings **[5]**

335/36 . . having sulfur atoms of isothiourea groups bound to carbon atoms of six-membered aromatic rings **[5]**

335/38 . . containing any of the groups



being a hetero atom, Y being any atom **[5]**

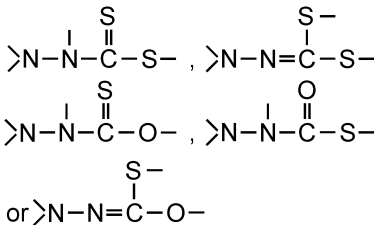
335/40 . having nitrogen atoms of thiourea or isothiourea groups further bound to other hetero atoms **[5]**

335/42 . . Sulfonylthioureas; Sulfonylisothioureas **[5]**

335/44 . . Sulfenylthioureas; Sulfenylisothioureas **[5]**

337/00 Derivatives of thiocarbonic acids containing functional groups covered by groups C07C 333/00 or C07C 335/00 in which at least one nitrogen atom of these functional groups is further bound to another nitrogen atom not being part of a nitro or nitroso group [5]

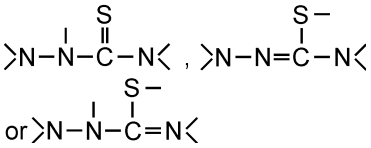
337/02 . Compounds containing any of the groups



e.g. thiocarbazates **[5]**

337/04 . . the other nitrogen atom being further doubly-bound to a carbon atom **[5]**

337/06 . Compounds containing any of the groups



e.g. thiosemicarbazides **[5]**

337/08 . . the other nitrogen atom being further doubly-bound to a carbon atom, e.g. thiosemicarbazones **[5]**

337/10 . the two nitrogen atoms of the functional group being doubly-bound to each other **[5]**

381/00 Compounds containing carbon and sulfur and having functional groups not covered by groups C07C 301/00 to C07C 337/00 [5]

381/02 . Thiosulfates **[5]**

381/04 . Thiosulfonates **[5]**

381/06 . Compounds containing sulfur atoms only bound to two nitrogen atoms **[5]**

381/08 . . having at least one of the nitrogen atoms acylated **[5]**

381/10 . Compounds containing sulfur atoms doubly-bound to nitrogen atoms **[5]**

381/12 . Sulfonium compounds **[5]**

381/14 . Compounds containing a carbon atom having four bonds to hetero atoms, with a double bond to one hetero atom and at least one bond to a sulfur atom further doubly-bound to oxygen atoms **[5]**

391/00 Compounds containing selenium [5]

391/02 . having selenium atoms bound to carbon atoms of six-membered aromatic rings **[5]**

395/00 Compounds containing tellurium [5]

401/00 Irradiation products of cholesterol or its derivatives; Vitamin D derivatives, 9,10-seco cyclopenta[a]phenanthrene or analogues obtained by chemical preparation without irradiation [5]

403/00 Derivatives of cyclohexane or of a cyclohexene, having a side-chain containing an acyclic unsaturated part of at least four carbon atoms, this part being directly attached to the cyclohexane or cyclohexene rings, e.g. vitamin A, beta-carotene, beta-ionone [5]

403/02 . having side-chains containing only carbon and hydrogen atoms **[5]**

403/04 . having side-chains substituted by halogen atoms **[5]**

403/06 . having side-chains substituted by singly-bound oxygen atoms **[5]**

403/08 . . by hydroxy groups **[5]**

403/10 . . by etherified hydroxy groups **[5]**

403/12 . . by esterified hydroxy groups **[5]**

403/14 . having side-chains substituted by doubly-bound oxygen atoms **[5]**

403/16 . . not being part of −CHO groups **[5]**

403/18 . having side-chains substituted by nitrogen atoms **[5]**

403/20 . having side-chains substituted by carboxyl groups **[5]**

403/22 . having side-chains substituted by sulfur atoms **[5]**

403/24 . having side-chains substituted by six-membered non-aromatic rings, e.g. beta-carotene **[5]**

405/00 Compounds containing a five-membered ring having two side-chains in ortho position to each other, and having oxygen atoms directly attached to the ring in ortho position to one of the side-chains, one side-chain containing, not directly attached to the ring, a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, and the other side-chain having oxygen atoms attached in gamma-position to the ring, e.g. prostaglandins [5]

407/00 Preparation of peroxy compounds [5]

409/00 Peroxy compounds [5]

409/02 . the −O−O− group being bound between a carbon atom, not further substituted by oxygen atoms, and hydrogen, i.e. hydroperoxides **[5]**

409/04 . . the carbon atom being acyclic **[5]**

409/06 . . . Compounds containing rings other than six-membered aromatic rings **[5]**

409/08 . . . Compounds containing six-membered aromatic rings **[5]**

409/10 . . . . Cumene hydroperoxide **[5]**

409/12 . . . . with two alpha,alpha-dialkylmethyl-hydroperoxy groups bound to carbon atoms of the same six-membered aromatic ring **[5]**

409/14 . . the carbon atom belonging to a ring other than a six-membered aromatic ring **[5]**

409/16 . the −O−O− group being bound between two carbon atoms not further substituted by oxygen atoms, i.e. peroxides **[5]**

409/18 . . at least one of the carbon atoms belonging to a ring other than a six-membered aromatic ring **[5]**

409/20 . the −O−O− group being bound to a carbon atom further substituted by singly-bound oxygen atoms **[5]**

409/22 . . having two −O−O− groups bound to the carbon atom **[5]**

409/24 . the −O−O− group being bound between a 〉C=O group and hydrogen, i.e. peroxy acids **[5]**

409/26 . . Peracetic acid **[5]**

409/28 . . a 〉C=O group being bound to a carbon atom of a ring other than a six-membered aromatic ring **[5]**

409/30 . . a 〉C=O group being bound to a carbon atom of a six-membered aromatic ring **[5]**

409/32 . the −O−O− group being bound between two 〉C=O groups **[5]**

409/34 . . both belonging to carboxylic acids **[5]**

409/36 . . . Diacetyl peroxide **[5]**

409/38 . the −O−O− group being bound between a 〉C=O group and a carbon atom, not further substituted by oxygen atoms, i.e. esters of peroxy acids **[5]**

409/40 . containing nitrogen atoms **[5]**

409/42 . containing sulfur atoms **[5]**

409/44 . . with sulfur atoms directly bound to the −O−O− groups, e.g. persulfonic acids **[5]**

C07D HETEROCYCLIC COMPOUNDS [2]

(1) This subclass does not cover compounds containing saccharide radicals (as defined in Note (3) following the title of subclass C07H), which are covered by subclass C07H. **[2]**

(2) In this subclass, in compounds containing a hetero ring covered by group C07D 295/00 and at least one other hetero ring, the hetero ring covered by group C07D 295/00 is considered as an acyclic chain containing nitrogen atoms. **[3]**

(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "hetero ring" is a ring having at least one halogen, nitrogen, oxygen, sulfur, selenium or tellurium atom as a ring member; **[2]**
- "bridged" means the presence of at least one fusion other than ortho, peri or spiro; **[2]**
- two rings are "condensed" if they share at least one ring member, i.e. "spiro" and "bridged" are considered as condensed; **[2]**
- "condensed ring system" is a ring system in which all rings are condensed among themselves; **[2]**
- "number of relevant rings" in a condensed ring system equals the number of scissions necessary to convert the ring system into one acyclic chain; **[2]**
- "relevant rings" in a condensed ring system, i.e. the rings which taken together describe all the links between every atom of the ring system, are chosen according to the following criteria consecutively:
  (a) lowest number of ring members;
  (b) highest number of hetero atoms as ring members;
  (c) lowest number of members shared with other rings;
  (d) last place in the classification scheme. **[2]**

(4) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07K and within these subclasses. **[8]**

(5) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

(6) In this subclass, in the absence of an indication to the contrary:

(a) compounds having only one hetero ring are classified in the last appropriate place in one of the groups C07D 203/00 to C07D 347/00. The same applies for compounds having more hetero rings covered by the same main group, neither condensed among themselves nor condensed with a common carbocyclic ring system; **[2]**

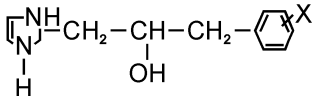
(b) compounds having two or more hetero rings covered by different main groups neither condensed among themselves nor condensed with a common carbocyclic ring system are classified in the last appropriate place in one of the groups C07D 401/00 to C07D 421/00; **[2]**

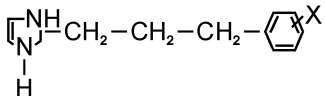
(c) compounds having two or more relevant hetero rings, covered by the same or by different main groups, which are condensed among themselves or condensed with a common carbocyclic ring system, are classified in the last appropriate place in one of the groups C07D 451/00 to C07D 519/00. **[2]**

(7) In this subclass:

– where a compound may exist in tautomeric forms, it is classified as though existing in the form which is classified last in the system. Therefore, double bonds between ring members and non-ring members and double bonds between ring members themselves are considered equivalent in determining the degree of hydrogenation of the ring. Formulae are considered to be written in Kekule form; **[2]**

– hydrocarbon radicals containing a carbocyclic ring and an acyclic chain by which it is linked to the hetero ring and being substituted on both the carbocyclic ring and the acyclic chain by hetero atoms or by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, are classified according to the substituents on the acyclic chain. For example, the compound

 is classified in group C07D 233/22, and the compound



is classified in groups C07D 233/24 and C07D 233/26, where X $-NH_2$, $-NHCOCH_3$, or $-COOCH_3$. **[2]**

Subclass index

Heterocyclic compounds having only nitrogen as ring hetero atom [2]

201/00 Preparation, separation, purification, or stabilisation of unsubstituted lactams [2]

201/02 . Preparation of lactams **[2]**
201/04 . . from or via oximes by Beckmann rearrangement **[2]**
201/06 . . . from ketones by simultaneous oxime formation and rearrangement **[2]**
201/08 . . from carboxylic acids or derivatives thereof, e.g. hydroxy carboxylic acids, lactones, nitriles **[2]**
201/10 . . from cycloaliphatic compounds by simultaneous nitrosylation and rearrangement **[2]**
201/12 . . by depolymerising polyamides **[2]**
201/14 . Preparation of salts or adducts of lactams **[2]**
201/16 . Separation or purification (separation of inorganic salts C01) **[2]**
201/18 . Stabilisation **[2]**

203/00 Heterocyclic compounds containing three-membered rings with one nitrogen atom as the only ring hetero atom [2]

203/02 . Preparation by ring-closure **[2]**
203/04 . not condensed with other rings **[2]**
203/06 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
203/08 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to the ring nitrogen atom **[2]**
203/10 . . . . Radicals substituted by singly bound oxygen atoms **[2]**
203/12 . . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[2]**
203/14 . . . . with carbocyclic rings directly attached to the ring nitrogen atom **[2]**
203/16 . . . with acylated ring nitrogen atoms **[2]**
203/18 . . . . by carboxylic acids, or by sulfur or nitrogen analogues thereof **[2]**
203/20 . . . . by carbonic acid, or by sulfur or nitrogen analogues thereof, e.g. carbamates **[2]**
203/22 . . . with hetero atoms directly attached to the ring nitrogen atom **[2]**
203/24 . . . . Sulfur atoms **[2]**
203/26 . condensed with carbocyclic rings or ring systems **[2]**

205/00 Heterocyclic compounds containing four-membered rings with one nitrogen atom as the only ring hetero atom [2]

205/02 . not condensed with other rings **[2]**
205/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
205/06 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
205/08 . . . with one oxygen atom directly attached in position 2, e.g. beta-lactams **[2]**
205/085 . . . . with a nitrogen atom directly attached in position 3 **[5]**
205/09 . . . . with a sulfur atom directly attached in position 4 **[5]**
205/095 . . . . . and with a nitrogen atom directly attached in position 3 **[5]**
205/10 . . having two double bonds between ring members or between ring members and non-ring members **[2]**
205/12 . condensed with carbocyclic rings or ring systems **[2]**

207/00 Heterocyclic compounds containing five-membered rings not condensed with other rings, with one nitrogen atom as the only ring hetero atom [2]

Note

Pyrrolidines having only hydrogen atoms attached to the ring carbon atoms are classified in group C07D 295/00. **[2]**

207/02 . with only hydrogen or carbon atoms directly attached to the ring nitrogen atom **[2]**
207/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
207/06 . . . with radicals, containing only hydrogen and carbon atoms, attached to ring carbon atoms **[2]**
207/08 . . . with hydrocarbon radicals, substituted by hetero atoms, attached to ring carbon atoms **[2]**
207/09 . . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[3]**
207/10 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
207/12 . . . . Oxygen or sulfur atoms **[2]**

207/14 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**
207/16 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
207/18 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
207/20 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
207/22 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
207/24 . . . . Oxygen or sulfur atoms **[2]**
207/26 . . . . . 2-Pyrrolidones **[2]**
207/263 . . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms directly attached to other ring carbon atoms **[3]**
207/267 . . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms directly attached to the ring nitrogen atom **[3]**
207/27 . . . . . with substituted hydrocarbon radicals directly attached to the ring nitrogen atom **[3]**
207/273 . . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to other ring carbon atoms **[3]**
207/277 . . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[3]**
207/28 . . . . . 2-Pyrrolidone-5- carboxylic acids; Functional derivatives thereof, e.g. esters, nitriles **[2,3]**
207/30 . . having two double bonds between ring members or between ring members and non-ring members **[2]**
207/32 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
207/323 . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms directly attached to the ring nitrogen atoms **[3]**
207/325 . . . . with substituted hydrocarbon radicals directly attached to the ring nitrogen atom **[3]**
207/327 . . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[3]**
207/33 . . . . with substituted hydrocarbon radicals, directly attached to ring carbon atoms **[3]**
207/333 . . . . . Radicals substituted by oxygen or sulfur atoms **[3]**
207/335 . . . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[3]**
207/337 . . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[3]**
207/34 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
207/36 . . . . Oxygen or sulfur atoms **[2]**
207/38 . . . . . 2-Pyrrolones **[2]**
207/40 . . . . . 2,5-Pyrrolidine-diones **[2]**
207/404 . . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms directly attached to other ring carbon atoms, e.g. succinimide **[3]**
207/408 . . . . . Radicals containing only hydrogen and carbon atoms attached to ring carbon atoms **[3]**
207/412 . . . . . Acyclic radicals containing more than six carbon atoms **[3]**
207/416 . . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to other ring carbon atoms **[3]**
207/42 . . . . Nitro radicals **[2]**
207/44 . . having three double bonds between ring members or between ring members and non-ring members **[2]**
207/444 . . . having two doubly-bound oxygen atoms directly attached in positions 2 and 5 **[3]**
207/448 . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms directly attached to other ring carbon atoms, e.g. maleimide **[3]**
207/452 . . . . . with hydrocarbon radicals, substituted by hetero atoms, directly attached to the ring nitrogen atom **[3]**
207/456 . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to other ring carbon atoms **[3]**
207/46 . with hetero atoms directly attached to the ring nitrogen atom **[2]**
207/48 . . Sulfur atoms **[2]**
207/50 . . Nitrogen atoms **[2]**

209/00 Heterocyclic compounds containing five-membered rings, condensed with other rings, with one nitrogen atom as the only ring hetero atom [2]

209/02 . condensed with one carbocyclic ring **[2]**
209/04 . . Indoles; Hydrogenated indoles **[2]**
209/06 . . . Preparation of indole from coal-tar **[2]**
209/08 . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to carbon atoms of the hetero ring **[2]**
209/10 . . . with substituted hydrocarbon radicals attached to carbon atoms of the hetero ring **[2]**
209/12 . . . . Radicals substituted by oxygen atoms **[2]**
209/14 . . . . Radicals substituted by nitrogen atoms, not forming part of a nitro radical **[2]**
209/16 . . . . . Tryptamines **[2]**

209/18 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**

209/20 . . . . . substituted additionally by nitrogen atoms, e.g. tryptophane **[2]**

209/22 . . . . . with an aralkyl radical attached to the ring nitrogen atom **[2]**

209/24 . . . . . with an alkyl or cycloalkyl radical attached to the ring nitrogen atom **[2]**

209/26 . . . . . with an acyl radical attached to the ring nitrogen atom **[2]**

209/28 . . . . . 1-(4-Chlorobenzoyl)-2-methyl-indolyl-3-acetic acid, substituted in position 5 by an oxygen or nitrogen atom; Esters thereof **[2]**

209/30 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, directly attached to carbon atoms of the hetero ring **[2]**

209/32 . . . . Oxygen atoms **[2]**

209/34 . . . . . in position 2 **[2]**

209/36 . . . . . in position 3, e.g. adrenochrome **[2]**

209/38 . . . . . in positions 2 and 3, e.g. isatin **[2]**

209/40 . . . . Nitrogen atoms, not forming part of a nitro radical, e.g. isatin semicarbazone **[2]**

209/42 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**

209/43 . . . with an $-OCH_2CH(OH)CH_2NH_2$ radical, which may be further substituted, attached in positions 4, 5, 6 or 7 **[5]**

209/44 . . Iso-indoles; Hydrogenated iso-indoles **[2]**

209/46 . . . with an oxygen atom in position 1 **[2]**

209/48 . . . with oxygen atoms in positions 1 and 3, e.g. phthalimide **[2]**

209/49 . . . . and having in the molecule an acyl radical containing a saturated three-membered ring, e.g. chrysanthemumic acid esters **[5]**

209/50 . . . with oxygen and nitrogen atoms in positions 1 and 3 **[2]**

209/52 . . condensed with a ring other than six-membered **[2]**

209/54 . . Spiro-condensed **[2]**

209/56 . Ring systems containing three or more rings **[2]**

209/58 . . [b]- or [c]-condensed **[2]**

209/60 . . . Naphtho [b] pyrroles; Hydrogenated naphtho [b] pyrroles **[2]**

209/62 . . . Naphtho [c] pyrroles; Hydrogenated naphtho [c] pyrroles **[2]**

209/64 . . . . with an oxygen atom in position 1 **[2]**

209/66 . . . . with oxygen atoms in positions 1 and 3 **[2]**

209/68 . . . . with oxygen and nitrogen atoms in positions 1 and 3 **[2]**

209/70 . . . containing carbocyclic rings other than six-membered **[2]**

209/72 . . . 4,7-Endo-alkylene-iso-indoles **[2]**

209/74 . . . . with an oxygen atom in position 1 **[2]**

209/76 . . . . with oxygen atoms in positions 1 and 3 **[2]**

209/78 . . . . with oxygen and nitrogen atoms in positions 1 and 3 **[2]**

209/80 . . [b, c]- or [b, d]-condensed **[2]**

209/82 . . . Carbazoles; Hydrogenated carbazoles **[2]**

209/84 . . . . Separation, e.g. from tar; Purification **[2]**

209/86 . . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to carbon atoms of the ring system **[2]**

209/88 . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to carbon atoms of the ring system **[2]**

209/90 . . . Benzo [c, d] indoles; Hydrogenated benzo [c, d] indoles **[2]**

209/92 . . . . Naphthostyrils **[2]**

209/94 . . . containing carbocyclic rings other than six-membered **[4]**

209/96 . . Spiro-condensed ring systems **[2]**

211/00 Heterocyclic compounds containing hydrogenated pyridine rings, not condensed with other rings [2]

(1) In this group, the following term is used with the meaning indicated:
– "hydrogenated" means having less than three double bonds between ring members or between ring members and non-ring members. **[2]**

(2) Piperidines having only hydrogen atoms attached to ring carbon atoms are classified in group C07D 295/00. **[2]**

211/02 . Preparation by ring-closure or hydrogenation **[2]**

211/04 . with only hydrogen or carbon atoms directly attached to the ring nitrogen atom **[2]**

211/06 . . having no double bonds between ring members or between ring members and non-ring members **[2]**

211/08 . . . with hydrocarbon or substituted hydrocarbon radicals directly attached to ring carbon atoms **[2,3]**

211/10 . . . . with radicals containing only carbon and hydrogen atoms attached to ring carbon atoms **[2,3]**

211/12 . . . . . with only hydrogen atoms attached to the ring nitrogen atom **[2,3]**

211/14 . . . . . with hydrocarbon or substituted hydrocarbon radicals attached to the ring nitrogen atom **[2]**

211/16 . . . . . with acylated ring nitrogen atom **[2]**

211/18 . . . . with substituted hydrocarbon radicals attached to ring carbon atoms **[2]**

211/20 . . . . . with hydrocarbon radicals, substituted by singly bound oxygen or sulfur atoms (bound to the same carbon atom C07D 211/30) **[2]**

211/22 . . . . . by oxygen atoms **[2]**

211/24 . . . . . by sulfur atoms to which a second hetero atom is attached **[2]**

211/26 . . . . . with hydrocarbon radicals, substituted by nitrogen atoms **[2]**

211/28 . . . . . to which a second hetero atom is attached **[2]**

211/30 . . . . . with hydrocarbon radicals, substituted by doubly bound oxygen or sulfur atoms or by two oxygen or sulfur atoms singly bound to the same carbon atom **[2]**

211/32 . . . . . by oxygen atoms **[2]**

211/34 . . . . . with hydrocarbon radicals, substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**

211/36 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
211/38 . . . . Halogen atoms or nitro radicals **[2]**
211/40 . . . . Oxygen atoms **[2]**
211/42 . . . . . attached in position 3 or 5 **[2]**
211/44 . . . . . attached in position 4 **[2]**
211/46 . . . . . having a hydrogen atom as the second substituent in position 4 **[2]**
211/48 . . . . . having an acyclic carbon atom attached in position 4 **[2]**
211/50 . . . . . Aroyl radical **[2]**
211/52 . . . . . having an aryl radical as the second substituent in position 4 **[2]**
211/54 . . . . Sulfur atoms **[2]**
211/56 . . . . Nitrogen atoms (nitro radicals C07D 211/38) **[2]**
211/58 . . . . . attached in position 4 **[2]**
211/60 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
211/62 . . . . . attached in position 4 **[2]**
211/64 . . . . . having an aryl radical as the second substituent in position 4 **[2]**
211/66 . . . . . having a hetero atom as the second substituent in position 4 **[2]**
211/68 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
211/70 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
211/72 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms, with at the most one bond to halogen, directly attached to ring carbon atoms **[2]**
211/74 . . . . Oxygen atoms **[2]**
211/76 . . . . . attached in position 2 or 6 **[2]**
211/78 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
211/80 . . having two double bonds between ring members or between ring members and non-ring members **[2]**
211/82 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
211/84 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, directly attached to ring carbon atoms **[2]**
211/86 . . . . Oxygen atoms **[2]**
211/88 . . . . . attached in positions 2 and 6, e.g. glutarimide **[2]**
211/90 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
211/92 . with a hetero atom directly attached to the ring nitrogen atom **[2]**
211/94 . . Oxygen atom, e.g. piperidine N-oxide **[2]**
211/96 . . Sulfur atom **[2]**
211/98 . . Nitrogen atom **[2]**

213/00 Heterocyclic compounds containing six-membered rings, not condensed with other rings, with one nitrogen atom as the only ring hetero atom and three or more double bonds between ring members or between ring members and non-ring members [2]

213/02 . having three double bonds between ring members or between ring members and non-ring members **[2]**
213/04 . . having no bond between the ring nitrogen atom and a non-ring member or having only hydrogen or carbon atoms directly attached to the ring nitrogen atom **[2]**
213/06 . . . containing only hydrogen and carbon atoms in addition to the ring nitrogen atom **[2]**
213/08 . . . . Preparation by ring-closure **[2]**
213/09 . . . . . involving the use of ammonia, amines, amine salts, or nitriles **[3]**
213/10 . . . . . from acetaldehyde or cyclic polymers thereof **[3]**
213/12 . . . . . from unsaturated compounds **[3]**
213/127 . . . . Preparation from compounds containing pyridine rings **[3]**
213/133 . . . . Preparation by dehydrogenation of hydrogenated pyridine compounds **[3]**
213/14 . . . . Preparation from compounds containing heterocyclic oxygen **[2]**
213/16 . . . . containing only one pyridine ring **[2]**
213/18 . . . . . Salts thereof **[2]**
213/20 . . . . . Quaternary compounds thereof **[2]**
213/22 . . . . containing two or more pyridine rings directly linked together, e.g. bipyridyl **[2]**
213/24 . . . with substituted hydrocarbon radicals attached to ring carbon atoms **[2]**
213/26 . . . . Radicals substituted by halogen atoms or nitro radicals **[2]**
213/28 . . . . Radicals substituted by singly-bound oxygen or sulfur atoms (bound to the same carbon atom C07D 213/44) **[2]**
213/30 . . . . . Oxygen atoms **[2]**
213/32 . . . . . Sulfur atoms **[2]**
213/34 . . . . . to which a second hetero atom is attached **[2]**
213/36 . . . . Radicals substituted by singly-bound nitrogen atoms (nitro radicals C07D 213/26) **[2]**
213/38 . . . . . having only hydrogen or hydrocarbon radicals attached to the substituent nitrogen atom **[2]**
213/40 . . . . . Acylated substituent nitrogen atom **[2]**
213/42 . . . . . having hetero atoms attached to the substituent nitrogen atom (nitro radicals C07D 213/26) **[2]**
213/44 . . . . Radicals substituted by doubly-bound oxygen, sulfur, or nitrogen atoms, or by two such atoms singly-bound to the same carbon atom **[2]**
213/46 . . . . . Oxygen atoms **[2]**
213/48 . . . . . Aldehydo radicals **[2]**
213/50 . . . . . Ketonic radicals **[2]**
213/51 . . . . . Acetal radicals **[2]**
213/52 . . . . . Sulfur atoms **[2]**
213/53 . . . . . Nitrogen atoms **[2]**
213/54 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
213/55 . . . . . Acids; Esters **[2]**

213/56 . . . . . Amides **[2]**
213/57 . . . . . Nitriles **[2]**
213/58 . . . . . Amidines **[2]**
213/59 . . . . . with at least one of the bonds being to sulfur **[2]**
213/60 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
213/61 . . . . Halogen atoms or nitro radicals **[2]**
213/62 . . . . Oxygen or sulfur atoms **[2]**
213/63 . . . . . One oxygen atom **[2]**
213/64 . . . . . attached in position 2 or 6 **[2]**
213/643 . . . . . 2-Phenoxypyridines; Derivatives thereof **[5]**
213/647 . . . . . and having in the molecule an acyl radical containing a saturated three-membered ring, e.g. chrysanthemumic acid esters **[5]**
213/65 . . . . . attached in position 3 or 5 **[2]**
213/66 . . . . . having in position 3 an oxygen atom and in each of the positions 4 and 5 a carbon atom bound to an oxygen, sulfur, or nitrogen atom, e.g. pyridoxal **[2]**
213/67 . . . . . 2-Methyl-3-hydroxy-4,5-bis (hydroxy-methyl) pyridine, i.e. pyridoxine **[2]**
213/68 . . . . . attached in position 4 **[2]**
213/69 . . . . . Two or more oxygen atoms **[2]**
213/70 . . . . . Sulfur atoms **[4]**
213/71 . . . . . to which a second hetero atom is attached **[4]**
213/72 . . . . Nitrogen atoms (nitro radicals C07D 213/61) **[2]**
213/73 . . . . . Unsubstituted amino or imino radicals **[2]**
213/74 . . . . . Amino or imino radicals substituted by hydrocarbon or substituted hydrocarbon radicals **[2]**
213/75 . . . . . Amino or imino radicals, acylated by carboxylic or carbonic acids, or by sulfur or nitrogen analogues thereof, e.g. carbamates **[2]**
213/76 . . . . . to which a second hetero atom is attached (nitro radicals C07D 213/61) **[2]**
213/77 . . . . . Hydrazine radicals **[2]**
213/78 . . . . Carbon atoms having three bonds to hetero atoms, with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
213/79 . . . . . Acids; Esters **[2]**
213/80 . . . . . in position 3 **[2]**
213/803 . . . . . Processes of preparation **[3]**
213/807 . . . . . by oxidation of pyridines or condensed pyridines **[3]**
213/81 . . . . . Amides; Imides **[2]**
213/82 . . . . . in position 3 **[2]**
213/83 . . . . . Thioacids; Thioesters; Thioamides; Thioimides **[2]**
213/84 . . . . . Nitriles **[2]**
213/85 . . . . . in position 3 **[2]**
213/86 . . . . . Hydrazides; Thio or imino analogues thereof **[2]**
213/87 . . . . . in position 3 **[2]**
213/88 . . . . . Nicotinoylhydrazones **[2]**
213/89 . . with hetero atoms directly attached to the ring nitrogen atom **[2]**
213/90 . having more than three double bonds between ring members or between ring members and non-ring members **[2]**

215/00 Heterocyclic compounds containing quinoline or hydrogenated quinoline ring systems [2]

215/02 . having no bond between the ring nitrogen atom and a non-ring member or having only hydrogen atoms or carbon atoms directly attached to the ring nitrogen atom **[2]**
215/04 . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to the ring carbon atoms **[2]**
215/06 . . . having only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, attached to the ring nitrogen atom **[2]**
215/08 . . . with acylated ring nitrogen atom **[2]**
215/10 . . . Quaternary compounds **[2]**
215/12 . . with substituted hydrocarbon radicals attached to ring carbon atoms **[2]**
215/14 . . . Radicals substituted by oxygen atoms **[2]**
215/16 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
215/18 . . . Halogen atoms or nitro radicals **[2]**
215/20 . . . Oxygen atoms (quinophthalones C09B 25/00) **[2]**
215/22 . . . . attached in position 2 or 4 **[2]**
215/227 . . . . . only one oxygen atom which is attached in position 2 **[5]**
215/233 . . . . . only one oxygen atom which is attached in position 4 **[5]**
215/24 . . . . attached in position 8 **[2]**
215/26 . . . . . Alcohols; Ethers thereof **[2]**
215/28 . . . . . with halogen atoms or nitro radicals in positions 5, 6 or 7 **[2]**
215/30 . . . . . Metal salts; Chelates **[2]**
215/32 . . . . . Esters **[2]**
215/34 . . . . . Carbamates **[2]**
215/36 . . . Sulfur atoms (C07D 215/24 takes precedence) **[2]**
215/38 . . . Nitrogen atoms (nitro radicals C07D 215/18) **[2]**
215/40 . . . . attached in position 8 **[2]**
215/42 . . . . attached in position 4 **[2]**
215/44 . . . . . with aryl radicals attached to said nitrogen atoms **[2]**
215/46 . . . . . with hydrocarbon radicals, substituted by nitrogen atoms, attached to said nitrogen atoms **[2]**
215/48 . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
215/50 . . . . attached in position 4 **[2]**
215/52 . . . . . with aryl radicals attached in position 2 **[2]**
215/54 . . . . attached in position 3 **[2]**
215/56 . . . . . with oxygen atoms in position 4 **[2]**
215/58 . with hetero atoms directly attached to the ring nitrogen atom **[2]**
215/60 . . N-oxides **[2]**

217/00 Heterocyclic compounds containing isoquinoline or hydrogenated isoquinoline ring systems [2]

217/02 . with only hydrogen atoms or radicals containing only carbon and hydrogen atoms, directly attached to carbon atoms of the nitrogen-containing ring; Alkylene-bis-isoquinolines **[2]**
217/04 . . with hydrocarbon or substituted hydrocarbon radicals attached to the ring nitrogen atom **[2]**
217/06 . . with the ring nitrogen atom acylated by carboxylic or carbonic acids, or with sulfur or nitrogen analogues thereof, e.g. carbamates **[2]**
217/08 . . with a hetero atom directly attached to the ring nitrogen atom **[2]**
217/10 . . Quaternary compounds **[2]**
217/12 . with radicals, substituted by hetero atoms, attached to carbon atoms of the nitrogen-containing ring **[2]**
217/14 . . other than aralkyl radicals **[2]**
217/16 . . . substituted by oxygen atoms **[2]**
217/18 . . Aralkyl radicals **[2]**
217/20 . . . with oxygen atoms directly attached to the aromatic ring of said aralkyl radical, e.g. papaverine **[2]**
217/22 . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to carbon atoms of the nitrogen-containing ring **[2]**
217/24 . . Oxygen atoms **[2]**
217/26 . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**

219/00 Heterocyclic compounds containing acridine or hydrogenated acridine ring systems [2]

219/02 . with only hydrogen, hydrocarbon or substituted hydrocarbon radicals, directly attached to carbon atoms of the ring system **[2]**
219/04 . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to carbon atoms of the ring system **[2]**
219/06 . . Oxygen atoms **[2]**
219/08 . . Nitrogen atoms (acridine dyes C09B 15/00) **[2]**
219/10 . . . attached in position 9 **[2]**
219/12 . . . . Aminoalkyl-amino radicals attached in position 9 **[2]**
219/14 . with hydrocarbon radicals, substituted by nitrogen atoms, attached to the ring nitrogen atom **[2]**
219/16 . with acyl radicals, substituted by nitrogen atoms, attached to the ring nitrogen atom **[2]**

221/00 Heterocyclic compounds containing six-membered rings having one nitrogen atom as the only ring hetero atom, not provided for by groups C07D 211/00 to C07D 219/00 [2]

221/02 . condensed with carbocyclic rings or ring systems **[2]**
221/04 . . Ortho- or peri-condensed ring systems **[2]**
221/06 . . . Ring systems of three rings **[2]**
221/08 . . . . Aza-anthracenes (acridine C07D 219/00) **[2]**
221/10 . . . . Aza-phenanthrenes **[2]**
221/12 . . . . . Phenanthridines **[2]**
221/14 . . . . Aza-phenalenes, e.g. 1,8-naphthalimide **[2]**
221/16 . . . . containing carbocyclic rings other than six-membered **[2]**
221/18 . . . Ring systems of four or more rings **[2]**
221/20 . . Spiro-condensed ring systems **[2]**
221/22 . . Bridged ring systems **[2]**
221/24 . . . Camphidines **[2]**
221/26 . . . Benzomorphans **[2]**
221/28 . . . Morphinans **[2]**

223/00 Heterocyclic compounds containing seven-membered rings having one nitrogen atom as the only ring hetero atom [2]

Note

Hexamethylene imines or 3-azabicyclo [3.2.2] nonanes, having only hydrogen atoms attached to the ring carbon atoms, are classified in group C07D 295/00. **[2]**

223/02 . not condensed with other rings **[2]**
223/04 . . with only hydrogen atoms, halogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
223/06 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms (halogen atoms C07D 223/04) **[2]**
223/08 . . . Oxygen atoms **[2]**
223/10 . . . . attached in position 2 **[2]**
223/12 . . . Nitrogen atoms not forming part of a nitro radical **[2]**
223/14 . condensed with carbocyclic rings or ring systems **[2]**
223/16 . . Benzazepines; Hydrogenated benzazepines **[2]**
223/18 . . Dibenzazepines; Hydrogenated dibenzazepines **[2]**
223/20 . . . Dibenz [b, e] azepines; Hydrogenated dibenz [b, e] azepines **[2]**
223/22 . . . Dibenz [b, f] azepines; Hydrogenated dibenz [b, f] azepines **[2]**
223/24 . . . . with hydrocarbon radicals, substituted by nitrogen atoms, attached to the ring nitrogen atom **[2]**
223/26 . . . . . having a double bond between positions 10 and 11 **[2]**
223/28 . . . . . having a single bond between positions 10 and 11 **[2]**
223/30 . . . . with hetero atoms directly attached to the ring nitrogen atom **[2]**
223/32 . . containing carbocyclic rings other than six-membered **[2]**

225/00 Heterocyclic compounds containing rings of more than seven members having one nitrogen atom as the only ring hetero atom [2]

Note

Polymethyleneimines with at least five ring members and having only hydrogen atoms attached to the ring carbon atoms are classified in group C07D 295/00. **[3]**

225/02 . not condensed with other rings **[2]**
225/04 . condensed with carbocyclic rings or ring systems **[2]**
225/06 . . condensed with one six-membered ring **[2]**
225/08 . . condensed with two six-membered rings **[2]**

227/00 Heterocyclic compounds containing rings having one nitrogen atom as the only ring hetero atom, according to more than one of groups C07D 203/00 to C07D 225/00 [2]

Note

Polymethyleneimines with at least five ring members and having only hydrogen atoms attached to the ring carbon atoms are classified in group C07D 295/00. **[3]**

227/02 . with only hydrogen or carbon atoms directly attached to the ring nitrogen atom **[2]**
227/04 . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, attached to ring carbon atoms **[2]**
227/06 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
227/08 . . . Oxygen atoms **[2]**
227/087 . . . . One doubly-bound oxygen atom in position 2, e.g. lactams **[3]**
227/093 . . . . Two doubly-bound oxygen atoms attached to the carbon atoms adjacent to the ring nitrogen atom, e.g. dicarboxylic acid imides **[3]**
227/10 . . . Nitrogen atoms not forming part of a nitro radical **[2]**
227/12 . with hetero atoms directly attached to the ring nitrogen atom **[2]**

229/00 Heterocyclic compounds containing rings of less than five members having two nitrogen atoms as the only ring hetero atoms [2]

229/02 . containing three-membered rings **[3]**

231/00 Heterocyclic compounds containing 1,2-diazole or hydrogenated 1,2-diazole rings [2]

231/02 . not condensed with other rings **[2]**
231/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
231/06 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
231/08 . . . with oxygen or sulfur atoms directly attached to ring carbon atoms **[2]**
231/10 . . having two or three double bonds between ring members or between ring members and non-ring members **[2]**
231/12 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
231/14 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
231/16 . . . . Halogen atoms or nitro radicals **[2]**
231/18 . . . . One oxygen or sulfur atom **[2]**
231/20 . . . . . One oxygen atom attached in position 3 or 5 **[2]**
231/22 . . . . . with aryl radicals attached to ring nitrogen atoms **[2]**
231/24 . . . . . having sulfone or sulfonic acid radicals in the molecule **[2]**
231/26 . . . . . 1-Phenyl-3-methyl-5- pyrazolones, unsubstituted or substituted on the phenyl ring **[2]**
231/28 . . . . Two oxygen or sulfur atoms **[2]**
231/30 . . . . . attached in position 3 and 5 **[2]**
231/32 . . . . . Oxygen atoms **[2]**
231/34 . . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, attached in position 4 **[2]**
231/36 . . . . . with hydrocarbon radicals, substituted by hetero atoms, attached in position 4 **[2]**
231/38 . . . . Nitrogen atoms (nitro radicals C07D 231/16) **[2]**
231/40 . . . . . Acylated on said nitrogen atom **[2]**
231/42 . . . . . Benzene-sulfonamido pyrazoles **[2]**
231/44 . . . . Oxygen and nitrogen or sulfur and nitrogen atoms **[2]**
231/46 . . . . . Oxygen atom in position 3 or 5 and nitrogen atom in position 4 **[2]**
231/48 . . . . . with hydrocarbon radicals attached to said nitrogen atom **[2]**
231/50 . . . . . Acylated on said nitrogen atom **[2]**
231/52 . . . . . Oxygen atom in position 3 and nitrogen atom in position 5, or vice-versa **[2]**
231/54 . condensed with carbocyclic rings or ring systems **[2]**
231/56 . . Benzopyrazoles; Hydrogenated benzopyrazoles **[2]**

233/00 Heterocyclic compounds containing 1,3-diazole or hydrogenated 1,3-diazole rings, not condensed with other rings [2]

233/02 . having no double bonds between ring members or between ring members and non-ring members **[2]**
233/04 . having one double bond between ring members or between a ring member and a non-ring member **[2]**
233/06 . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to ring carbon atoms **[2]**
233/08 . . . with alkyl radicals, containing more than four carbon atoms, directly attached to ring carbon atoms **[2]**
233/10 . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to ring nitrogen atoms **[2]**
233/12 . . . . with substituted hydrocarbon radicals attached to ring nitrogen atoms **[2]**
233/14 . . . . . Radicals substituted by oxygen atoms **[2]**
233/16 . . . . . Radicals substituted by nitrogen atoms **[2]**
233/18 . . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
233/20 . . with substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
233/22 . . . Radicals substituted by oxygen atoms **[2]**
233/24 . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[2]**
233/26 . . . Radicals substituted by carbon atoms having three bonds to hetero atoms **[2]**
233/28 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
233/30 . . . Oxygen or sulfur atoms **[2]**
233/32 . . . . One oxygen atom **[2]**
233/34 . . . . . Ethylene-urea **[2]**
233/36 . . . . . with hydrocarbon radicals, substituted by nitrogen atoms, attached to ring nitrogen atoms **[2]**
233/38 . . . . . with acyl radicals or hetero atoms directly attached to ring nitrogen atoms **[2]**

233/40 . . . . Two or more oxygen atoms **[2]**
233/42 . . . . Sulfur atoms **[2]**
233/44 . . . Nitrogen atoms not forming part of a nitro radical **[2]**
233/46 . . . . with only hydrogen atoms attached to said nitrogen atoms **[2]**
233/48 . . . . with acyclic hydrocarbon or substituted acyclic hydrocarbon radicals, attached to said nitrogen atoms **[2]**
233/50 . . . . with carbocyclic radicals directly attached to said nitrogen atoms **[2]**
233/52 . . . . with hetero atoms directly attached to said nitrogen atoms **[2]**
233/54 . having two double bonds between ring members or between ring members and non-ring members **[2]**
233/56 . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, attached to ring carbon atoms **[2]**
233/58 . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, attached to ring nitrogen atoms **[2]**
233/60 . . . with hydrocarbon radicals, substituted by oxygen or sulfur atoms, attached to ring nitrogen atoms **[2]**
233/61 . . . with hydrocarbon radicals, substituted by nitrogen atoms not forming part of a nitro radical, attached to ring nitrogen atoms **[3]**
233/62 . . . with triarylmethyl radicals attached to ring nitrogen atoms (triarylmethane dyes C09B 11/26) **[2]**
233/64 . . with substituted hydrocarbon radicals attached to ring carbon atoms, e.g. histidine **[2]**
233/66 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
233/68 . . . Halogen atoms **[2]**
233/70 . . . One oxygen atom **[2]**
233/72 . . . Two oxygen atoms, e.g. hydantoin **[2]**
233/74 . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, attached to other ring members **[2]**
233/76 . . . . with substituted hydrocarbon radicals attached to the third ring carbon atom **[2]**
233/78 . . . . . Radicals substituted by oxygen atoms **[2]**
233/80 . . . . with hetero atoms or acyl radicals directly attached to ring nitrogen atoms **[2]**
233/82 . . . . . Halogen atoms **[2]**
233/84 . . . Sulfur atoms **[2]**
233/86 . . . Oxygen and sulfur atoms, e.g. thiohydantoin **[2]**
233/88 . . . Nitrogen atoms, e.g. allantoin (nitro radicals C07D 233/91) **[2]**
233/90 . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
233/91 . . . Nitro radicals **[2]**
233/92 . . . . attached in position 4 or 5 **[2]**
233/93 . . . . . with hydrocarbon radicals, substituted by halogen atoms, attached to other ring members **[2]**
233/94 . . . . . with hydrocarbon radicals, substituted by oxygen or sulfur atoms, attached to other ring members **[2]**
233/95 . . . . . with hydrocarbon radicals, substituted by nitrogen atoms, attached to other ring members **[2]**
233/96 . having three double bonds between ring members or between ring members and non-ring members **[2]**

235/00 Heterocyclic compounds containing 1,3-diazole or hydrogenated 1,3-diazole rings, condensed with other rings [2]

235/02 . condensed with carbocyclic rings or ring systems **[2]**
235/04 . . Benzimidazoles; Hydrogenated benzimidazoles **[2]**
235/06 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached in position 2 **[2]**
235/08 . . . . Radicals containing only hydrogen and carbon atoms **[2]**
235/10 . . . . Radicals substituted by halogen atoms or nitro radicals **[2]**
235/12 . . . . Radicals substituted by oxygen atoms **[2]**
235/14 . . . . Radicals substituted by nitrogen atoms (by nitro radicals C07D 235/10) **[2]**
235/16 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
235/18 . . . with aryl radicals directly attached in position 2 **[2]**
235/20 . . . Two benzimidazolyl-2 radicals linked together directly or via a hydrocarbon or substituted hydrocarbon radical **[2]**
235/22 . . . with hetero atoms directly attached to ring nitrogen atoms (C07D 235/10 takes precedence) **[2]**
235/24 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 2 **[2]**
235/26 . . . . Oxygen atoms **[2]**
235/28 . . . . Sulfur atoms **[2]**
235/30 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**
235/32 . . . . . Benzimidazole-2-carbamic acids, unsubstituted or substituted; Esters thereof; Thio-analogues thereof **[2]**

237/00 Heterocyclic compounds containing 1,2-diazine or hydrogenated 1,2-diazine rings [2]

237/02 . not condensed with other rings **[2]**
237/04 . . having less than three double bonds between ring members or between ring members and non-ring members **[2]**
237/06 . . having three double bonds between ring members or between ring members and non-ring members **[2]**
237/08 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
237/10 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
237/12 . . . . Halogen atoms or nitro radicals **[2]**
237/14 . . . . Oxygen atoms **[2]**
237/16 . . . . . Two oxygen atoms **[2]**
237/18 . . . . Sulfur atoms **[2]**

237/20 . . . . Nitrogen atoms (nitro radicals C07D 237/12) **[2]**
237/22 . . . . Nitrogen and oxygen atoms **[2]**
237/24 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
237/26 . condensed with carbocyclic rings or ring systems **[2]**
237/28 . . Cinnolines **[2]**
237/30 . . Phthalazines **[2]**
237/32 . . . with oxygen atoms directly attached to carbon atoms of the nitrogen-containing ring **[2]**
237/34 . . . with nitrogen atoms directly attached to carbon atoms of the nitrogen-containing ring, e.g. hydrazine radicals **[2]**
237/36 . . Benzo-cinnolines **[2]**

239/00 Heterocyclic compounds containing 1,3-diazine or hydrogenated 1,3-diazine rings [2]

239/02 . not condensed with other rings **[2]**
239/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
239/06 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
239/08 . . . with hetero atoms directly attached in position 2 **[2]**
239/10 . . . . Oxygen or sulfur atoms **[2]**
239/12 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**
239/14 . . . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, attached to said nitrogen atoms **[2]**
239/16 . . . . . acylated on said nitrogen atoms **[2]**
239/18 . . . . . with hetero atoms attached to said nitrogen atoms, except nitro radicals, e.g. hydrazine radicals **[2]**
239/20 . . having two double bonds between ring members or between ring members and non-ring members **[2]**
239/22 . . . with hetero atoms directly attached to ring carbon atoms **[2]**
239/24 . . having three or more double bonds between ring members or between ring members and non-ring members **[2]**
239/26 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
239/28 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, directly attached to ring carbon atoms **[2]**
239/30 . . . . Halogen atoms or nitro radicals **[2]**
239/32 . . . . One oxygen, sulfur or nitrogen atom **[2]**
239/34 . . . . . One oxygen atom **[2]**
239/36 . . . . . as doubly bound oxygen atom or as unsubstituted hydroxy radical **[2]**
239/38 . . . . . One sulfur atom **[2]**
239/40 . . . . . as doubly bound sulfur atom or as unsubstituted mercapto radical **[2]**
239/42 . . . . . One nitrogen atom (nitro radicals C07D 239/30; benzenesulfonamido-pyrimidines C07D 239/69) **[2]**
239/46 . . . . Two or more oxygen, sulfur or nitrogen atoms (benzenesulfonamido- pyrimidines C07D 239/69) **[2]**
239/47 . . . . . One nitrogen atom and one oxygen or sulfur atom, e.g. cytosine **[3]**
239/48 . . . . . Two nitrogen atoms **[2]**
239/49 . . . . . with an aralkyl radical, or substituted aralkyl radical, attached in position 5, e.g. trimethoprim **[3]**
239/50 . . . . . Three nitrogen atoms **[2]**
239/52 . . . . . Two oxygen atoms **[2]**
239/54 . . . . . as doubly bound oxygen atoms or as unsubstituted hydroxy radicals **[2]**
239/545 . . . . . with other hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, directly attached to ring carbon atoms **[5]**
239/553 . . . . . with halogen atoms or nitro radicals directly attached to ring carbon atoms, e.g. fluorouracil **[5]**
239/557 . . . . . with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, directly attached to ring carbon atoms, e.g. orotic acid **[5]**
239/56 . . . . . One oxygen atom and one sulfur atom **[2]**
239/58 . . . . . Two sulfur atoms **[2]**
239/60 . . . . . Three or more oxygen or sulfur atoms **[2]**
239/62 . . . . . Barbituric acids **[2]**
239/64 . . . . . Salts of organic bases; Organic double compounds **[2]**
239/66 . . . . . Thiobarbituric acids **[2]**
239/68 . . . . . Salts of organic bases; Organic double compounds **[2]**
239/69 . . . . Benzenesulfonamido-pyrimidines **[3]**
239/70 . condensed with carbocyclic rings or ring systems **[2]**
239/72 . . Quinazolines; Hydrogenated quinazolines **[2]**
239/74 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, attached to ring carbon atoms of the hetero ring **[2]**
239/76 . . . . N-oxides **[2]**
239/78 . . . with hetero atoms directly attached in position 2 **[2]**
239/80 . . . . Oxygen atoms **[2]**
239/82 . . . . . with an aryl radical attached in position 4 **[2]**
239/84 . . . . Nitrogen atoms **[2]**
239/86 . . . with hetero atoms directly attached in position 4 **[2]**
239/88 . . . . Oxygen atoms **[2]**
239/90 . . . . . with acyclic radicals attached in position 2 or 3 **[2]**
239/91 . . . . . with aryl or aralkyl radicals attached in position 2 or 3 **[2]**
239/92 . . . . . with hetero atoms directly attached to nitrogen atoms of the hetero ring **[2]**
239/93 . . . . Sulfur atoms **[2]**
239/94 . . . . Nitrogen atoms **[2]**
239/95 . . . with hetero atoms directly attached in positions 2 and 4 **[2]**
239/96 . . . . Two oxygen atoms **[2]**

241/00 Heterocyclic compounds containing 1,4-diazine or hydrogenated 1,4-diazine rings [2]

Note

Piperazines with only hydrogen atoms directly attached to ring carbon atoms are classified in group C07D 295/00. **[2]**

241/02 . not condensed with other rings **[2]**
241/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
241/06 . . having one or two double bonds between ring members or between ring members and non-ring members **[2]**
241/08 . . . with oxygen atoms directly attached to ring carbon atoms **[2]**
241/10 . . having three double bonds between ring members or between ring members and non-ring members **[2]**
241/12 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
241/14 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
241/16 . . . . Halogen atoms; Nitro radicals **[2]**
241/18 . . . . Oxygen or sulfur atoms **[2]**
241/20 . . . . Nitrogen atoms (nitro radicals C07D 241/16) **[2]**
241/22 . . . . . Benzenesulfonamido pyrazines **[2]**
241/24 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
241/26 . . . . . with nitrogen atoms directly attached to ring carbon atoms **[2]**
241/28 . . . . . in which said hetero-bound carbon atoms have double bonds to oxygen, sulfur or nitrogen atoms **[2,5]**
241/30 . . . . . in which said hetero-bound carbon atoms are part of a substructure −C(=X)−X−C(=X)−X− in which X is an oxygen or sulfur atom or an imino radical, e.g. imidoylguanidines **[2,5]**
241/32 . . . . . (Amino-pyrazinoyl) guanidines **[2,5]**
241/34 . . . . . (Amino-pyrazine carbonamido) guanidines **[2,5]**
241/36 . condensed with carbocyclic rings or ring systems **[2]**
241/38 . . with only hydrogen or carbon atoms directly attached to the ring nitrogen atoms **[2]**
241/40 . . . Benzopyrazines **[2]**
241/42 . . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to carbon atoms of the hetero ring **[2]**
241/44 . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to carbon atoms of the hetero ring **[2]**
241/46 . . . Phenazines **[2]**
241/48 . . . . with hydrocarbon radicals, substituted by nitrogen atoms, directly attached to the ring nitrogen atoms **[2]**
241/50 . . with hetero atoms directly attached to ring nitrogen atoms **[2]**
241/52 . . . Oxygen atoms **[2]**
241/54 . . . Nitrogen atoms **[2]**

243/00 Heterocyclic compounds containing seven-membered rings having two nitrogen atoms as the only ring hetero atoms [2]

243/02 . having the nitrogen atoms in positions 1 and 2 **[2]**
243/04 . having the nitrogen atoms in positions 1 and 3 **[2]**
243/06 . having the nitrogen atoms in positions 1 and 4 **[2]**
243/08 . . not condensed with other rings **[2]**
243/10 . . condensed with carbocyclic rings or ring systems **[2]**
243/12 . . . 1,5-Benzodiazepines; Hydrogenated 1,5-benzodiazepines **[2]**
243/14 . . . 1,4-Benzodiazepines; Hydrogenated 1,4-benzodiazepines **[2]**
243/16 . . . . substituted in position 5 by aryl radicals **[2]**
243/18 . . . . . substituted in position 2 by nitrogen, oxygen or sulfur atoms **[2]**
243/20 . . . . . Nitrogen atoms **[2]**
243/22 . . . . . Sulfur atoms **[2]**
243/24 . . . . . Oxygen atoms **[2]**
243/26 . . . . . Preparation from compounds already containing the benzodiazepine skeleton **[2]**
243/28 . . . . . Preparation including building-up the benzodiazepine skeleton from compounds containing no hetero rings **[2]**
243/30 . . . . . Preparation including building-up the benzodiazepine skeleton from compounds already containing hetero rings **[2]**
243/32 . . . . . containing a phthalimide or hydrogenated phthalimide ring system **[2]**
243/34 . . . . . containing a quinazoline or hydrogenated quinazoline ring system **[2]**
243/36 . . . . . containing an indole or hydrogenated indole ring system **[2]**
243/38 . . . [b, e]- or [b, f]-condensed with six-membered rings **[2]**

245/00 Heterocyclic compounds containing rings of more than seven members having two nitrogen atoms as the only ring hetero atoms [2]

245/02 . not condensed with other rings **[2]**
245/04 . condensed with carbocyclic rings or ring systems **[2]**
245/06 . . condensed with one six-membered ring **[2]**

247/00 Heterocyclic compounds containing rings having two nitrogen atoms as the only ring hetero atoms, according to more than one of groups C07D 229/00 to C07D 245/00 [2]

247/02 . having the nitrogen atoms in positions 1 and 3 **[2]**

249/00 Heterocyclic compounds containing five-membered rings having three nitrogen atoms as the only ring hetero atoms [2]

249/02 . not condensed with other rings **[2]**
249/04 . . 1,2,3-Triazoles; Hydrogenated 1,2,3-triazoles **[2]**
249/06 . . . with aryl radicals directly attached to ring atoms **[2]**
249/08 . . 1,2,4-Triazoles; Hydrogenated 1,2,4-triazoles **[2]**

249/10 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
249/12 . . . . Oxygen or sulfur atoms **[2]**
249/14 . . . . Nitrogen atoms **[2]**
249/16 . condensed with carbocyclic rings or ring systems **[2]**
249/18 . . Benzotriazoles **[2]**
249/20 . . . with aryl radicals directly attached in position 2 **[2]**
249/22 . . Naphthotriazoles **[2]**
249/24 . . . with stilbene radicals directly attached in position 2 **[2]**

251/00 Heterocyclic compounds containing 1,3,5-triazine rings [2]

251/02 . not condensed with other rings **[2]**
251/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
251/06 . . . with hetero atoms directly attached to ring nitrogen atoms **[2]**
251/08 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
251/10 . . having two double bonds between ring members or between ring members and non-ring members **[2]**
251/12 . . having three double bonds between ring members or between ring members and non-ring members **[2]**
251/14 . . . with hydrogen or carbon atoms directly attached to at least one ring carbon atom **[2]**
251/16 . . . . to only one ring carbon atom **[2]**
251/18 . . . . . with nitrogen atoms directly attached to the two other ring carbon atoms, e.g. guanamines **[2]**
251/20 . . . . . with no nitrogen atoms directly attached to a ring carbon atom **[2]**
251/22 . . . . to two ring carbon atoms **[2]**
251/24 . . . . to three ring carbon atoms **[2]**
251/26 . . . with only hetero atoms directly attached to ring carbon atoms **[2]**
251/28 . . . . Only halogen atoms, e.g. cyanuric chloride **[2]**
251/30 . . . . Only oxygen atoms **[2]**
251/32 . . . . . Cyanuric acid; Isocyanuric acid **[2]**
251/34 . . . . . Cyanuric or isocyanuric esters **[2]**
251/36 . . . . . having halogen atoms directly attached to ring nitrogen atoms **[2]**
251/38 . . . . Sulfur atoms **[2]**
251/40 . . . . Nitrogen atoms **[2]**
251/42 . . . . . One nitrogen atom **[2]**
251/44 . . . . . with halogen atoms attached to the two other ring carbon atoms **[2]**
251/46 . . . . . with oxygen or sulfur atoms attached to the two other ring carbon atoms **[2]**
251/48 . . . . . Two nitrogen atoms **[2]**
251/50 . . . . . with a halogen atom attached to the third ring carbon atom **[2]**
251/52 . . . . . with an oxygen or sulfur atom attached to the third ring carbon atom **[2]**
251/54 . . . . . Three nitrogen atoms **[2]**
251/56 . . . . . Preparation of melamine **[2]**
251/58 . . . . . from cyanamide, dicyanamide or calcium cyanamide **[2]**
251/60 . . . . . from urea or from carbon dioxide and ammonia **[2]**
251/62 . . . . . Purification of melamine **[2]**
251/64 . . . . . Condensation products of melamine with aldehydes; Derivatives thereof (polycondensation products C08G) **[2]**
251/66 . . . . . Derivatives of melamine in which a hetero atom is directly attached to a nitrogen atom of melamine **[2]**
251/68 . . . . . Triazinylamino stilbenes **[2]**
251/70 . . . . . Other substituted melamines **[2]**
251/72 . condensed with carbocyclic rings or ring systems **[2]**

253/00 Heterocyclic compounds containing six-membered rings having three nitrogen atoms as the only ring hetero atoms, not provided for by group C07D 251/00 [2]

253/02 . not condensed with other rings **[2]**
253/04 . . 1,2,3-Triazines **[2]**
253/06 . . 1,2,4-Triazines **[2]**
253/065 . . . having three double bonds between ring members or between ring members and non-ring members **[5]**
253/07 . . . . with hetero atoms, or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[5]**
253/075 . . . . . Two hetero atoms, in positions 3 and 5 **[5]**
253/08 . condensed with carbocyclic rings or ring systems **[2]**
253/10 . . Condensed 1,2,4-triazines; Hydrogenated condensed 1,2,4-triazines **[5]**

255/00 Heterocyclic compounds containing rings having three nitrogen atoms as the only ring hetero atoms, not provided for by groups C07D 249/00 to C07D 253/00 [2]

255/02 . not condensed with other rings **[2]**
255/04 . condensed with carbocyclic rings or ring systems **[2]**

257/00 Heterocyclic compounds containing rings having four nitrogen atoms as the only ring hetero atoms [2]

257/02 . not condensed with other rings **[2]**
257/04 . . Five-membered rings **[2]**
257/06 . . . with nitrogen atoms directly attached to the ring carbon atom **[2]**
257/08 . . Six-membered rings **[2]**
257/10 . condensed with carbocyclic rings or ring systems **[2]**
257/12 . . Six-membered rings having four nitrogen atoms **[2]**

259/00 Heterocyclic compounds containing rings having more than four nitrogen atoms as the only ring hetero atoms [2]

Heterocyclic compounds having nitrogen and oxygen as the only ring hetero atoms [2]

261/00 Heterocyclic compounds containing 1,2-oxazole or hydrogenated 1,2-oxazole rings [2]

261/02 . not condensed with other rings **[2]**
261/04 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
261/06 . . having two or more double bonds between ring members or between ring members and non-ring members **[2]**

261/08 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**

261/10 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**

261/12 . . . . Oxygen atoms **[2]**

261/14 . . . . Nitrogen atoms **[2]**

261/16 . . . . . Benzene-sulfonamido isoxazoles **[2]**

261/18 . . . . Carbon atoms having three bonds to hetero atoms, with at the most one bond to halogen **[2]**

261/20 . condensed with carbocyclic rings or ring systems **[2]**

263/00 Heterocyclic compounds containing 1,3-oxazole or hydrogenated 1,3-oxazole rings [2]

263/02 . not condensed with other rings **[2]**

263/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**

263/06 . . . with hydrocarbon radicals, substituted by oxygen atoms, attached to ring carbon atoms **[2]**

263/08 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**

263/10 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**

263/12 . . . . with radicals containing only hydrogen and carbon atoms **[2]**

263/14 . . . . with radicals substituted by oxygen atoms **[2]**

263/16 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**

263/18 . . . . Oxygen atoms **[2]**

263/20 . . . . . attached in position 2 **[2]**

263/22 . . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to other ring carbon atoms **[2]**

263/24 . . . . . with hydrocarbon radicals, substituted by oxygen atoms, attached to other ring carbon atoms **[2]**

263/26 . . . . . with hetero atoms or acyl radicals directly attached to the ring nitrogen atom **[2]**

263/28 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**

263/30 . . having two or three double bonds between ring members or between ring members and non-ring members **[2]**

263/32 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**

263/34 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**

263/36 . . . . One oxygen atom **[2]**

263/38 . . . . . attached in position 2 **[2]**

263/40 . . . . . attached in position 4 **[2]**

263/42 . . . . . attached in position 5 **[2]**

263/44 . . . . Two oxygen atoms **[2]**

263/46 . . . . Sulfur atoms **[2]**

263/48 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**

263/50 . . . . . Benzene-sulfonamido oxazoles **[2]**

263/52 . condensed with carbocyclic rings or ring systems **[2]**

263/54 . . Benzoxazoles; Hydrogenated benzoxazoles **[2]**

263/56 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached in position 2 **[2]**

263/57 . . . . Aryl or substituted aryl radicals **[5]**

263/58 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 2 **[2]**

263/60 . . Naphthoxazoles; Hydrogenated naphthoxazoles **[2]**

263/62 . . having two or more ring systems containing condensed 1,3-oxazole rings **[2]**

263/64 . . . linked in positions 2 and 2' by chains containing six-membered aromatic rings or ring systems containing such rings **[5]**

265/00 Heterocyclic compounds containing six-membered rings having one nitrogen atom and one oxygen atom as the only ring hetero atoms [2]

Note

Morpholines having only hydrogen atoms attached to the ring carbon atoms are classified in group C07D 295/00. **[2]**

265/02 . 1,2-Oxazines; Hydrogenated 1,2-oxazines **[2]**

265/04 . 1,3-Oxazines; Hydrogenated 1,3-oxazines **[2]**

265/06 . . not condensed with other rings **[2]**

265/08 . . . having one double bond between ring members or between a ring member and a non-ring member **[2]**

265/10 . . . . with oxygen atoms directly attached to ring carbon atoms **[2]**

265/12 . . condensed with carbocyclic rings or ring systems **[2]**

265/14 . . . condensed with one six-membered ring **[2]**

265/16 . . . . with only hydrogen or carbon atoms directly attached in positions 2 and 4 **[2]**

265/18 . . . . with hetero atoms directly attached in position 2 **[2]**

265/20 . . . . with hetero atoms directly attached in position 4 **[2]**

265/22 . . . . . Oxygen atoms **[2]**

265/24 . . . . with hetero atoms directly attached in positions 2 and 4 **[2]**

265/26 . . . . . Two oxygen atoms, e.g. isatoic anhydride **[2]**

265/28 . 1,4-Oxazines; Hydrogenated 1,4-oxazines **[2]**

265/30 . . not condensed with other rings **[2]**

265/32 . . . with oxygen atoms directly attached to ring carbon atoms **[2]**

265/33 . . . . Two oxygen atoms, in positions 3 and 5 **[5]**

265/34 . . condensed with carbocyclic rings **[2]**

265/36 . . . condensed with one six-membered ring **[2]**

265/38 . . . [b, e]-condensed with two six-membered rings **[2]**

267/00 Heterocyclic compounds containing rings of more than six members having one nitrogen atom and one oxygen atom as the only ring hetero atoms [2]

267/02 . Seven-membered rings **[2]**
267/04 . . having the hetero atoms in positions 1 and 2 **[2]**
267/06 . . having the hetero atoms in positions 1 and 3 **[2]**
267/08 . . having the hetero atoms in positions 1 and 4 **[2]**
267/10 . . . not condensed with other rings **[2]**
267/12 . . . condensed with carbocyclic rings or ring systems **[2]**
267/14 . . . . condensed with one six-membered ring **[2]**
267/16 . . . . condensed with two six-membered rings **[2]**
267/18 . . . . . [b, e]-condensed **[2]**
267/20 . . . . . [b, f]-condensed **[2]**
267/22 . Eight-membered rings **[2]**

269/00 Heterocyclic compounds containing rings having one nitrogen atom and one oxygen atom as the only ring hetero atoms according to more than one of groups C07D 261/00 to C07D 267/00 [2]

269/02 . having the hetero atoms in positions 1 and 3 **[2]**

271/00 Heterocyclic compounds containing five-membered rings having two nitrogen atoms and one oxygen atom as the only ring hetero atoms [2]

271/02 . not condensed with other rings **[2]**
271/04 . . 1,2,3-Oxadiazoles; Hydrogenated 1,2,3-oxadiazoles **[2]**
271/06 . . 1,2,4-Oxadiazoles; Hydrogenated 1,2,4-oxadiazoles **[2]**
271/07 . . . with oxygen, sulfur or nitrogen atoms, directly attached to ring carbon atoms, the nitrogen atoms not forming part of a nitro radical **[5]**
271/08 . . 1,2,5-Oxadiazoles; Hydrogenated 1,2,5-oxadiazoles **[2]**
271/10 . . 1,3,4-Oxadiazoles; Hydrogenated 1,3,4-oxadiazoles **[2]**
271/107 . . . with two aryl or substituted aryl radicals attached in positions 2 and 5 **[5]**
271/113 . . . with oxygen, sulfur or nitrogen atoms, directly attached to ring carbon atoms, the nitrogen atoms not forming part of a nitro radical **[5]**
271/12 . condensed with carbocyclic rings or ring systems **[2]**

273/00 Heterocyclic compounds containing rings having nitrogen and oxygen atoms as the only ring hetero atoms, not provided for by groups C07D 261/00 to C07D 271/00 [2]

273/01 . having one nitrogen atom **[3]**
273/02 . having two nitrogen atoms and only one oxygen atom **[2]**
273/04 . . Six-membered rings **[2]**
273/06 . . Seven-membered rings **[2]**
273/08 . having two nitrogen atoms and more than one oxygen atom **[3]**

<u>Heterocyclic compounds having nitrogen and sulfur as the only ring hetero atoms</u> [2]

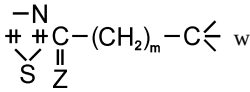
275/00 Heterocyclic compounds containing 1, 2-thiazole or hydrogenated 1,2-thiazole rings [2]

275/02 . not condensed with other rings **[2]**
275/03 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[5]**
275/04 . condensed with carbocyclic rings or ring systems **[2]**
275/06 . . with hetero atoms directly attached to the ring sulfur atom **[2]**

277/00 Heterocyclic compounds containing 1,3-thiazole or hydrogenated 1,3-thiazole rings [2]

277/02 . not condensed with other rings **[2]**
277/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
277/06 . . . with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
277/08 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**
277/10 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
277/12 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
277/14 . . . . Oxygen atoms **[2]**
277/16 . . . . Sulfur atoms **[2]**
277/18 . . . . Nitrogen atoms **[2]**
277/20 . . having two or three double bonds between ring members or between ring members and non-ring members **[2]**
277/22 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
277/24 . . . . Radicals substituted by oxygen atoms **[2]**
277/26 . . . . Radicals substituted by sulfur atoms **[2]**
277/28 . . . . Radicals substituted by nitrogen atoms **[2]**
277/30 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
277/32 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
277/34 . . . . Oxygen atoms **[2]**
277/36 . . . . Sulfur atoms **[2]**
277/38 . . . . Nitrogen atoms **[2]**
277/40 . . . . . Unsubstituted amino or imino radicals **[2]**
277/42 . . . . . Amino or imino radicals substituted by hydrocarbon or substituted hydrocarbon radicals **[2]**
277/44 . . . . . Acylated amino or imino radicals **[2]**
277/46 . . . . . by carboxylic acids, or sulfur or nitrogen analogues thereof **[2]**
277/48 . . . . . by radicals derived from carbonic acid, or sulfur or nitrogen analogues thereof, e.g. carbonylguanidines **[2]**
277/50 . . . . . Nitrogen atoms bound to hetero atoms (nitro radicals C07D 277/58) **[2]**
277/52 . . . . . to sulfur atoms, e.g. sulfonamides **[2]**
277/54 . . . . Nitrogen and either oxygen or sulfur atoms **[2]**
277/56 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
277/58 . . . . Nitro radicals **[2]**

277/587 . . . with aliphatic hydrocarbon radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms, said aliphatic radicals being substituted in the alpha-position to the ring by a hetero atom, e.g.



with m >= 0, Z being a singly or a doubly bound hetero atom **[5]**

277/593 . . . . Z being doubly bound oxygen or doubly bound nitrogen, which nitrogen is part of a possibly substituted oximino radical **[5]**

277/60 . condensed with carbocyclic rings or ring systems **[2]**

277/62 . . Benzothiazoles **[2]**

277/64 . . . with only hydrocarbon or substituted hydrocarbon radicals attached in position 2 **[2]**

277/66 . . . . with aromatic rings or ring systems directly attached in position 2 **[2]**

277/68 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 2 **[2]**

277/70 . . . . Sulfur atoms **[2]**

277/72 . . . . . 2-Mercaptobenzothiazole **[2]**

277/74 . . . . . Sulfur atoms substituted by carbon atoms **[2]**

277/76 . . . . . Sulfur atoms attached to a second hetero atom **[2]**

277/78 . . . . . to a second sulfur atom **[2]**

277/80 . . . . . to a nitrogen atom **[2]**

277/82 . . . . Nitrogen atoms **[2]**

277/84 . . Naphthothiazoles **[2]**

279/00 Heterocyclic compounds containing six-membered rings having one nitrogen atom and one sulfur atom as the only ring hetero atoms [2]

Note

Thiomorpholines having only hydrogen atoms attached to the ring carbon atoms are classified in group C07D 295/00. **[2]**

279/02 . 1,2-Thiazines; Hydrogenated 1,2-thiazines **[2]**

279/04 . 1,3-Thiazines; Hydrogenated 1,3-thiazines **[2]**

279/06 . . not condensed with other rings **[2]**

279/08 . . condensed with carbocyclic rings or ring systems **[2]**

279/10 . 1,4-Thiazines; Hydrogenated 1,4-thiazines **[2]**

279/12 . . not condensed with other rings **[2]**

279/14 . . condensed with carbocyclic rings or ring systems **[2]**

279/16 . . . condensed with one six-membered ring **[2]**

279/18 . . . [b, e]-condensed with two six-membered rings **[2]**

279/20 . . . . with hydrogen atoms directly attached to the ring nitrogen atom **[2]**

279/22 . . . . with carbon atoms directly attached to the ring nitrogen atom **[2]**

279/24 . . . . . with hydrocarbon radicals, substituted by amino radicals, attached to the ring nitrogen atom **[2]**

279/26 . . . . . without other substituents attached to the ring system **[2]**

279/28 . . . . . with other substituents attached to the ring system **[2]**

279/30 . . . . . with acyl radicals attached to the ring nitrogen atom **[2]**

279/32 . . . . with hetero atoms directly attached to the ring nitrogen atom **[2]**

279/34 . . . . with hetero atoms directly attached to the ring sulfur atom **[2]**

279/36 . . . [b, e]-condensed, at least one with a further condensed benzene ring **[2]**

281/00 Heterocyclic compounds containing rings of more than six members having one nitrogen atom and one sulfur atom as the only ring hetero atoms [2]

281/02 . Seven-membered rings **[2]**

281/04 . . having the hetero atoms in positions 1 and 4 **[2]**

281/06 . . . not condensed with other rings **[2]**

281/08 . . . condensed with carbocyclic rings or ring systems **[2]**

281/10 . . . . condensed with one six-membered ring **[2]**

281/12 . . . . condensed with two six-membered rings **[2]**

281/14 . . . . . [b, e]-condensed **[2]**

281/16 . . . . . [b, f]-condensed **[2]**

281/18 . Eight-membered rings **[2]**

283/00 Heterocyclic compounds containing rings having one nitrogen atom and one sulfur atom as the only ring hetero atoms, according to more than one of groups C07D 275/00 to C07D 281/00 [2]

283/02 . having the hetero atoms in positions 1 and 3 **[2]**

285/00 Heterocyclic compounds containing rings having nitrogen and sulfur atoms as the only ring hetero atoms, not provided for by groups C07D 275/00 to C07D 283/00 [2]

285/01 . Five-membered rings **[5]**

285/02 . . Thiadiazoles; Hydrogenated thiadiazoles **[2,5]**

285/04 . . . not condensed with other rings **[2,5]**

285/06 . . . . 1,2,3-Thiadiazoles; Hydrogenated 1,2,3-thiadiazoles **[2,5]**

285/08 . . . . 1,2,4-Thiadiazoles; Hydrogenated 1,2,4-thiadiazoles **[2,5]**

285/10 . . . . 1,2,5-Thiadiazoles; Hydrogenated 1,2,5-thiadiazoles **[2,5]**

285/12 . . . . 1,3,4-Thiadiazoles; Hydrogenated 1,3,4-thiadiazoles **[2,5]**

285/125 . . . . . with oxygen, sulfur or nitrogen atoms, directly attached to ring carbon atoms, the nitrogen atoms not forming part of a nitro radical **[5]**

285/13 . . . . . Oxygen atoms **[5]**

285/135 . . . . . Nitrogen atoms **[5]**

285/14 . . . condensed with carbocyclic rings or ring systems **[2,5]**

285/15 . Six-membered rings **[5]**

285/16 . . Thiadiazines; Hydrogenated thiadiazines **[2,5]**

285/18 . . . 1,2,4-Thiadiazines; Hydrogenated 1,2,4-thiadiazines **[2,5]**

285/20 . . . . condensed with carbocyclic rings or ring systems **[2,5]**

285/22 . . . . . condensed with one six-membered ring **[2,5]**

285/24 . . . . . with oxygen atoms directly attached to the ring sulfur atom **[2,5]**

285/26 . . . . . substituted in position 6 or 7 by sulfamoyl or substituted sulfamoyl radicals **[2,5]**

285/28 . . . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached in position 3 **[2,5]**
285/30 . . . . . with hydrocarbon radicals, substituted by hetero atoms, attached in position 3 **[2,5]**
285/32 . . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 3 **[2,5]**
285/34 . . . 1,3,5-Thiadiazines; Hydrogenated 1,3,5-thiadiazines **[2,5]**
285/36 . Seven-membered rings **[2]**
285/38 . Eight-membered rings **[2]**

291/00 Heterocyclic compounds containing rings having nitrogen, oxygen and sulfur atoms as the only ring hetero atoms [2]
291/02 . not condensed with other rings **[2]**
291/04 . . Five-membered rings **[2]**
291/06 . . Six-membered rings **[2]**
291/08 . condensed with carbocyclic rings or ring systems **[2]**

293/00 Heterocyclic compounds containing rings having nitrogen and selenium or nitrogen and tellurium, with or without oxygen or sulfur atoms, as the ring hetero atoms [2]
293/02 . not condensed with other rings **[2]**
293/04 . . Five-membered rings **[2]**
293/06 . . . Selenazoles; Hydrogenated selenazoles **[2]**
293/08 . . Six-membered rings **[2]**
293/10 . condensed with carbocyclic rings or ring systems **[2]**
293/12 . . Selenazoles; Hydrogenated selenazoles **[2]**

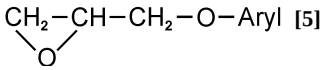
295/00 Heterocyclic compounds containing polymethylene-imine rings with at least five ring members, 3-azabicyclo [3.2.2] nonane, piperazine, morpholine or thiomorpholine rings, having only hydrogen atoms directly attached to the ring carbon atoms [2]
295/02 . containing only hydrogen and carbon atoms in addition to the ring hetero elements **[2]**
295/023 . . Preparation; Separation; Stabilisation; Use of additives **[5]**
295/027 . . containing only one hetero ring **[5]**
295/03 . . . with the ring nitrogen atoms directly attached to acyclic carbon atoms **[5]**
295/033 . . . with the ring nitrogen atoms directly attached to carbocyclic rings **[5]**
295/037 . . with quaternary ring nitrogen atoms **[5]**
295/04 . with substituted hydrocarbon radicals attached to ring nitrogen atoms **[2]**
295/06 . . substituted by halogen atoms or nitro radicals **[2]**
295/067 . . . with the ring nitrogen atoms and the substituents attached to the same carbon chain, which is not interrupted by carbocyclic rings **[5]**
295/073 . . . with the ring nitrogen atoms and the substituents separated by carbocyclic rings or by carbon chains interrupted by carbocyclic rings **[5]**
295/08 . . substituted by singly bound oxygen or sulfur atoms **[2]**
295/084 . . . with the ring nitrogen atoms and the oxygen or sulfur atoms attached to the same carbon chain, which is not interrupted by carbocyclic rings **[5]**
295/088 . . . . to an acyclic saturated chain **[5]**
295/092 . . . . with aromatic radicals attached to the chain **[5]**
295/096 . . . with the ring nitrogen atoms and the oxygen or sulfur atoms separated by carbocyclic rings or by carbon chains interrupted by carbocyclic rings **[5]**
295/10 . . substituted by doubly bound oxygen or sulfur atoms (acylated ring nitrogen atoms C07D 295/16) **[2]**
295/104 . . . with the ring nitrogen atoms and the doubly bound oxygen or sulfur atoms attached to the same carbon chain, which is not interrupted by carbocyclic rings **[5]**
295/108 . . . . to an acyclic saturated chain **[5]**
295/112 . . . with the ring nitrogen atoms and the doubly bound oxygen or sulfur atoms separated by carbocyclic rings or by carbon chains interrupted by carbocyclic rings **[5]**
295/116 . . . . with the doubly bound oxygen or sulfur atoms directly attached to a carbocyclic ring **[5]**
295/12 . . substituted by singly or doubly bound nitrogen atoms (nitro radicals C07D 295/06) **[2]**
295/125 . . . with the ring nitrogen atoms and the substituent nitrogen atoms attached to the same carbon chain, which is not interrupted by carbocyclic rings **[5]**
295/13 . . . . to an acyclic saturated chain **[5]**
295/135 . . . with the ring nitrogen atoms and the substituent nitrogen atoms separated by carbocyclic rings or by carbon chains interrupted by carbocyclic rings **[5]**
295/14 . . substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
295/145 . . . with the ring nitrogen atoms and the carbon atoms with three bonds to hetero atoms attached to the same carbon chain, which is not interrupted by carbocyclic rings **[5]**
295/15 . . . . to an acyclic saturated chain **[5]**
295/155 . . . with the ring nitrogen atoms and the carbon atoms with three bonds to hetero atoms separated by carbocyclic rings or by carbon chains interrupted by carbocyclic rings **[5]**
295/16 . acylated on ring nitrogen atoms **[2]**
295/18 . . by radicals derived from carboxylic acids, or sulfur or nitrogen analogues thereof **[2]**
295/182 . . . Radicals derived from carboxylic acids **[5]**
295/185 . . . . from aliphatic carboxylic acids **[5]**
295/192 . . . . from aromatic carboxylic acids **[5]**
295/194 . . . Radicals derived from thio- or thiono carboxylic acids **[5]**
295/195 . . . Radicals derived from nitrogen analogues of carboxylic acids **[5]**
295/20 . . by radicals derived from carbonic acid, or sulfur or nitrogen analogues thereof **[2]**
295/205 . . . Radicals derived from carbonic acid **[5]**
295/21 . . . Radicals derived from sulfur analogues of carbonic acid **[5]**
295/215 . . . Radicals derived from nitrogen analogues of carbonic acid **[5]**

295/22 . with hetero atoms directly attached to ring nitrogen atoms **[2]**
295/24 . . Oxygen atoms **[5]**
295/26 . . Sulfur atoms **[5]**
295/28 . . Nitrogen atoms **[5]**
295/30 . . . non-acylated **[5]**
295/32 . . . acylated with carboxylic or carbonic acids, or their nitrogen or sulfur analogues **[5]**

Heterocyclic compounds having oxygen atoms, with or without sulfur, selenium, or tellurium atoms, as ring hetero atoms [2]

301/00 Preparation of oxiranes [2]
301/02 . Synthesis of the oxirane ring **[2]**
301/03 . . by oxidation of unsaturated compounds, or of mixtures of unsaturated and saturated compounds **[3]**
301/04 . . . with air or molecular oxygen **[2,3]**
301/06 . . . . in the liquid phase **[2,3]**
301/08 . . . . in the gaseous phase **[2,3]**
301/10 . . . . . with catalysts containing silver or gold **[2,3]**
301/12 . . . with hydrogen peroxide or inorganic peroxides or peracids **[2,3]**
301/14 . . . with organic peracids, or salts, anhydrides or esters thereof **[2,3]**
301/16 . . . . formed in situ, e.g. from carboxylic acids and hydrogen peroxide **[2,3]**
301/18 . . . . . from polybasic carboxylic acids **[2,3]**
301/19 . . . with organic hydroperoxides **[3]**
301/22 . . by oxidation of saturated compounds with air or molecular oxygen (of mixtures of unsaturated and saturated compounds C07D 301/04) **[2]**
301/24 . . by splitting-off Hal−Y from compounds containing the radical Hal−C−C−OY **[2]**
301/26 . . . Y being hydrogen **[2]**
301/27 . Condensation of epihalohydrins or halohydrins with compounds containing active hydrogen atoms (macromolecular compounds C08) **[3]**
301/28 . . by reaction with hydroxyl radicals **[2,3]**
301/30 . . by reaction with carboxyl radicals **[2,3]**
301/32 . Separation; Purification **[2]**
301/36 . Use of additives, e.g. for stabilisation **[3]**

303/00 Compounds containing three-membered rings having one oxygen atom as the only ring hetero atom [2]
303/02 . Compounds containing oxirane rings **[2]**
303/04 . . containing only hydrogen and carbon atoms in addition to the ring oxygen atoms **[2]**
303/06 . . . in which the oxirane rings are condensed with a carbocyclic ring system having three or more relevant rings **[2]**
303/08 . . with hydrocarbon radicals, substituted by halogen atoms, nitro radicals or nitroso radicals **[2]**
303/10 . . . in which the oxirane rings are condensed with a carbocyclic ring system having three or more relevant rings (steroids C07J) **[2]**
303/12 . . with hydrocarbon radicals, substituted by singly or doubly bound oxygen atoms **[2]**
303/14 . . . by free hydroxyl radicals **[2]**
303/16 . . . by esterified hydroxyl radicals **[2]**
303/17 . . . . containing oxirane rings condensed with carbocyclic ring systems having three or more relevant rings **[3]**
303/18 . . . by etherified hydroxyl radicals **[2]**
303/20 . . . . Ethers with hydroxy compounds containing no oxirane rings **[2]**
303/22 . . . . . with monohydroxy compounds **[2]**
303/23 . . . . . Oxiranylmethyl ethers of compounds having one hydroxy group bound to a six-membered aromatic ring, the oxiranylmethyl radical not being further substituted, i.e.



[5]

303/24 . . . . . with polyhydroxy compounds **[2]**
303/26 . . . . . having one or more free hydroxyl radicals **[2]**
303/27 . . . . . having all hydroxyl radicals etherified with oxirane containing compounds **[3]**
303/28 . . . . Ethers with hydroxy compounds containing oxirane rings **[2]**
303/30 . . . . . Ethers of oxirane-containing polyhydroxy compounds in which all hydroxyl radicals are etherified with oxirane-containing hydroxy compounds **[2]**
303/31 . . . . in which the oxirane rings are condensed with a carbocyclic ring system having three or more relevant rings **[3]**
303/32 . . . by aldehydo- or ketonic radicals **[2]**
303/34 . . with hydrocarbon radicals, substituted by sulfur, selenium, or tellurium atoms **[2]**
303/36 . . with hydrocarbon radicals, substituted by nitrogen atoms (nitro, nitroso radicals C07D 303/08) **[2]**
303/38 . . with hydrocarbon radicals, substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
303/40 . . . by ester radicals **[2]**
303/42 . . . . Acyclic compounds having a chain of seven or more carbon atoms, e.g. epoxidised fats **[2]**
303/44 . . . . Esterified with oxirane-containing hydroxy compounds **[2]**
303/46 . . . by amide or nitrile radicals **[2]**
303/48 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, directly attached to ring carbon atoms, e.g. ester or nitrile radicals **[3]**

305/00 Heterocyclic compounds containing four-membered rings having one oxygen atom as the only ring hetero atoms [2]
305/02 . not condensed with other rings **[2]**
305/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**
305/06 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to the ring atoms **[2]**
305/08 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring atoms **[2]**
305/10 . . having one or more double bonds between ring members or between ring members and non-ring members **[2]**
305/12 . . . Beta-lactones **[2]**
305/14 . condensed with carbocyclic rings or ring systems **[2]**

307/00 Heterocyclic compounds containing five-membered rings having one oxygen atom as the only ring hetero atom [2]

307/02 . not condensed with other rings **[2]**

307/04 . . having no double bonds between ring members or between ring members and non-ring members **[2]**

307/06 . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to ring carbon atoms **[2]**

307/08 . . . . Preparation of tetrahydrofuran **[2]**

307/10 . . . with substituted hydrocarbon radicals attached to ring carbon atoms **[2]**

307/12 . . . . Radicals substituted by oxygen atoms **[2]**

307/14 . . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[2]**

307/16 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**

307/18 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**

307/20 . . . . Oxygen atoms **[2]**

307/22 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**

307/24 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**

307/26 . . having one double bond between ring members or between a ring member and a non-ring member **[2]**

307/28 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**

307/30 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**

307/32 . . . . Oxygen atoms **[2]**

307/33 . . . . . in position 2, the oxygen atom being in its keto or unsubstituted enol form **[5]**

307/34 . . having two or three double bonds between ring members or between ring members and non-ring members **[2]**

307/36 . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to ring carbon atoms **[2]**

307/38 . . . with substituted hydrocarbon radicals attached to ring carbon atoms **[2]**

307/40 . . . . Radicals substituted by oxygen atoms **[2]**

307/42 . . . . . Singly bound oxygen atoms (two oxygen atoms bound to the same carbon atom C07D 307/46) **[2]**

307/44 . . . . . Furfuryl alcohol **[2]**

307/45 . . . . . Oxygen atoms acylated by a cyclopropane containing carboxylic acyl radical, e.g. chrysanthemumates **[3]**

307/46 . . . . . Doubly bound oxygen atoms, or two oxygen atoms singly bound to the same carbon atom **[2]**

307/48 . . . . . Furfural **[2]**

307/50 . . . . . Preparation from natural products **[2]**

307/52 . . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[2]**

307/54 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**

307/56 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**

307/58 . . . . One oxygen atom, e.g. butenolide **[2]**

307/60 . . . . Two oxygen atoms, e.g. succinic anhydride **[2]**

307/62 . . . . Three oxygen atoms, e.g. ascorbic acid **[2]**

307/64 . . . . Sulfur atoms **[2]**

307/66 . . . . Nitrogen atoms (nitro radicals C07D 307/70) **[2]**

307/68 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**

307/70 . . . . Nitro radicals **[2]**

307/71 . . . . . attached in position 5 **[2]**

307/72 . . . . . with hydrocarbon radicals, substituted by nitrogen-containing radicals, attached in position 2 **[2]**

307/73 . . . . . by amino or imino, or substituted amino or imino radicals **[2]**

307/74 . . . . . by hydrazino or hydrazono or such substituted radicals **[2]**

307/75 . . . . . having carboxylic acyl radicals or their thio or nitrogen analogues directly attached to the hydrazino or hydrazono radical, e.g. hydrazides **[2]**

307/76 . . . . . having carbonic acyl radicals or their thio or nitrogen analogues directly attached to the hydrazino or hydrazono radical, e.g. semicarbazides **[2,3]**

307/77 . ortho- or peri-condensed with carbocyclic rings or ring systems **[2]**

307/78 . . Benzo [b] furans; Hydrogenated benzo [b] furans **[2]**

307/79 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to carbon atoms of the hetero ring **[2]**

307/80 . . . . Radicals substituted by oxygen atoms **[2]**

307/81 . . . . Radicals substituted by nitrogen atoms not forming part of a nitro radical **[2]**

307/82 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to carbon atoms of the hetero ring **[2]**

307/83 . . . . Oxygen atoms **[2]**

307/84 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**

307/85 . . . . . attached in position 2 **[2]**

307/86 . . . with an oxygen atom directly attached in position 7 **[2]**

307/87 . . Benzo [c] furans; Hydrogenated benzo [c] furans **[2]**

307/88 . . . with one oxygen atom directly attached in position 1 or 3 **[2]**

307/885 . . . . 3,3-Diphenylphthalides **[5]**

307/89 . . . with two oxygen atoms directly attached in positions 1 and 3 **[2]**
307/90 . . . with an oxygen atom in position 1 and a nitrogen atom in position 3, or vice versa **[2]**
307/91 . . Dibenzofurans; Hydrogenated dibenzofurans **[2]**
307/92 . . Naphthofurans; Hydrogenated naphthofurans **[2]**
307/93 . . condensed with a ring other than six-membered **[2]**
307/935 . . . Not further condensed cyclopenta [b] furans or hydrogenated cyclopenta [b] furans **[3]**
307/937 . . . . with hydrocarbon or substituted hydrocarbon radicals directly attached in position 2, e.g. prostacyclins **[5]**
307/94 . spiro-condensed with carbocyclic rings or ring systems, e.g. griseofulvins **[2]**

309/00 Heterocyclic compounds containing six-membered rings having one oxygen atom as the only ring hetero atom, not condensed with other rings [2]

309/02 . having no double bonds between ring members or between ring members and non-ring members **[2]**
309/04 . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to ring carbon atoms **[2]**
309/06 . . . Radicals substituted by oxygen atoms **[2]**
309/08 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
309/10 . . . Oxygen atoms **[2]**
309/12 . . . . only hydrogen atoms and one oxygen atom directly attached to ring carbon atoms, e.g. tetrahydropyranyl ethers **[2]**
309/14 . . . Nitrogen atoms not forming part of a nitro radical **[2]**
309/16 . having one double bond between ring members or between a ring member and a non-ring member **[2]**
309/18 . . containing only hydrogen and carbon atoms in addition to the ring hetero atom **[2]**
309/20 . . with hydrogen atoms and substituted hydrocarbon radicals directly attached to ring carbon atoms **[2]**
309/22 . . . Radicals substituted by oxygen atoms **[2]**
309/24 . . . . Methylol radicals **[2]**
309/26 . . . . Carboxaldehyde radicals **[2]**
309/28 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
309/30 . . . Oxygen atoms, e.g. delta-lactones **[2]**
309/32 . having two double bonds between ring members or between ring members and non-ring members **[2]**
309/34 . having three or more double bonds between ring members or between ring members and non-ring members **[2]**
309/36 . . with oxygen atoms directly attached to ring carbon atoms **[2]**
309/38 . . . one oxygen atom in position 2 or 4, e.g. pyrones **[2]**
309/40 . . . Oxygen atoms attached in positions 3 and 4, e.g. maltol **[2]**

311/00 Heterocyclic compounds containing six-membered rings having one oxygen atom as the only hetero atom, condensed with other rings [2]

311/02 . ortho- or peri-condensed with carbocyclic rings or ring systems **[2]**
311/04 . . Benzo [b] pyrans, not hydrogenated in the carbocyclic ring **[2]**
311/06 . . . with oxygen or sulfur atoms directly attached in position 2 **[2]**
311/08 . . . . not hydrogenated in the hetero ring **[2]**
311/10 . . . . . unsubstituted **[2]**
311/12 . . . . . substituted in position 3 and unsubstituted in position 7 **[2]**
311/14 . . . . . substituted in position 6 and unsubstituted in position 7 **[2]**
311/16 . . . . . substituted in position 7 **[2]**
311/18 . . . . . substituted otherwise than in position 3 or 7 (substituted in position 4 by oxygen or sulfur C07D 311/42) **[2]**
311/20 . . . . hydrogenated in the hetero ring **[2]**
311/22 . . . with oxygen or sulfur atoms directly attached in position 4 **[2]**
311/24 . . . . with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 2 **[2]**
311/26 . . . . with aromatic rings attached in position 2 or 3 **[2]**
311/28 . . . . . with aromatic rings attached in position 2 only **[2]**
311/30 . . . . . not hydrogenated in the hetero ring, e.g. flavones **[2]**
311/32 . . . . . 2, 3-Dihydro derivatives, e.g. flavanones **[2]**
311/34 . . . . . with aromatic rings attached in position 3 only **[2]**
311/36 . . . . . not hydrogenated in the hetero ring, e.g. isoflavones **[2]**
311/38 . . . . . 2, 3-Dihydro derivatives, e.g. isoflavanones **[2]**
311/40 . . . . . Separation, e.g. from natural material; Purification **[2]**
311/42 . . . with oxygen or sulfur atoms in positions 2 and 4 **[2]**
311/44 . . . . with one hydrogen atom in position 3 **[2]**
311/46 . . . . . unsubstituted in the carbocyclic ring **[2]**
311/48 . . . . . with two such benzopyran radicals linked together by a carbon chain **[2]**
311/50 . . . . . with elements other than carbon and hydrogen in position 3 **[2]**
311/52 . . . . . Enol-esters or -ethers, or sulfur analogues thereof **[2]**
311/54 . . . . . substituted in the carbocyclic ring **[2]**
311/56 . . . . without hydrogen atoms in position 3 **[2]**
311/58 . . . other than with oxygen or sulfur atoms in position 2 or 4 **[2]**
311/60 . . . . with aryl radicals attached in position 2 **[2]**
311/62 . . . . . with oxygen atoms directly attached in position 3, e.g. anthocyanidins **[2]**
311/64 . . . . with oxygen atoms directly attached in position 8 **[2]**
311/66 . . . . with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 2 **[2]**
311/68 . . . . with nitrogen atoms directly attached in position 4 **[2]**
311/70 . . . . with two hydrocarbon radicals attached in position 2 and elements other than carbon and hydrogen in position 6 **[2]**
311/72 . . . . . 3, 4-Dihydro derivatives having in position 2 at least one methyl radical and in position 6 one oxygen atom, e.g. tocopherols **[2]**

311/74 . . Benzo [b] pyrans, hydrogenated in the carbocyclic ring **[2]**
311/76 . . Benzo [c] pyrans **[2]**
311/78 . . Ring systems having three or more relevant rings **[2]**
311/80 . . . Dibenzopyrans; Hydrogenated dibenzopyrans **[2]**
311/82 . . . . Xanthenes **[2]**
311/84 . . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 9 **[2]**
311/86 . . . . . Oxygen atoms, e.g. xanthones **[2]**
311/88 . . . . . Nitrogen atoms **[2]**
311/90 . . . . . with hydrocarbon radicals, substituted by amino radicals, directly attached in position 9 **[2]**
311/92 . . . Naphthopyrans; Hydrogenated naphthopyrans **[2]**
311/94 . . condensed with rings other than six-membered or with ring systems containing such rings **[2,5]**
311/96 . spiro-condensed with carbocyclic rings or ring systems **[2]**

313/00 Heterocyclic compounds containing rings of more than six members having one oxygen atom as the only ring hetero atom [2]

313/02 . Seven-membered rings **[2]**
313/04 . . not condensed with other rings **[2]**
313/06 . . condensed with carbocyclic rings or ring systems **[2]**
313/08 . . . condensed with one six-membered ring **[2]**
313/10 . . . condensed with two six-membered rings **[2]**
313/12 . . . . [b, e]-condensed **[2]**
313/14 . . . . [b, f]-condensed **[2]**
313/16 . Eight-membered rings **[2]**
313/18 . . not condensed with other rings **[2]**
313/20 . . condensed with carbocyclic rings or ring systems **[2]**

315/00 Heterocyclic compounds containing rings having one oxygen atom as the only ring hetero atom according to more than one of groups C07D 303/00 to C07D 313/00 [2]

317/00 Heterocyclic compounds containing five-membered rings having two oxygen atoms as the only ring hetero atoms [2]

317/02 . having the hetero atoms in positions 1 and 2 **[2]**
317/04 . . not condensed with other rings **[2]**
317/06 . . condensed with carbocyclic rings or ring systems **[2]**
317/08 . having the hetero atoms in positions 1 and 3 **[2]**
317/10 . . not condensed with other rings **[2]**
317/12 . . . with only hydrogen atoms or radicals containing only hydrogen and carbon atoms, directly attached to ring carbon atoms **[2]**
317/14 . . . with substituted hydrocarbon radicals attached to ring carbon atoms **[2]**
317/16 . . . . Radicals substituted by halogen atoms or nitro radicals **[2]**
317/18 . . . . Radicals substituted by singly bound oxygen or sulfur atoms **[2]**
317/20 . . . . . Free hydroxyl or mercaptan **[2]**
317/22 . . . . . etherified **[2]**
317/24 . . . . . esterified **[2]**
317/26 . . . . Radicals substituted by doubly bound oxygen or sulfur atoms or by two such atoms singly bound to the same carbon atom **[2]**
317/28 . . . . Radicals substituted by nitrogen atoms (nitro radicals C07D 317/16) **[2]**
317/30 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
317/32 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
317/34 . . . . Oxygen atoms **[2]**
317/36 . . . . . Alkylene carbonates; Substituted alkylene carbonates **[2]**
317/38 . . . . . Ethylene carbonate **[2]**
317/40 . . . . . Vinylene carbonate; Substituted vinylene carbonates **[2]**
317/42 . . . . Halogen atoms or nitro radicals **[2]**
317/44 . . ortho- or peri-condensed with carbocyclic rings or ring systems **[2]**
317/46 . . . condensed with one six-membered ring **[2]**
317/48 . . . . Methylenedioxybenzenes or hydrogenated methylenedioxybenzenes, unsubstituted on the hetero ring **[2]**
317/50 . . . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to atoms of the carbocyclic ring **[2]**
317/52 . . . . . Radicals substituted by halogen atoms or nitro radicals **[2]**
317/54 . . . . . Radicals substituted by oxygen atoms **[2]**
317/56 . . . . . Radicals substituted by sulfur atoms **[2]**
317/58 . . . . . Radicals substituted by nitrogen atoms (nitro radicals C07D 317/52) **[2]**
317/60 . . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
317/62 . . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to atoms of the carbocyclic ring **[2]**
317/64 . . . . . Oxygen atoms **[2]**
317/66 . . . . . Nitrogen atoms not forming part of a nitro radical **[2]**
317/68 . . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
317/70 . . . condensed with ring systems containing two or more relevant rings **[2]**
317/72 . . spiro-condensed with carbocyclic rings **[2]**

319/00 Heterocyclic compounds containing six-membered rings having two oxygen atoms as the only ring hetero atoms [2]

319/02 . 1,2-Dioxanes; Hydrogenated 1,2-dioxanes **[2]**
319/04 . 1,3-Dioxanes; Hydrogenated 1,3-dioxanes **[2]**
319/06 . . not condensed with other rings **[2]**
319/08 . . condensed with carbocyclic rings or ring systems **[2]**
319/10 . 1,4-Dioxanes; Hydrogenated 1,4-dioxanes **[2]**

319/12 . . not condensed with other rings **[2]**
319/14 . . condensed with carbocyclic rings or ring systems **[2]**
319/16 . . . condensed with one six-membered ring **[2]**
319/18 . . . . Ethylenedioxybenzenes, not substituted on the hetero ring **[2]**
319/20 . . . . with substituents attached to the hetero ring **[2]**
319/22 . . . condensed with one naphthalene or hydrogenated naphthalene ring system **[2]**
319/24 . . . [b, e]-condensed with two six-membered rings **[2]**

321/00 Heterocyclic compounds containing rings having two oxygen atoms as the only ring hetero atoms, not provided for by groups C07D 317/00 to C07D 319/00 [2]
321/02 . Seven-membered rings **[2]**
321/04 . . not condensed with other rings **[2]**
321/06 . . . 1, 3-Dioxepines; Hydrogenated 1,3-dioxepines **[2]**
321/08 . . . 1, 4-Dioxepines; Hydrogenated 1,4-dioxepines **[2]**
321/10 . . condensed with carbocyclic rings or ring systems **[2]**
321/12 . Eight-membered rings **[2]**

323/00 Heterocyclic compounds containing more than two oxygen atoms as the only ring hetero atoms [2]
323/02 . Five-membered rings **[2]**
323/04 . Six-membered rings **[2]**
323/06 . . Trioxane **[2]**

325/00 Heterocyclic compounds containing rings having oxygen as the only ring hetero atom according to more than one of groups C07D 303/00 to C07D 323/00 [2]

327/00 Heterocyclic compounds containing rings having oxygen and sulfur atoms as the only ring hetero atoms [2]
327/02 . one oxygen atom and one sulfur atom **[2]**
327/04 . . Five-membered rings **[2]**
327/06 . . Six-membered rings **[2]**
327/08 . . . [b, e]-condensed with two six-membered carbocyclic rings **[2]**
327/10 . two oxygen atoms and one sulfur atom, e.g. cyclic sulfates **[2]**

329/00 Heterocyclic compounds containing rings having oxygen and selenium or oxygen and tellurium atoms as the only ring hetero atoms [2]

Heterocyclic compounds having sulfur, selenium, or tellurium atoms as the only ring hetero atoms [2]

331/00 Heterocyclic compounds containing rings of less than five members, having one sulfur atom as the only ring hetero atom [2]
331/02 . Three-membered rings **[2]**
331/04 . Four-membered rings **[2]**

333/00 Heterocyclic compounds containing five-membered rings having one sulfur atom as the only ring hetero atom [2]
333/02 . not condensed with other rings **[2]**
333/04 . . not substituted on the ring sulfur atom **[2]**
333/06 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to the ring carbon atoms **[2]**
333/08 . . . . Hydrogen atoms or radicals containing only hydrogen and carbon atoms **[2]**
333/10 . . . . . Thiophene **[2]**
333/12 . . . . Radicals substituted by halogen atoms or nitro or nitroso radicals **[2]**
333/14 . . . . Radicals substituted by singly bound hetero atoms other than halogen **[2]**
333/16 . . . . . by oxygen atoms **[2]**
333/18 . . . . . by sulfur atoms **[2]**
333/20 . . . . . by nitrogen atoms (nitro, nitroso radicals C07D 333/12) **[2]**
333/22 . . . . Radicals substituted by doubly bound hetero atoms, or by two hetero atoms other than halogen singly bound to the same carbon atom **[2]**
333/24 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
333/26 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to ring carbon atoms **[2]**
333/28 . . . . Halogen atoms **[2]**
333/30 . . . . Hetero atoms other than halogen **[2]**
333/32 . . . . . Oxygen atoms **[2]**
333/34 . . . . . Sulfur atoms **[2]**
333/36 . . . . . Nitrogen atoms (nitro, nitroso radicals C07D 333/42) **[2]**
333/38 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
333/40 . . . . . Thiophene-2-carboxylic acid **[2]**
333/42 . . . . with nitro or nitroso radicals directly attached to ring carbon atoms **[2]**
333/44 . . . . . attached in position 5 **[2]**
333/46 . . substituted on the ring sulfur atom **[2]**
333/48 . . . by oxygen atoms **[2]**
333/50 . condensed with carbocyclic rings or ring systems **[2]**
333/52 . . Benzo [b] thiophenes; Hydrogenated benzo [b] thiophenes **[2]**
333/54 . . . with only hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached to carbon atoms of the hetero ring **[2]**
333/56 . . . . Radicals substituted by oxygen atoms **[2]**
333/58 . . . . Radicals substituted by nitrogen atoms **[2]**
333/60 . . . . Radicals substituted by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals **[2]**
333/62 . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached to carbon atoms of the hetero ring **[2]**
333/64 . . . . Oxygen atoms **[2]**
333/66 . . . . Nitrogen atoms not forming part of a nitro radical **[2]**
333/68 . . . . Carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
333/70 . . . . . attached in position 2 **[2]**

333/72 . . Benzo [c] thiophenes; Hydrogenated benzo [c] thiophenes **[2]**
333/74 . . Naphthothiophenes **[2]**
333/76 . . Dibenzothiophenes **[2]**
333/78 . . condensed with rings other than six-membered or with ring systems containing such rings **[2,5]**
333/80 . . . Seven-membered rings **[2]**

335/00 Heterocyclic compounds containing six-membered rings having one sulfur atom as the only ring hetero atom [2]
335/02 . not condensed with other rings **[2]**
335/04 . condensed with carbocyclic rings or ring systems **[2]**
335/06 . . Benzothiopyrans; Hydrogenated benzothiopyrans **[2]**
335/08 . . Naphthothiopyrans; Hydrogenated naphthothiopyrans **[2]**
335/10 . . Dibenzothiopyrans; Hydrogenated dibenzothiopyrans **[2]**
335/12 . . . Thioxanthenes **[2]**
335/14 . . . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 9 **[2]**
335/16 . . . . . Oxygen atoms, e.g. thioxanthones **[2]**
335/18 . . . . . Nitrogen atoms **[2]**
335/20 . . . . with hydrocarbon radicals, substituted by amino radicals, directly attached in position 9 **[2]**

337/00 Heterocyclic compounds containing rings of more than six members having one sulfur atom as the only ring hetero atom [2]
337/02 . Seven-membered rings **[2]**
337/04 . . not condensed with other rings **[2]**
337/06 . . condensed with carbocyclic rings or ring systems **[2]**
337/08 . . . condensed with one six-membered ring **[2]**
337/10 . . . condensed with two six-membered rings **[2]**
337/12 . . . . [b, e]-condensed **[2]**
337/14 . . . . [b, f]-condensed **[2]**
337/16 . Eight-membered rings **[2]**

339/00 Heterocyclic compounds containing rings having two sulfur atoms as the only ring hetero atoms [2]
339/02 . Five-membered rings **[2]**
339/04 . . having the hetero atoms in positions 1 and 2, e.g. lipoic acid **[2]**
339/06 . . having the hetero atoms in positions 1 and 3, e.g. cyclic dithiocarbonates **[2]**
339/08 . Six-membered rings **[2]**

341/00 Heterocyclic compounds containing rings having three or more sulfur atoms as the only ring hetero atoms [2]

343/00 Heterocyclic compounds containing rings having sulfur and selenium or sulfur and tellurium atoms as the only ring hetero atoms [2]

345/00 Heterocyclic compounds containing rings having selenium or tellurium atoms as the only ring hetero atoms [2]

347/00 Heterocyclic compounds containing rings having halogen atoms as ring hetero atoms [2]

Heterocyclic compounds containing two or more hetero rings [2]

Note

Groups C07D 401/00 to C07D 421/00 cover compounds containing two or more relevant hetero rings at least two of which are covered by different main groups of groups C07D 203/00 to C07D 347/00, neither condensed among themselves nor condensed with a common carbocyclic ring or ring system. **[2]**

401/00 Heterocyclic compounds containing two or more hetero rings, having nitrogen atoms as the only ring hetero atoms, at least one ring being a six-membered ring with only one nitrogen atom [2]
401/02 . containing two hetero rings **[2]**
401/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
401/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
401/08 . . linked by a carbon chain containing alicyclic rings **[2]**
401/10 . . linked by a carbon chain containing aromatic rings **[2]**
401/12 . . linked by a chain containing hetero atoms as chain links **[2]**
401/14 . containing three or more hetero rings **[2]**

403/00 Heterocyclic compounds containing two or more hetero rings, having nitrogen atoms as the only ring hetero atoms, not provided for by group C07D 401/00 [2]
403/02 . containing two hetero rings **[2]**
403/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
403/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
403/08 . . linked by a carbon chain containing alicyclic rings **[2]**
403/10 . . linked by a carbon chain containing aromatic rings **[2]**
403/12 . . linked by a chain containing hetero atoms as chain links **[2]**
403/14 . containing three or more hetero rings **[2]**

405/00 Heterocyclic compounds containing both one or more hetero rings having oxygen atoms as the only ring hetero atoms, and one or more rings having nitrogen as the only ring hetero atom [2]
405/02 . containing two hetero rings **[2]**
405/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
405/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
405/08 . . linked by a carbon chain containing alicyclic rings **[2]**
405/10 . . linked by a carbon chain containing aromatic rings **[2]**
405/12 . . linked by a chain containing hetero atoms as chain links **[2]**
405/14 . containing three or more hetero rings **[2]**

407/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having oxygen atoms as the only ring hetero atoms, not provided for by group C07D 405/00 [2]
407/02 . containing two hetero rings **[2]**

407/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
407/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
407/08 . . linked by a carbon chain containing alicyclic rings **[2]**
407/10 . . linked by a carbon chain containing aromatic rings **[2]**
407/12 . . linked by a chain containing hetero atoms as chain links **[2]**
407/14 . containing three or more hetero rings **[2]**

409/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having sulfur atoms as the only ring hetero atoms [2]
409/02 . containing two hetero rings **[2]**
409/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
409/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
409/08 . . linked by a carbon chain containing alicyclic rings **[2]**
409/10 . . linked by a carbon chain containing aromatic rings **[2]**
409/12 . . linked by a chain containing hetero atoms as chain links **[2]**
409/14 . containing three or more hetero rings **[2]**

411/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having oxygen and sulfur atoms as the only ring hetero atoms [2]
411/02 . containing two hetero rings **[2]**
411/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
411/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
411/08 . . linked by a carbon chain containing alicyclic rings **[2]**
411/10 . . linked by a carbon chain containing aromatic rings **[2]**
411/12 . . linked by a chain containing hetero atoms as chain links **[2]**
411/14 . containing three or more hetero rings **[2]**

413/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having nitrogen and oxygen atoms as the only ring hetero atoms [2]
413/02 . containing two hetero rings **[2]**
413/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
413/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
413/08 . . linked by a carbon chain containing alicyclic rings **[2]**
413/10 . . linked by a carbon chain containing aromatic rings **[2]**
413/12 . . linked by a chain containing hetero atoms as chain links **[2]**
413/14 . containing three or more hetero rings **[2]**

415/00 Heterocyclic compounds containing the thiamine skeleton [2]

417/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having nitrogen and sulfur atoms as the only ring hetero atoms, not provided for by group C07D 415/00 [2]
417/02 . containing two hetero rings **[2]**
417/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
417/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
417/08 . . linked by a carbon chain containing alicyclic rings **[2]**
417/10 . . linked by a carbon chain containing aromatic rings **[2]**
417/12 . . linked by a chain containing hetero atoms as chain links **[2]**
417/14 . containing three or more hetero rings **[2]**

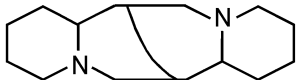
419/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having nitrogen, oxygen, and sulfur atoms as the only ring hetero atoms [2]
419/02 . containing two hetero rings **[2]**
419/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
419/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
419/08 . . linked by a carbon chain containing alicyclic rings **[2]**
419/10 . . linked by a carbon chain containing aromatic rings **[2]**
419/12 . . linked by a chain containing hetero atoms as chain links **[2]**
419/14 . containing three or more hetero rings **[2]**

421/00 Heterocyclic compounds containing two or more hetero rings, at least one ring having selenium, tellurium, or halogen atoms as ring hetero atoms [2]
421/02 . containing two hetero rings **[2]**
421/04 . . directly linked by a ring-member-to-ring- member bond **[2]**
421/06 . . linked by a carbon chain containing only aliphatic carbon atoms **[2]**
421/08 . . linked by a carbon chain containing alicyclic rings **[2]**
421/10 . . linked by a carbon chain containing aromatic rings **[2]**
421/12 . . linked by a chain containing hetero atoms as chain links **[2]**
421/14 . containing three or more hetero rings **[2]**

Heterocyclic compounds containing condensed hetero ring systems [2]

(1) Groups C07D 451/00 to C07D 517/00 cover compounds containing one system of two or more relevant hetero rings condensed among themselves or condensed with a common carbocyclic ring system, with or without other non-condensed hetero rings. **[2]**
(2) For the purpose of classification in groups C07D 451/00 to C07D 519/00, the degree of hydrogenation of the ring system is not taken into consideration. **[2]**

(3) For the purpose of classification in groups C07D 451/00 to C07D 463/00, C07D 473/00 to C07D 477/00, C07D 489/00, C07D 499/00 to C07D 507/00, the wording of the groups has to be understood, in the absence of an indication to the contrary, as including ring systems further condensed with carbocyclic rings or ring systems, but excluding ring systems further condensed with other hetero rings, either directly or through a common carbocyclic ring system, e.g. sparteine



is classified in group C07D 471/22, not in group C07D 455/02. **[3,5]**

(4) In groups C07D 471/00, C07D 487/00, C07D 491/00 to C07D 498/00 or C07D 513/00 to C07D 517/00, the subdivision is based on the number of relevant hetero rings. **[3]**

451/00 Heterocyclic compounds containing 8-azabicyclo [3.2.1] octane, 9-azabicyclo [3.3.1] nonane, or 3-oxa-9-azatricyclo [3.3.1.02,4] nonane ring systems, e.g. tropane or granatane alkaloids, scopolamine; Cyclic acetals thereof [2]

451/02 . containing not further condensed 8-azabicyclo [3.2.1] octane or 3-oxa-9-azatricyclo [3.3.1.02,4] nonane ring systems, e.g. tropane; Cyclic acetals thereof **[2]**

451/04 . . with hetero atoms directly attached in position 3 of the 8-azabicyclo [3.2.1] octane or in position 7 of the 3-oxa-9-azatricyclo [3.3.1.02,4] nonane ring system **[2]**

451/06 . . . Oxygen atoms **[2]**

451/08 . . . . Diarylmethoxy radicals **[2]**

451/10 . . . . acylated by aliphatic or araliphatic carboxylic acids, e.g. atropine, scopolamine **[2]**

451/12 . . . . acylated by aromatic or heteroaromatic carboxylic acids, e.g. cocaine **[2]**

451/14 . containing 9-azabicyclo [3.3.1] nonane ring systems, e.g. granatane, 2-aza-adamantane; Cyclic acetals thereof **[2]**

453/00 Heterocyclic compounds containing quinuclidine or iso-quinuclidine ring systems, e.g. quinine alkaloids [2]

453/02 . containing not further condensed quinuclidine ring systems **[2]**

453/04 . . having a quinolyl-4, a substituted quinolyl-4 or a alkylenedioxy-quinolyl-4 radical linked through only one carbon atom, attached in position 2, e.g. quinine **[2]**

453/06 . containing iso-quinuclidine ring systems **[2]**

455/00 Heterocyclic compounds containing quinolizine ring systems, e.g. emetine alkaloids, protoberberine; Alkylenedioxy derivatives of dibenzo [a, g] quinolizines, e.g. berberine [2]

455/02 . containing not further condensed quinolizine ring systems **[2]**

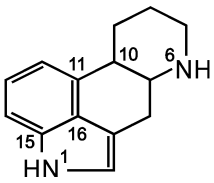
455/03 . containing quinolizine ring systems directly condensed with at least one six-membered carbocyclic ring, e.g. protoberberine; Alkylenedioxy derivatives of dibenzo [a, g] quinolizines, e.g. berberine **[3]**

455/04 . . containing a quinolizine ring system condensed with only one six-membered carbocyclic ring, e.g. julolidine **[2,3]**

455/06 . . . containing benzo [a] quinolizine ring systems **[2,3]**

455/08 . . . . having an isoquinolyl-1, a substituted isoquinolyl-1 or an alkylenedioxyisoquinolyl-1 radical linked through only one carbon atom, attached in position 2, e.g. emetine **[2,3]**

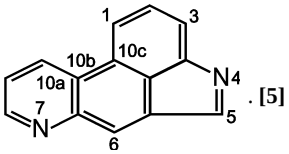
457/00 Heterocyclic compounds containing indolo [4, 3-f, g] quinoline ring systems, e.g. derivatives of ergoline, of the formula:



, e.g. lysergic acid (compounds of the cyclic peptide type derived from ergotamane C07D 519/02) **[2]**

Note

The numbering may be different according to the RING INDEX and given by the formula:



. **[5]**

457/02 . with hydrocarbon or substituted hydrocarbon radicals, attached in position 8 **[2]**

457/04 . with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, directly attached in position 8 **[2]**

457/06 . . Lysergic acid amides **[2]**

457/08 . . . in which the amide nitrogen is a member of a heterocyclic ring **[2]**

457/10 . with hetero atoms directly attached in position 8 **[2]**

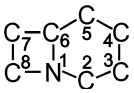
457/12 . . Nitrogen atoms **[2]**

457/14 . containing indolo [4, 3-f, g] quinoline ring systems condensed with carbocyclic rings or ring systems **[3]**

459/00 Heterocyclic compounds containing benz [g] indolo [2, 3-a] quinolizine ring systems, e.g. yohimbine; 16, 18-lactones thereof, e.g. reserpic acid lactone [2]

461/00 Heterocyclic compounds containing indolo [3, 2, 1-d, e] pyrido [3, 2, 1-i, j] [1, 5]-naphthyridine ring systems, e.g. vincamine (dimeric indolo alkaloids C07D 519/04) **[3]**

463/00 Heterocyclic compounds containing 1-azabicyclo [4.2.0] octane ring systems, i.e. compounds containing a ring system of the formula:



, e.g. carbacephalosporins; Such ring systems being further condensed, e.g. 2,3-condensed with an oxygen-, nitrogen- or sulfur-containing hetero ring [5]

463/02 . Preparation (by microbiological processes C12P 17/18) **[6]**

463/04 . . by forming the ring or condensed ring systems **[6]**

463/06 . . from compounds already containing the ring or condensed ring systems, e.g. by dehydrogenation of the ring, by introduction, elimination or modification of substituents **[6]**

463/08 . . . Modification of a carboxyl group directly attached in position 2, e.g. esterification **[6]**

463/10 . with a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[6]**

463/12 . . with hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals attached in position 7 **[6]**

463/14 . . with hetero atoms directly attached in position 7 **[6]**

463/16 . . . Nitrogen atoms **[6]**

463/18 . . . . further acylated by radicals derived from carboxylic acids or by nitrogen or sulfur analogues thereof **[6]**

463/20 . . . . . with the acylating radicals further substituted by hetero atoms or by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[6]**

463/22 . . . . . further substituted by nitrogen atoms **[6]**

471/00 Heterocyclic compounds containing nitrogen atoms as the only ring hetero atoms in the condensed system, at least one ring being a six-membered ring with one nitrogen atom, not provided for by groups C07D 451/00 to C07D 463/00 [2,5]

471/02 . in which the condensed system contains two hetero rings **[2]**

471/04 . . Ortho-condensed systems (carbacephams, e.g. homothienamycins, C07D 463/00) **[2,5]**

471/06 . . Peri-condensed systems **[2]**

471/08 . . Bridged systems **[2]**

471/10 . . Spiro-condensed systems **[2]**

471/12 . in which the condensed system contains three hetero rings **[2]**

471/14 . . Ortho-condensed systems **[2]**

471/16 . . Peri-condensed systems **[2]**

471/18 . . Bridged systems **[2]**

471/20 . . Spiro-condensed systems **[2]**

471/22 . in which the condensed systems contains four or more hetero rings **[2]**

473/00 Heterocyclic compounds containing purine ring systems [2]

473/02 . with oxygen, sulfur, or nitrogen atoms directly attached in positions 2 and 6 **[2]**

473/04 . . two oxygen atoms **[2]**

473/06 . . . with radicals containing only hydrogen and carbon atoms, attached in position 1 or 3 **[2]**

473/08 . . . . with methyl radicals in positions 1 and 3, e.g. theophylline **[2]**

473/10 . . . . with methyl radicals in positions 3 and 7, e.g. theobromine **[2]**

473/12 . . . . with methyl radicals in positions 1, 3, and 7, e.g. caffeine **[2]**

473/14 . . . . with two methyl radicals in positions 1 and 3 and two methyl radicals in positions 7, 8, or 9 **[2]**

473/16 . . two nitrogen atoms **[2]**

473/18 . . one oxygen and one nitrogen atom, e.g. guanine **[2]**

473/20 . . two sulfur atoms **[2]**

473/22 . . one oxygen and one sulfur atom **[2]**

473/24 . . one nitrogen and one sulfur atom **[2]**

473/26 . with an oxygen, sulfur, or nitrogen atom directly attached in position 2 or 6, but not in both **[2]**

473/28 . . Oxygen atom **[2]**

473/30 . . . attached in position 6, e.g. hypoxanthine **[2]**

473/32 . . Nitrogen atom **[2]**

473/34 . . . attached in position 6, e.g. adenine **[2]**

473/36 . . Sulfur atom **[2]**

473/38 . . . attached in position 6 **[2]**

473/40 . with halogen atoms or perhalogeno-alkyl radicals directly attached in position 2 or 6 **[2]**

475/00 Heterocyclic compounds containing pteridine ring systems [2]

475/02 . with an oxygen atom directly attached in position 4 **[2]**

475/04 . . with a nitrogen atom directly attached in position 2 **[2]**

475/06 . with a nitrogen atom directly attached in position 4 **[2]**

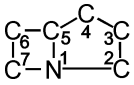
475/08 . . with a nitrogen atom directly attached in position 2 **[2]**

475/10 . . with an aromatic or hetero-aromatic ring directly attached in position 2 **[2]**

475/12 . containing pteridine ring systems condensed with carbocyclic rings or ring systems **[3]**

475/14 . . Benz [g] pteridines, e.g. riboflavin **[3]**

477/00 Heterocyclic compounds containing 1-azabicyclo [3.2.0] heptane ring systems, i.e. compounds containing a ring system of the formula:



, e.g. carbapenicillins, thienamycins;

Such ring systems being further condensed, e.g. 2,3-condensed with an oxygen-, nitrogen- or sulfur-containing hetero ring [5]

477/02 . Preparation (by microbiological processes C12P 17/18) **[6]**

477/04 . . by forming the ring or condensed ring systems **[6]**

477/06 . . from compounds already containing the ring or condensed ring systems, e.g. by dehydrogenation of the ring, by introduction, elimination or modification of substituents **[6]**

477/08 . . . Modification of a carboxyl group directly attached in position 2, e.g. esterification **[6]**

477/10 . with hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, directly attached in position 4, and with a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[6]**

477/12 . . with hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, attached in position 6 **[6]**

477/14 . . . with hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, attached in position 3 **[6]**

477/16 . . . with hetero atoms or carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 3 **[6]**

477/18 . . . . Oxygen atoms **[6]**

477/20 . . . . Sulfur atoms **[6]**

477/22 . . . . Nitrogen atoms **[6]**

477/24 . . with hetero atoms or carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 6 **[6]**

477/26 . with hetero atoms or carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 4 **[6]**

487/00 Heterocyclic compounds containing nitrogen atoms as the only ring hetero atoms in the condensed system, not provided for by groups C07D 451/00 to C07D 477/00 [2,5]

487/02 . in which the condensed system contains two hetero rings **[2]**

487/04 . . Ortho-condensed systems (carbapenams, e.g. thienamycins, C07D 477/00) **[2,5]**

487/06 . . Peri-condensed systems **[2]**

487/08 . . Bridged systems **[2]**

487/10 . . Spiro-condensed systems **[2]**

487/12 . in which the condensed system contains three hetero rings **[2]**

487/14 . . Ortho-condensed systems **[2]**

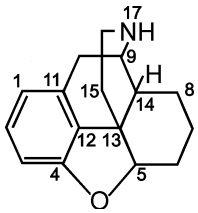
487/16 . . Peri-condensed systems **[2]**

487/18 . . Bridged systems **[2]**

487/20 . . Spiro-condensed systems **[2]**

487/22 . in which the condensed system contains four or more hetero rings **[2]**

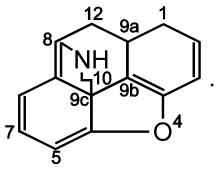
489/00 Heterocyclic compounds containing 4aH-8, 9 c-Iminoethano-phenanthro [4, 5-b, c, d] furan ring systems, e.g. derivatives of [4, 5-epoxy]-morphinan of the formula:



[2]

Note

The numbering may be different according to the RING INDEX and given by the formula:



. **[5]**

489/02 . with oxygen atoms attached in positions 3 and 6, e.g. morphine, morphinone **[2]**

489/04 . . Salts; Organic complexes **[2]**

489/06 . with a hetero atom directly attached in position 14 **[2]**

489/08 . . Oxygen atom **[2]**

489/09 . containing 4aH-8, 9 c-Iminoethano- phenanthro [4, 5-b, c, d] furan ring systems condensed with carbocyclic rings or ring systems **[3]**

489/10 . . with a bridge between positions 6 and 14 **[2,3]**

489/12 . . . the bridge containing only two carbon atoms **[2,3]**

491/00 Heterocyclic compounds containing in the condensed ring system both one or more rings having oxygen atoms as the only ring hetero atoms and one or more rings having nitrogen atoms as the only ring hetero atoms, not provided for by groups C07D 451/00 to C07D 459/00, C07D 463/00, C07D 477/00 or C07D 489/00 [2]

491/02 . in which the condensed system contains two hetero rings **[2]**

491/04 . . Ortho-condensed systems **[2]**

491/044 . . . with only one oxygen atom as ring hetero atom in the oxygen-containing ring **[3]**

491/048 . . . . the oxygen-containing ring being five-membered **[3]**

491/052 . . . . the oxygen-containing ring being six-membered **[3]**

491/056 . . . with two or more oxygen atoms as ring hetero atoms in the oxygen-containing ring **[3]**

491/06 . . Peri-condensed systems **[2]**

491/08 . . Bridged systems **[2]**

491/10 . . Spiro-condensed systems **[2]**

491/107 . . . with only one oxygen atom as ring hetero atom in the oxygen-containing ring **[3]**

491/113 . . . with two or more oxygen atoms as ring hetero atoms in the oxygen-containing ring **[3]**

491/12 . in which the condensed system contains three hetero rings **[2]**

491/14 . . Ortho-condensed systems (alkylenedioxy derivatives of dibenzo [a, g] quinolizines, e.g. berberine, C07D 455/03) **[2]**

491/147 . . . the condensed system containing one ring with oxygen as ring hetero atom and two rings with nitrogen as ring hetero atom **[3]**

491/153 . . . the condensed system containing two rings with oxygen as ring hetero atom and one ring with nitrogen as ring hetero atom **[3]**

491/16 . . Peri-condensed systems **[2]**

491/18 . . Bridged systems (3-oxa-9-azatricyclo [3.3.1.02,4] nonane ring systems, e.g. scopolamine, C07D 451/00) **[2]**

491/20 . . Spiro-condensed systems **[2]**

491/22 . in which the condensed system contains four or more hetero rings **[2]**

493/00 Heterocyclic compounds containing oxygen atoms as the only ring hetero atoms in the condensed system [2]

493/02 . in which the condensed system contains two hetero rings **[2]**

493/04 . . Ortho-condensed systems **[2]**

493/06 . . Peri-condensed systems **[2]**

493/08 . . Bridged systems **[2]**

493/10 . . Spiro-condensed systems **[2]**

493/12 . in which the condensed system contains three hetero rings **[2]**

493/14 . . Ortho-condensed systems **[2]**

493/16 . . Peri-condensed systems **[2]**

493/18 . . Bridged systems **[2]**

493/20 . . Spiro-condensed systems **[2]**

493/22 . in which the condensed system contains four or more hetero rings **[2]**

495/00 Heterocyclic compounds containing in the condensed system at least one hetero ring having sulfur atoms as the only ring hetero atoms [2]

495/02 . in which the condensed system contains two hetero rings **[2]**

495/04 . . Ortho-condensed systems **[2]**
495/06 . . Peri-condensed systems **[2]**
495/08 . . Bridged systems **[2]**
495/10 . . Spiro-condensed systems **[2]**
495/12 . in which the condensed system contains three hetero rings **[2]**
495/14 . . Ortho-condensed systems **[2]**
495/16 . . Peri-condensed systems **[2]**
495/18 . . Bridged systems **[2]**
495/20 . . Spiro-condensed systems **[2]**
495/22 . in which the condensed system contains four or more hetero rings **[2]**

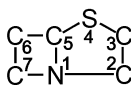
497/00 Heterocyclic compounds containing in the condensed system at least one hetero ring having oxygen and sulfur atoms as the only ring hetero atoms [2]

497/02 . in which the condensed system contains two hetero rings **[2]**
497/04 . . Ortho-condensed systems **[2]**
497/06 . . Peri-condensed systems **[2]**
497/08 . . Bridged systems **[2]**
497/10 . . Spiro-condensed systems **[2]**
497/12 . in which the condensed system contains three hetero rings **[2]**
497/14 . . Ortho-condensed systems **[2]**
497/16 . . Peri-condensed systems **[2]**
497/18 . . Bridged systems **[2]**
497/20 . . Spiro-condensed systems **[2]**
497/22 . in which the condensed system contains four or more hetero rings **[2]**

498/00 Heterocyclic compounds containing in the condensed system at least one hetero ring having nitrogen and oxygen atoms as the only ring hetero atoms (4-oxa-1-azabicyclo [3.2.0] heptanes, e.g. oxapenicillins C07D 503/00; 5-oxa-1-azabicyclo [4.2.0] octanes, e.g. oxacephalosporins C07D 505/00; analogues thereof having ring oxygen atoms in other position C07D 507/00) **[2,6]**

498/02 . in which the condensed system contains two hetero rings **[2]**
498/04 . . Ortho-condensed systems **[2]**
498/06 . . Peri-condensed systems **[2]**
498/08 . . Bridged systems **[2]**
498/10 . . Spiro-condensed systems **[2]**
498/12 . in which the condensed system contains three hetero rings **[2]**
498/14 . . Ortho-condensed systems **[2]**
498/16 . . Peri-condensed systems **[2]**
498/18 . . Bridged systems **[2]**
498/20 . . Spiro-condensed systems **[2]**
498/22 . in which the condensed system contains four or more hetero rings **[2]**

499/00 Heterocyclic compounds containing 4-thia-1-azabicyclo [3.2.0] heptane ring systems, i.e. compounds containing a ring system of the formula:



, e.g. penicillins, penems; **Such ring systems being further condensed, e.g. 2,3-condensed with an oxygen-, nitrogen- or sulfur-containing hetero ring [2]**

499/04 . Preparation **[2,6]**
499/06 . . by forming the ring or condensed ring systems (by microbiological processes C12P 37/00) **[2,6]**
499/08 . . Modification of a carboxyl radical directly attached in position 2, e.g. esterification **[2,6]**
499/10 . . Modification of an amino radical directly attached in position 6 **[2,6]**
499/12 . . . Acylation **[2,6]**
499/14 . . Preparation of salts **[2,6]**
499/16 . . . of alkali or alkaline earth metals **[2,6]**
499/18 . . Separation; Purification **[2,6]**
499/20 . . . via salts with organic bases **[2,6]**
499/21 . with a nitrogen atom directly attached in position 6 and a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[6]**
499/22 . . Salts with organic bases; Complexes with organic compounds **[2]**
499/24 . . . with acyclic or carbocyclic compounds containing amino radicals **[2]**
499/26 . . . with heterocyclic compounds **[2]**
499/28 . . with modified 2-carboxyl group **[2]**
499/30 . . . Acid anhydride **[2]**
499/32 . . . Esters **[2]**
499/34 . . . Thio-acid; Esters thereof **[2]**
499/36 . . . . O-esters **[2]**
499/38 . . . . S-esters **[2]**
499/40 . . . Amides; Hydrazides; Azides **[2]**
499/42 . . Compounds with a free primary amino radical attached in position 6 **[2]**
499/44 . . Compounds with an amino radical acylated by carboxylic acids, attached in position 6 **[2]**
499/46 . . . with acyclic hydrocarbon radicals or such radicals substituted by carbocyclic or heterocyclic rings, attached to the carboxamido radical **[2]**
499/48 . . . with a carbon chain, substituted by hetero atoms or by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. ester or nitrile radicals, attached to the carboxamido radical **[2]**
499/50 . . . . substituted in beta-position to the carboxamido radical **[2]**
499/52 . . . . . by oxygen or sulfur atoms **[2]**
499/54 . . . . . by nitrogen atoms **[2]**
499/56 . . . . . by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[2]**
499/58 . . . . substituted in alpha-position to the carboxamido radical **[2]**
499/60 . . . . . by oxygen atoms **[2]**
499/62 . . . . . by sulfur atoms **[2]**
499/64 . . . . . by nitrogen atoms **[2]**
499/66 . . . . . with alicyclic rings as additional substituents on the carbon chain **[2]**
499/68 . . . . . with aromatic rings as additional substituents on the carbon chain **[2]**
499/70 . . . . . with hetero rings as additional substituents on the carbon chain **[2]**
499/72 . . . . . by carbon atoms having three bonds to hetero atoms **[2]**
499/74 . . . with carbocyclic rings directly attached to the carboxamido radical **[2]**
499/76 . . . with hetero rings directly attached to the carboxamido radical **[2]**
499/78 . . Compounds with an amino radical, acylated by carbonic acid, or by nitrogen or sulfur analogues thereof, attached in position 6 **[2]**

499/80 . . Compounds with a nitrogen-containing hetero ring, attached with the ring nitrogen atom in position 6 **[2]**

499/86 . with only atoms other than nitrogen atoms directly attached in position 6 and a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[5,6]**

499/861 . . with a hydrocarbon radical or a substituted hydrocarbon radical, directly attached in position 6 **[6]**

499/865 . . with hetero atoms or with carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 6 **[6]**

499/87 . Compounds being unsubstituted in position 3 or with substituents other than only two methyl radicals attached in position 3, and with a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[6]**

499/88 . Compounds with a double bond between positions 2 and 3 and a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[5,6]**

499/881 . . with a hydrogen atom or an unsubstituted hydrocarbon radical, attached in position 3 **[6]**

499/883 . . with a substituted hydrocarbon radical attached in position 3 **[6]**

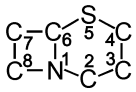
499/887 . . with a hetero atom or a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 3 **[6]**

499/893 . . with a hetero ring or a condensed hetero ring system, directly attached in position 3 **[6]**

499/897 . Compounds with substituents other than a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, directly attached in position 2 **[6]**

499/90 . further condensed with carbocyclic rings or ring systems **[5]**

501/00 Heterocyclic compounds containing 5-thia-1-azabicyclo [4.2.0] octane ring systems, i.e. compounds containing a ring system of the formula:



, e.g. cephalosporins; **Such ring systems being further condensed, e.g. 2,3-condensed with an oxygen-, nitrogen- or sulfur-containing hetero ring [2]**

501/02 . Preparation **[2]**

501/04 . . from compounds already containing the ring or condensed ring systems, e.g. by dehydrogenation of the ring, by introduction, elimination or modification of substituents **[2]**

501/06 . . . Acylation of 7-aminocephalosporanic acid **[2]**

501/08 . . by forming the ring or condensed ring systems (by microbiological processes C12P 35/00) **[2]**

501/10 . . . from compounds containing the penicillin ring system **[2]**

501/12 . . Separation; Purification **[2]**

501/14 . Compounds having a nitrogen atom directly attached in position 7 **[2]**

501/16 . . with a double bond between positions 2 and 3 **[2]**

501/18 . . . 7-Aminocephalosporanic or substituted 7-aminocephalosporanic acids **[2]**

501/20 . . . 7-Acylaminocephalosporanic or substituted 7-acylaminocephalosporanic acids in which the acyl radicals are derived from carboxylic acids **[2]**

501/22 . . . . with radicals containing only hydrogen and carbon atoms, attached in position 3 **[2]**

501/24 . . . . with hydrocarbon radicals, substituted by hetero atoms or hetero rings, attached in position 3 **[2]**

501/26 . . . . . Methylene radicals, substituted by oxygen atoms; Lactones thereof with the 2-carboxyl group **[2]**

501/28 . . . . . with the 7-amino radical acylated by an aliphatic carboxylic acid, which is substituted by hetero atoms **[2]**

501/30 . . . . . with the 7-amino-radical acylated by an araliphatic carboxylic acid **[2]**

501/32 . . . . . with the 7-amino radical acylated by an araliphatic carboxylic acid, which is substituted on the aliphatic radical by hetero atoms **[2]**

501/34 . . . . . with the 7-amino radical acylated by carboxylic acids containing hetero rings **[2]**

501/36 . . . . . Methylene radicals, substituted by sulfur atoms **[2]**

501/38 . . . . . Methylene radicals, substituted by nitrogen atoms; Lactams thereof with the 2-carboxyl group; Methylene radicals substituted by nitrogen-containing hetero rings attached by the ring nitrogen atom; Quaternary compounds thereof **[2]**

501/40 . . . . . with the 7-amino radical acylated by an aliphatic carboxylic acid, which is substituted by hetero atoms **[2]**

501/42 . . . . . with the 7-amino radical acylated by an araliphatic carboxylic acid **[2]**

501/44 . . . . . with the 7-amino radical acylated by an araliphatic carboxylic acid, which is substituted on the aliphatic radical by hetero atoms **[2]**

501/46 . . . . . with the 7-amino radical acylated by carboxylic acids containing hetero rings **[2]**

501/48 . . . . . Methylene radicals, substituted by hetero rings (C07D 501/38 to C07D 501/46 take precedence) **[2]**

501/50 . . . . . with the 7-amino radical acylated by an aliphatic carboxylic acid, which is substituted by hetero atoms **[2]**

501/52 . . . . . with the 7-amino radical acylated by an araliphatic carboxylic acid **[2]**

501/54 . . . . . with the 7-amino radical acylated by an araliphatic carboxylic acid, which is substituted on the aliphatic radical by hetero atoms **[2]**

501/56 . . . . . with the 7-amino radical acylated by carboxylic acids containing hetero rings **[2]**

501/57 . . . . with a further substituent in position 7, e.g. cephamycines **[3]**

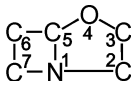
501/58 . . . with a nitrogen atom, which is a member of a hetero ring, attached in position 7 **[2]**

501/59 . . . with hetero atoms directly attached in position 3 **[3]**

501/60 . . with a double bond between positions 3 and 4 **[2]**

501/62 . Compounds further condensed with a carbocyclic ring or ring system **[3]**

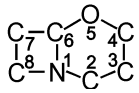
503/00 **Heterocyclic compounds containing 4-oxa-1-azabicyclo [3.2.0] heptane ring systems, i.e. compounds containing a ring system of the formula:**



, e.g. oxapenicillins, clavulanic acid derivatives; **Such ring systems being further condensed, e.g. 2,3-condensed with an oxygen-, nitrogen- or sulfur-containing hetero ring [6]**

503/02 . Preparation (by microbiological processes C12P 17/18) **[6]**
503/04 . . by forming the ring or condensed ring systems **[6]**
503/06 . . from compounds already containing the ring or condensed ring systems, e.g. by dehydrogenation of the ring, by introduction, elimination or modification of substituents **[6]**
503/08 . . . Modification of a carboxyl group directly attached in position 2, e.g. esterification **[6]**
503/10 . with a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[6]**
503/12 . . unsubstituted in position 6 **[6]**
503/14 . . . with hydrogen atoms, hydrocarbon or substituted hydrocarbon radicals, other than a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, attached in position 3 **[6]**
503/16 . . . . Radicals substituted by hetero atoms or by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical **[6]**
503/18 . . . . . by oxygen atoms **[6]**
503/20 . . . . . by sulfur atoms **[6]**
503/22 . . . . . by nitrogen atoms **[6]**

505/00 **Heterocyclic compounds containing 5-oxa-1-azabicyclo [4.2.0] octane ring systems, i.e. compounds containing a ring system of the formula:**



, e.g. oxacephalosporins; **Such ring systems being further condensed, e.g. 2,3-condensed with an oxygen-, nitrogen- or sulfur-containing hetero ring [6]**

505/02 . Preparation (by microbiological processes C12P 17/18) **[6]**
505/04 . . by forming the ring or condensed ring systems **[6]**
505/06 . . from compounds already containing the ring or condensed ring systems, e.g. by dehydrogenation of the ring, by introduction, elimination or modification of substituents **[6]**
505/08 . . . Modification of a carboxyl group directly attached in position 2, e.g. esterification **[6]**
505/10 . with a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, e.g. an ester or nitrile radical, directly attached in position 2 **[6]**
505/12 . . substituted in position 7 **[6]**
505/14 . . . with hetero atoms directly attached in position 7 **[6]**
505/16 . . . . Nitrogen atoms **[6]**
505/18 . . . . . further acylated by radicals derived from carboxylic acids or by nitrogen or sulfur analogues thereof **[6]**
505/20 . . . . . with the acylating radicals further substituted by hetero atoms or by carbon atoms having three bonds to hetero atoms with at the most one bond to halogen **[6]**
505/22 . . . . . further substituted by singly-bound nitrogen atoms **[6]**
505/24 . . . . . further substituted by doubly-bound nitrogen atoms **[6]**

507/00 **Heterocyclic compounds containing a condensed beta-lactam ring system, not provided for by groups C07D 463/00, C07D 477/00 or C07D 499/00 to C07D 505/00**; **Such ring systems being further condensed [6]**

507/02 . containing 3-oxa-1-azabicyclo [3.2.0] heptane ring systems **[6]**
507/04 . containing 2-oxa-1-azabicyclo [4.2.0] octane ring systems **[6]**
507/06 . containing 3-oxa-1-azabicyclo [4.2.0] octane ring systems **[6]**
507/08 . containing 4-oxa-1-azabicyclo [4.2.0] octane ring systems **[6]**

513/00 **Heterocyclic compounds containing in the condensed system at least one hetero ring having nitrogen and sulfur atoms as the only ring hetero atoms, not provided for in groups C07D 463/00, C07D 477/00 or C07D 499/00 to C07D 507/00 [2,6]**

513/02 . in which the condensed system contains two hetero rings **[2]**
513/04 . . Ortho-condensed systems **[2]**
513/06 . . Peri-condensed systems **[2]**
513/08 . . Bridged systems **[2]**
513/10 . . Spiro-condensed systems **[2]**
513/12 . in which the condensed system contains three hetero rings **[2]**
513/14 . . Ortho-condensed systems **[2]**
513/16 . . Peri-condensed systems **[2]**
513/18 . . Bridged systems **[2]**
513/20 . . Spiro-condensed systems **[2]**
513/22 . in which the condensed system contains four or more hetero rings **[2]**

515/00 **Heterocyclic compounds containing in the condensed system at least one hetero ring having nitrogen, oxygen, and sulfur atoms as the only ring hetero atoms, not provided for in groups C07D 463/00, C07D 477/00 or C07D 499/00 to C07D 507/00 [2]**

515/02 . in which the condensed system contains two hetero rings **[2]**
515/04 . . Ortho-condensed systems **[2]**
515/06 . . Peri-condensed systems **[2]**
515/08 . . Bridged systems **[2]**
515/10 . . Spiro-condensed systems **[2]**
515/12 . in which the condensed system contains three hetero rings **[2]**
515/14 . . Ortho-condensed systems **[2]**
515/16 . . Peri-condensed systems **[2]**
515/18 . . Bridged systems **[2]**
515/20 . . Spiro-condensed systems **[2]**
515/22 . in which the condensed system contains four or more hetero rings **[2]**

517/00 Heterocyclic compounds containing in the condensed system at least one hetero ring having selenium, tellurium, or halogen atoms as ring hetero atoms [2]

517/02 . in which the condensed system contains two hetero rings **[2]**
517/04 . . Ortho-condensed systems **[2]**
517/06 . . Peri-condensed systems **[2]**
517/08 . . Bridged systems **[2]**
517/10 . . Spiro-condensed systems **[2]**
517/12 . in which the condensed system contains three hetero rings **[2]**
517/14 . . Ortho-condensed systems **[2]**
517/16 . . Peri-condensed systems **[2]**
517/18 . . Bridged systems **[2]**
517/20 . . Spiro-condensed systems **[2]**
517/22 . in which the condensed system contains four or more hetero rings **[2]**

519/00 Heterocyclic compounds containing more than one system of two or more relevant hetero rings condensed among themselves or condensed with a common carbocyclic ring system not provided for in groups C07D 453/00 or C07D 455/00 [2]

519/02 . Ergot alkaloids of the cyclic peptide type **[2]**
519/04 . Dimeric indole alkaloids, e.g. vincaleucoblastine **[2]**
519/06 . containing at least one condensed beta-lactam ring system, provided for by groups C07D 463/00, C07D 477/00 or C07D 499/00 to C07D 507/00, e.g. a penem or a cepham system **[6]**

521/00 Heterocyclic compounds containing unspecified hetero rings [2]

Note

This group is only used for the classification of heterocyclic compounds the chemical structure of which are not specified, i.e. only in those cases where the heterocyclic compounds cannot be classified in any of groups C07D 201/00 to C07D 519/00. **[2009.01]**

C07F ACYCLIC, CARBOCYCLIC, OR HETEROCYCLIC COMPOUNDS CONTAINING ELEMENTS OTHER THAN CARBON, HYDROGEN, HALOGEN, OXYGEN, NITROGEN, SULFUR, SELENIUM, OR TELLURIUM (metal-containing porphyrins C07D 487/22)

(1) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07K and within these subclasses. **[8]**
(2) Attention is drawn to Note (6) following the title of class C07. **[2]**
(3) Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**
(4) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**
(5) In this subclass, organic acid salts, alcoholates, phenates, chelates or mercaptides are classified as the parent compounds. **[2]**

1/00 Compounds containing elements of the 1st Group of the Periodic System

1/02 . Lithium compounds
1/04 . Sodium compounds
1/06 . Potassium compounds
1/08 . Copper compounds
1/10 . Silver compounds
1/12 . Gold compounds

3/00 Compounds containing elements of the 2nd Group of the Periodic System

3/02 . Magnesium compounds
3/04 . Calcium compounds
3/06 . Zinc compounds
3/08 . Cadmium compounds
3/10 . Mercury compounds
3/12 . . Aromatic substances containing mercury
3/14 . . Heterocyclic substances containing mercury

5/00 Compounds containing elements of the 3rd Group of the Periodic System

5/02 . Boron compounds
5/04 . . Esters of boric acids
5/05 . . Cyclic compounds having at least one ring containing boron but no carbon in the ring **[2]**
5/06 . Aluminium compounds

7/00 Compounds containing elements of the 4th Group of the Periodic System

7/02 . Silicon compounds
7/04 . . Esters of silicic acids
7/06 . . . with hydroxyaryl compounds
7/07 . . . Cyclic esters **[2]**
7/08 . . Compounds having one or more C−Si linkages
7/10 . . . containing nitrogen
7/12 . . . Organo silicon halides
7/14 . . . . Preparation thereof from halogenated silanes and hydrocarbons
7/16 . . . . Preparation thereof from silicon and halogenated hydrocarbons
7/18 . . . Compounds having one or more C−Si linkages as well as one or more C−O−Si linkages
7/20 . . . Purification; Separation
7/21 . . Cyclic compounds having at least one ring containing silicon but no carbon in the ring **[2]**
7/22 . Tin compounds
7/24 . Lead compounds
7/26 . . Tetra-alkyl lead compounds
7/28 . Titanium compounds
7/30 . Germanium compounds **[2]**

9/00 Compounds containing elements of the 5th Group of the Periodic System

9/02 . Phosphorus compounds **[2]**

9/04 . . Reaction products of phosphorus sulfur compounds with hydrocarbons
9/06 . . without P−C bonds
9/08 . . . Esters of oxyacids of phosphorus
9/09 . . . . Esters of phosphoric acids **[2]**
9/10 . . . . . Phosphatides, e.g. lecithin
9/11 . . . . . with hydroxyalkyl compounds without further substituents on alkyl **[2]**
9/113 . . . . . with unsaturated acyclic alcohols **[2]**
9/117 . . . . . with cycloaliphatic alcohols **[2]**
9/12 . . . . . with hydroxyaryl compounds **[2]**
9/14 . . . . . containing P-halide groups **[2]**
9/141 . . . . Esters of phosphorous acids **[2]**
9/142 . . . . . with hydroxyalkyl compounds without further substituents on alkyl **[2]**
9/143 . . . . . with unsaturated acyclic alcohols **[2]**
9/144 . . . . . with cycloaliphatic alcohols **[2]**
9/145 . . . . . with hydroxyaryl compounds **[2]**
9/146 . . . . . containing P-halide groups **[2]**
9/16 . . . Esters of thiophosphoric acids or thiophosphorous acids
9/165 . . . . Esters of thiophosphoric acids **[2]**
9/17 . . . . . with hydroxyalkyl compounds without further substituents on alkyl **[2]**
9/173 . . . . . with unsaturated acyclic alcohols **[2]**
9/177 . . . . . with cycloaliphatic alcohols **[2]**
9/18 . . . . . with hydroxyaryl compounds **[2]**
9/20 . . . . . containing P-halide groups **[2]**
9/201 . . . . Esters of thiophosphorous acids **[2]**
9/202 . . . . . with hydroxyalkyl compounds without further substituents on alkyl **[2]**
9/203 . . . . . with unsaturated acyclic alcohols **[2]**
9/204 . . . . . with cycloaliphatic alcohols **[2]**
9/205 . . . . . with hydroxyaryl compounds **[2]**
9/206 . . . . . containing P-halide groups **[2]**
9/22 . . . Amides of acids of phosphorus
9/24 . . . . Esteramides
9/26 . . . . containing P-halide groups
9/28 . . with one or more P−C bonds
9/30 . . . Phosphinic acids (R_2=P(:O)OH); Thiophosphinic acids
9/32 . . . . Esters thereof
9/34 . . . . Halides thereof
9/36 . . . . Amides thereof
9/38 . . . Phosphonic acids (R−P(:O)$(OH)_2$); Thiophosphonic acids
9/40 . . . . Esters thereof
9/42 . . . . Halides thereof
9/44 . . . . Amides thereof
9/46 . . . Phosphinous acids (R_2=P−OH); Thiophosphinous acids
9/48 . . . Phosphonous acids (R−P$(OH)_2$); Thiophosphonous acids
9/50 . . . Organo-phosphines
9/52 . . . . Halophosphines
9/53 . . . . Organo-phosphine oxides; Organo-phosphine sulfides **[2]**
9/535 . . . Organo-phosphoranes **[3]**
9/54 . . . Quaternary phosphonium compounds
9/547 . . Heterocyclic compounds, e.g. containing phosphorus as a ring hetero atom **[5]**
9/553 . . . having one nitrogen atom as the only ring hetero atom **[5]**
9/564 . . . . Three-membered rings **[5]**
9/568 . . . . Four-membered rings **[5]**
9/572 . . . . Five-membered rings **[5]**
9/576 . . . . Six-membered rings **[5]**
9/58 . . . . . Pyridine rings **[5]**
9/59 . . . . . Hydrogenated pyridine rings **[5]**
9/60 . . . . . Quinoline or hydrogenated quinoline ring systems **[5]**
9/62 . . . . . Isoquinoline or hydrogenated isoquinoline ring systems **[5]**
9/64 . . . . . Acridine or hydrogenated acridine ring systems **[5]**
9/645 . . . having two nitrogen atoms as the only ring hetero atoms **[5]**
9/6503 . . . . Five-membered rings **[5]**
9/6506 . . . . . having the nitrogen atoms in positions 1 and 3 **[5]**
9/6509 . . . . Six-membered rings **[5]**
9/6512 . . . . . having the nitrogen atoms in positions 1 and 3 **[5]**
9/6515 . . . having three nitrogen atoms as the only ring hetero atoms **[5]**
9/6518 . . . . Five-membered rings **[5]**
9/6521 . . . . Six-membered rings **[5]**
9/6524 . . . having four or more nitrogen atoms as the only ring hetero atoms **[5]**
9/6527 . . . having nitrogen and oxygen atoms as the only ring hetero atoms **[5]**
9/653 . . . . Five-membered rings **[5]**
9/6533 . . . . Six-membered rings **[5]**
9/6536 . . . having nitrogen and sulfur atoms with or without oxygen atoms, as the only ring hetero atoms **[5]**
9/6539 . . . . Five-membered rings **[5]**
9/6541 . . . . . condensed with carbocyclic rings or ring systems **[5]**
9/6544 . . . . Six-membered rings **[5]**
9/6547 . . . . . condensed with carbocyclic rings or ring systems **[5]**
9/655 . . . having oxygen atoms, with or without sulfur, selenium, or tellurium atoms, as the only ring hetero atoms **[5]**
9/6553 . . . having sulfur atoms, with or without selenium or tellurium atoms, as the only ring hetero atoms **[5]**
9/6558 . . . containing at least two different or differently substituted hetero rings neither condensed among themselves nor condensed with a common carbocyclic ring or ring system **[5]**
9/6561 . . . containing systems of two or more relevant hetero rings condensed among themselves or condensed with a common carbocyclic ring or ring system, with or without other non-condensed hetero rings **[5]**
9/6564 . . . having phosphorus atoms, with or without nitrogen, oxygen, sulfur, selenium or tellurium atoms, as ring hetero atoms **[5]**
9/6568 . . . . having phosphorus atoms as the only ring hetero atoms **[5]**
9/6571 . . . . having phosphorus and oxygen atoms as the only ring hetero atoms **[5]**
9/6574 . . . . . Esters of oxyacids of phosphorus **[5]**

9/6578 . . . . having phosphorus and sulfur atoms with or without oxygen atoms, as ring hetero atoms **[5]**
9/6581 . . . . having phosphorus and nitrogen atoms with or without oxygen or sulfur atoms, as ring hetero atoms **[5]**
9/6584 . . . . . having one phosphorus atom as ring hetero atom **[5]**
9/6587 . . . . . having two phosphorus atoms as ring hetero atoms **[5]**
9/659 . . . . . having three phosphorus atoms as ring hetero atoms **[5]**
9/6593 . . . . . 1,3,5-Triaza-2,4,6-triphosphorines **[5]**
9/6596 . . . having atoms other than oxygen, sulfur, selenium, tellurium, nitrogen or phosphorus as ring hetero atoms **[5]**
9/66 . Arsenic compounds
9/68 . . without As−C bonds
9/70 . . Organo-arsenic compounds
9/72 . . . Aliphatic compounds
9/74 . . . Aromatic compounds
9/76 . . . . containing hydroxyl groups
9/78 . . . . containing amino groups
9/80 . . . Heterocyclic compounds
9/82 . . . . Arsenic compounds containing one or more pyridine rings
9/84 . . . . Arsenic compounds containing one or more quinoline ring systems
9/86 . . . . Arsenic compounds containing one or more isoquinoline ring systems
9/88 . . . . Arsenic compounds containing one or more acridine ring systems
9/90 . Antimony compounds
9/92 . . Aromatic compounds
9/94 . Bismuth compounds

11/00 Compounds containing elements of the 6th Group of the Periodic System

13/00 Compounds containing elements of the 7th Group of the Periodic System

15/00 Compounds containing elements of the 8th Group of the Periodic System
15/02 . Iron compounds
15/03 . . Sideramines; The corresponding desferri compounds
15/04 . Nickel compounds
15/06 . Cobalt compounds

17/00 Metallocenes [2]
17/02 . of metals of the iron group or the platinum group **[2]**

19/00 Metal compounds according to more than one of main groups C07F 1/00 to C07F 17/00 [5]

C07G COMPOUNDS OF UNKNOWN CONSTITUTION (sulfonated fats, oils or waxes of undetermined constution C07C 309/62)

(1) This subclass does not cover peptides or proteins, of unknown constitution, which are covered by subclass C07K. **[4]**
(2) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07K and within these subclasses. **[8]**
(3) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

1/00 Low-molecular-weight derivatives of lignin *(high-molecular-weight derivatives of lignin C08H 7/00)* **[1,2011.01]**

3/00 Glycosides (polysaccharides C08B)

5/00 Alkaloids

9/00 Ammonium bituminosulfonate, e.g. Ichthyol

11/00 Antibiotics

13/00 Vitamins (vitamin K_1 C07C 50/14; pantothenic acid C07C 235/12; vitamins of the D group C07C 401/00; vitamin A C07C 403/00; pyridoxal, pyridoxamin C07D 213/66; pyridoxin C07D 213/67; vitamin C C07D 307/62; tocopherols C07D 311/72; lipoic acid C07D 339/04; vitamin B_1 C07D 415/00; riboflavin C07D 475/14; biotin C07D 495/04; sideramines, corresponding desferri compounds C07F 15/03; vitamin B_{12} C07H 23/00)

15/00 Hormones

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

C07H SUGARS; **DERIVATIVES THEREOF**; **NUCLEOSIDES**; **NUCLEOTIDES**; **NUCLEIC ACIDS** (derivatives of aldonic or saccharic acids C07C, C07D; aldonic acids, saccharic acids C07C 59/105, C07C 59/285; cyanohydrins C07C 255/16; glycals C07D; compounds of unknown constitution C07G; polysaccharides, derivatives thereof C08B; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification C12N 15/00; sugar industry C13) **[2]**

(1) This subclass covers compounds containing saccharide radicals (see the definitions in Note (3) below).
(2) This subclass does not cover polysaccharides which for the purpose of this subclass are defined as having more than five saccharide radicals attached to each other by glycosidic linkages.

(3) In this subclass, the following expressions are used with the meanings indicated:

– "saccharide radical" which is derived from acyclic polyhydroxy-aldehydes or acyclic polyhydroxy-ketones, or from their cyclic tautomers, by removing hydrogen atoms or by replacing hetero bonds to oxygen by the same number of hetero bonds to halogen, nitrogen, sulfur, selenium, or tellurium, in accordance with either of the following definitions:

(a) It

(i) consists of an uninterrupted carbon skeleton and oxygen atoms directly attached thereto, and

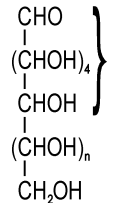
(ii) is considered to be terminated by every bond to a carbon atom of a cyclic structure and by every bond to a carbon atom having three bonds to hetero atoms, e.g. ester or nitrile radicals, and

(iii) contains within the carbon skeleton an unbranched sequence of at the most six carbon atoms in which at least three carbon atoms – at least two in the case of a skeleton having only four carbon atoms – have one single bond to an oxygen atom as the only hetero bond, and

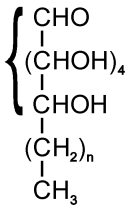
(A) in a cyclic or acyclic sequence, at least one other carbon atom has two single bonds to oxygen atoms as the only hetero bonds, or

(B) in an acyclic sequence, at least one other carbon atom has one double bond to an oxygen atom as the only hetero bond,

the said sequence containing at the most one double bond, i.e. C=C or possibly ketalised C(=O), in addition to the hetero bonds mentioned above under (A) or (B), e.g. the compounds



an unbranched sequence of at the most six carbon atoms, having bonds to oxygen as defined in this Note



n being an integer, are classified in group C07H 3/02; **[4]**

(b) It is also a radical derived from a radical as defined in (a) above by replacing at the most four of the specified hetero bonds to oxygen by the same number of hetero bonds to halogen, nitrogen, sulfur, selenium, or tellurium;

– "heterocyclic radical" or "hetero ring" is considered to exclude saccharide radicals as defined above.

(4) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07K and within these subclasses. **[8]**

(5) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

Subclass index

1/00 Processes for the preparation of sugar derivatives [2]

1/02 . Phosphorylation **[2]**

1/04 . . Introducing polyphosphoric acid radicals **[2]**

1/06 . Separation; Purification **[2]**

1/08 . . from natural products **[2]**

3/00 **Compounds containing only hydrogen atoms and saccharide radicals having only carbon, hydrogen, and oxygen atoms** (preparation by hydrolysis of di-or polysaccharides C13; separation or purification of sucrose, glucose, fructose, lactose or maltose C13) **[2]**

3/02 . Monosaccharides **[2]**

3/04 . Disaccharides **[2]**

3/06 . Oligosaccharides, i.e. having three to five saccharide radicals attached to each other by glycosidic linkages **[2]**

3/08 . Deoxysugars; Unsaturated sugars (1,2-dideoxy-1-enoses C07D); Osones **[2]**

3/10 . Anhydrosugars, e.g. epoxides **[2]**

5/00 **Compounds containing saccharide radicals in which the hetero bonds to oxygen have been replaced by the same number of hetero bonds to halogen, nitrogen, sulfur, selenium, or tellurium [2]**

5/02 . to halogen **[2]**

5/04 . to nitrogen **[2]**

5/06 . . Aminosugars **[2]**

5/08 . to sulfur, selenium, or tellurium **[2]**

5/10 . . to sulfur **[2]**

7/00 **Compounds containing non-saccharide radicals linked to saccharide radicals by a carbon-to-carbon bond [2]**

7/02 . Acyclic radicals **[2]**

7/027 . . Keto-aldonic acids **[4]**

7/033 . . Uronic acids **[4]**

7/04 . Carbocyclic radicals **[2]**

7/06 . Heterocyclic radicals **[2]**

9/00 **Compounds containing a hetero ring sharing at least two hetero atoms with a saccharide radical [2]**

9/02 . the hetero ring containing only oxygen as ring hetero atoms **[2]**

9/04 . . Cyclic acetals **[2]**

9/06 . the hetero ring containing nitrogen as ring hetero atoms **[2]**

11/00 **Compounds containing saccharide radicals esterified by inorganic acids**; **Metal salts thereof** (halo-sugars C07H 5/02; thio-, seleno-, or telluro-sugars C07H 5/08) **[2]**

11/02 . Nitrates; Nitrites **[2]**

11/04 . Phosphates; Phosphites; Polyphosphates **[2]**

13/00 **Compounds containing saccharide radicals esterified by carbonic acid or derivatives thereof, or by organic acids, e.g. phosphonic acids [2]**

13/02 . by carboxylic acids **[2]**

13/04 . . having the esterifying carboxyl radicals attached to acyclic carbon atoms **[2]**

13/06 . . . Fatty acids **[2]**

13/08 . . having the esterifying carboxyl radicals directly attached to carbocyclic rings **[2]**

13/10 . . having the esterifying carboxyl radicals directly attached to heterocyclic rings **[2]**

13/12 . by acids having the group $-X-C(=X)-X-$, or halides thereof, in which X means nitrogen, oxygen, sulfur, selenium, or tellurium, e.g. carbonic acid, carbamic acid **[2]**

15/00 **Compounds containing hydrocarbon or substituted hydrocarbon radicals directly attached to hetero atoms of saccharide radicals [2]**

Note

In this group, acyl radicals directly attached to hetero atoms of the saccharide radicals are not considered as substituted hydrocarbon radicals. **[4]**

15/02 . Acyclic radicals, not substituted by cyclic structures **[2]**

15/04 . . attached to an oxygen atom of a saccharide radical **[2]**

15/06 . . . being a hydroxyalkyl group esterified by a fatty acid **[4]**

15/08 . . . Polyoxyalkylene derivatives **[2]**

15/10 . . . containing unsaturated carbon-to-carbon bonds **[2]**

15/12 . . attached to a nitrogen atom of a saccharide radical **[2]**

15/14 . . attached to a sulfur, selenium or tellurium atom of a saccharide radical **[2]**

15/16 . . . Lincomycin; Derivatives thereof **[2]**

15/18 . Acyclic radicals, substituted by carbocyclic rings **[2]**

15/20 . Carbocyclic rings **[2]**

15/203 . . Monocyclic carbocyclic rings other than cyclohexane rings; Bicyclic carbocyclic ring systems **[4]**

15/207 . . Cyclohexane rings not substituted by nitrogen atoms, e.g. kasugamycins **[4]**

15/22 . . Cyclohexane rings, substituted by nitrogen atoms **[4]**

15/222 . . . Cyclohexane rings, substituted by at least two nitrogen atoms **[4]**

15/224 . . . . with only one saccharide radical directly attached to the cyclohexane rings, e.g. destomycin, fortimicin, neamine **[4]**

15/226 . . . . with at least two saccharide radicals directly attached to the cyclohexane rings **[4]**

15/228 . . . . . attached to adjacent ring-carbon atoms of the cyclohexane rings **[4]**

15/23 . . . . . with only two saccharide radicals in the molecule, e.g. ambutyrosin, butyrosin, xylostatin, ribostamycin **[4]**

15/232 . . . . . with at least three saccharide radicals in the molecule, e.g. lividomycin, neomycin, paromomycin **[4]**

15/234 . . . . . attached to non-adjacent ring carbon atoms of the cyclohexane rings, e.g. kanamycins, tobramycin, nebramycin, gentamicin A_2 **[4]**

15/236 . . . . . a saccharide radical being substituted by an alkylamino radical in position 3 and by two substituents different from hydrogen in position 4, e.g. gentamicin complex, sisomicin, verdamicin **[4]**

15/238 . . . Cyclohexane rings substituted by two guanidine radicals, e.g. streptomycins **[4]**

15/24 . . Condensed ring systems having three or more rings **[2]**

15/244 . . . Anthraquinone radicals, e.g. sennosides **[4]**

15/248 . . . Colchicine radicals, e.g. colchicosides **[4]**

15/252 . . . Naphthacene radicals, e.g. daunomycins, adriamycins **[4]**

15/256 . . . Polyterpene radicals **[4]**
15/26 . Acyclic or carbocyclic radicals, substituted by hetero rings **[2]**

17/00 Compounds containing heterocyclic radicals directly attached to hetero atoms of saccharide radicals [2]
17/02 . Heterocyclic radicals containing only nitrogen as ring hetero atoms **[2]**
17/04 . Heterocyclic radicals containing only oxygen as ring hetero atoms **[2]**
17/06 . . Benzopyran radicals **[4]**
17/065 . . . Benzo[b]pyrans **[4]**
17/07 . . . . Benzo[b]pyran-4-ones **[4]**
17/075 . . . . Benzo[b]pyran-2-ones **[4]**
17/08 . . Hetero rings containing eight or more ring members, e.g. erythromycins **[2]**

19/00 Compounds containing a hetero ring sharing one ring hetero atom with a saccharide radical; **Nucleosides**; **Mononucleotides**; **Anhydro derivatives thereof [2,4]**
19/01 . sharing oxygen **[4]**
19/02 . sharing nitrogen **[2]**
19/04 . . Heterocyclic radicals containing only nitrogen as ring hetero atom **[2]**
19/044 . . . Pyrrole radicals **[4]**
19/048 . . . Pyridine radicals **[4]**
19/052 . . . Imidazole radicals **[4]**
19/056 . . . Triazole or tetrazole radicals **[4]**
19/06 . . . Pyrimidine radicals **[2]**
19/067 . . . . with ribosyl as the saccharide radical **[4]**
19/073 . . . . with 2-deoxyribosyl as the saccharide radical **[4]**
19/09 . . . . with arabinosyl as the saccharide radical **[4]**
19/10 . . . . with the saccharide radical being esterified by phosphoric or polyphosphoric acids **[2]**
19/11 . . . . . containing cyclic phosphate **[4]**
19/12 . . . Triazine radicals **[2]**
19/14 . . . Pyrrolo-pyrimidine radicals **[2]**
19/16 . . . Purine radicals **[2]**
19/167 . . . . with ribosyl as the saccharide radical **[4]**
19/173 . . . . with 2-deoxyribosyl as the saccharide radical **[4]**
19/19 . . . . with arabinosyl as the saccharide radical **[4]**
19/20 . . . . with the saccharide radical being esterified by phosphoric or polyphosphoric acids **[2]**
19/207 . . . . . the phosphoric or polyphosphoric acids being esterified by a further hydroxylic compound, e.g. flavine-adenine dinucleotide or nicotinamide-adenine dinucleotide **[4]**
19/213 . . . . . containing cyclic phosphate **[4]**
19/22 . . . Pteridine radicals **[2]**
19/23 . . . Heterocyclic radicals containing two or more heterocyclic rings condensed among themselves or condensed with a common carbocyclic ring system, not provided for in groups C07H 19/14 to C07H 19/22 **[4]**
19/24 . . Heterocyclic radicals containing oxygen or sulfur as ring hetero atom **[2]**

21/00 Compounds containing two or more mononucleotide units having separate phosphate or polyphosphate groups linked by saccharide radicals of nucleoside groups, e.g. nucleic acids [2]
21/02 . with ribosyl as saccharide radical **[2]**
21/04 . with deoxyribosyl as saccharide radical **[2]**

23/00 Compounds containing boron, silicon, or a metal, e.g. chelates, vitamin B_{12} (esters with inorganic acids C07H 11/00; metal salts, see parent compounds) **[2]**

99/00 Subject matter not provided for in other groups of this subclass [8]

C07J STEROIDS (seco-steroids C07C) **[2]**

(1) This subclass covers compounds containing a cyclopenta[a]hydrophenanthrene skeleton or a ring structure derived therefrom:
– by contraction or expansion of one ring by one or two atoms,
– by contraction or expansion of two rings each by one atom,
– by contraction of one ring by one atom and expansion of one ring by one atom,
– by substitution of one or two carbon atoms of the cyclopenta[a]hydrophenanthrene skeleton, which are not shared by rings, by hetero atoms, in combination with the above defined contraction or expansion or not, or
– by condensation with carbocyclic or heterocyclic rings in combination with one or more of the foregoing alterations or not. **[4]**
(2) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07Kand within these subclasses. **[8]**
(3) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

Subclass index

Normal steroids, i.e. cyclopenta[a]hydrophenanthrenes, containing carbon, hydrogen, halogen, or oxygen [2]

1/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, not substituted in position 17 beta by a carbon atom, e.g. oestrane, androstane [2]**

3/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, substituted in position 17 beta by one carbon atom [2]**

5/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, substituted in position 17 beta by a chain of two carbon atoms, e.g. pregnane, and substituted in position 21 by only one singly bound oxygen atom [2]**

7/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, substituted in position 17 beta by a chain of two carbon atoms** (C07J 5/00 takes precedence) **[2]**

9/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, substituted in position 17 beta by a chain of more than two carbon atoms, e.g. cholane, cholestane, coprostane [2]**

11/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, not substituted in position 3 [2]**

13/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, having a carbon-to-carbon double bond from or to position 17 [2]**

15/00 **Stereochemically pure steroids containing carbon, hydrogen, halogen, or oxygen, having a partially or totally inverted skeleton, e.g. retrosteroids, L-isomers [2]**

17/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, having an oxygen-containing hetero ring not condensed with the cyclopenta[a]hydrophenanthrene skeleton [2]**

19/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, substituted in position 17 by a lactone ring [2]**

21/00 **Normal steroids containing carbon, hydrogen, halogen, or oxygen, having an oxygen-containing hetero ring spiro-condensed with the cyclopenta[a]hydrophenanthrene skeleton [2]**

Normal steroids, i.e. cyclopenta[a]hydrophenanthrenes, containing sulfur [2]

31/00 **Normal steroids containing one or more sulfur atoms not belonging to a hetero ring [2]**

33/00 **Normal steroids having a sulfur-containing hetero ring spiro-condensed or not condensed with the cyclopenta[a]hydrophenanthrene skeleton [2]**

Normal steroids, i.e. cyclopenta[a]hydrophenanthrenes, containing nitrogen [2]

41/00 **Normal steroids containing one or more nitrogen atoms not belonging to a hetero ring [2]**

43/00 **Normal steroids having a nitrogen-containing hetero ring spiro-condensed or not condensed with the cyclopenta[a]hydrophenanthrene skeleton [2]**

51/00 **Normal steroids with unmodified cyclopenta[a]hydrophenanthrene skeleton not provided for in groups C07J 1/00 to C07J 43/00 [2]**

53/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by condensation with carbocyclic rings or by formation of an additional ring by means of a direct link between two ring carbon atoms [2]**

Nor- or homosteroids [2]

61/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by contraction of only one ring by one or two atoms [2]**

63/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by expansion of only one ring by one or two atoms [2]**

65/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by contraction of two rings, each by one atom [2]**

67/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by expansion of two rings, each by one atom [2]**

69/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by contraction of only one ring by one atom and expansion of only one ring by one atom [2]**

71/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton is condensed with a heterocyclic ring** (spiro-condensed heterocyclic rings C07J 21/00, C07J 33/00, C07J 43/00) **[2]**

73/00 **Steroids in which the cyclopenta[a]hydrophenanthrene skeleton has been modified by substitution of one or two carbon atoms by hetero atoms [2]**

75/00 **Processes for the preparation of steroids, in general [4]**

C07K **PEPTIDES** (peptides containing β-lactam rings C07D; cyclic dipeptides not having in their molecule any other peptide link than those which form their ring, e.g. piperazine-2,5-diones, C07D; ergot alkaloids of the cyclic peptide type C07D 519/02; single cell proteins, enzymes C12N; genetic engineering processes for obtaining peptides C12N 15/00) **[4]**

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
- "amino acids" are compounds in which at least one amino group and at least one carboxyl group are bound to the same carbon skeleton and the nitrogen atom of the amino group may form part of a ring;
- "normal peptide link" is one between an alpha-amino group of an amino acid and the carboxyl group −in position 1 −of another alpha-amino acid;
- "abnormal peptide link" is a link where at least one of the linked amino acids is not an alpha-amino acid or a link formed by at least one carboxyl or amino group being part of the side chain of an alpha-amino acid;
- "peptides" are compounds containing at least two amino acid units, which are bound through at least one normal peptide link, including oligopeptides, polypeptides and proteins, where
  - (i) "linear peptides" may comprise rings formed through S−S bridges, or through an hydroxy or a mercapto group of an hydroxy- or a mercapto-amino acid and the carboxyl group of another amino acid (e.g. peptide lactones) but do not comprise rings which are formed only through peptide links;
  - (ii) "cyclic peptides" are peptides comprising at least one ring formed only through peptide links; the cyclisation may occur only through normal peptide links or through abnormal peptide links, e.g. through the 4-amino group of 2,4-diamino-butanoic acid. Thus, cyclic compounds in which at least one link in the ring is a non-peptide link are considered as "linear peptides";
  - (iii) "depsipeptides" are compounds containing a sequence of at least two alpha-amino acids and at least one alpha-hydroxy carboxylic acid, which are bound through at least one normal peptide link and ester links, derived from the hydroxy carboxylic acids, where
    - (a) "linear depsipeptides" may comprise rings formed through S−S bridges, or through an hydroxy or a mercapto group of an hydroxy-, or mercapto-amino acid and the carboxyl group of another amino- or hydroxy-acid but do not comprise rings formed only through peptide or ester links derived from hydroxy carboxylic acids, e.g. Gly-Ala-Gly−OCH_2CO_2H and Gly−OCH_2CO-Ala-Gly are considered as "linear depsipeptides", but $HOCH_2$CO-Gly-Ala-Gly does not contain an ester link, and is thus a derivative of Gly-Ala-Gly which is covered by C07K 5/08;
    - (b) "cyclic depsipeptides" are peptides containing at least one ring formed only through peptide or ester links −derived from hydroxy carboxylic acids −, e.g.

      ; **[4]**

  - (iv) "hybrid peptides" are peptides produced through fusion or covalent binding of two or more heterologous peptides.

(2) Attention is drawn to Note (3) after class C07, which defines the last place priority rule applied in the range of subclasses C07C to C07K and within these subclasses. **[8]**

(3) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

(4) When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

(5) Fragments of peptides or peptides modified by removal or addition of amino acids, by substitution of amino acids by others, or by combination of these modifications are classified as the parent peptides. However, fragments of peptides having only four or less amino acids are also classified in group C07K 5/00. **[6]**

(6) Peptides prepared by chemical processes and having an amino acid sequence derived from naturally occurring peptides are classified with the natural one. **[6]**

(7) Peptides prepared by recombinant DNA technology are not classified according to the host, but according to the original peptide expressed, e.g. HIV peptide expressed in E. coli is classified with HIV peptides. **[6]**

Subclass index

1/00 **General processes for the preparation of peptides [4]**
1/02 . in solution **[4]**
1/04 . on carriers **[4]**
1/06 . using protecting groups or activating agents **[4]**
1/08 . . using activating agents **[4]**
1/10 . using coupling agents **[4]**
1/107 . by chemical modification of precursor peptides **[6]**
1/113 . . without change of the primary structure **[6]**
1/12 . by hydrolysis **[4]**
1/13 . Labelling of peptides **[6]**
1/14 . Extraction; Separation; Purification **[4,6]**
1/16 . . by chromatography **[6]**

1/18 . . . Ion-exchange chromatography **[6]**
1/20 . . . Partition-, reverse-phase or hydrophobic interaction chromatography **[6]**
1/22 . . . Affinity chromatography or related techniques based upon selective absorption processes **[6]**
1/24 . . by electrochemical means **[6]**
1/26 . . . Electrophoresis **[6]**
1/28 . . . . Isoelectric focusing **[6]**
1/30 . . by precipitation **[6]**
1/32 . . . as complexes **[6]**
1/34 . . by filtration, ultrafiltration or reverse osmosis **[6]**
1/36 . . by a combination of two or more processes of different types **[6]**

2/00 Peptides of undefined number of amino acids; Derivatives thereof [6]

4/00 Peptides having up to 20 amino acids in an undefined or only partially defined sequence; Derivatives thereof [6]
4/02 . from viruses **[6]**
4/04 . from bacteria **[6]**
4/06 . from fungi **[6]**
4/08 . from algae; from lichens **[6]**
4/10 . from plants **[6]**
4/12 . from animals; from humans **[6]**

5/00 Peptides having up to four amino acids in a fully defined sequence; Derivatives thereof [4]

Note

In this group, the following expression is used with the meaning indicated: **[6]**
– "first amino acid" means the first amino acid from the left side, i.e. the N-terminal amino acid, of the peptide sequence. **[6]**

5/02 . containing at least one abnormal peptide link **[4]**
5/023 . . in which at least a beta-amino acid is involved **[6]**
5/027 . . in which at least a gamma-amino acid is involved, e.g. statine **[6]**
5/03 . . in which at least a delta-amino acid is involved, e.g. isosteres **[6]**
5/033 . . in which at least an epsilon- or zeta-amino acid is involved **[6]**
5/037 . . the abnormal link being formed by the side chain of an alpha-amino acid, e.g. gamma-Glu, epsilon-Lys, glutathione **[6]**
5/04 . containing only normal peptide links **[4]**
5/06 . . Dipeptides **[4]**
5/062 . . . the side chain of the first amino acid being acyclic, e.g. Gly, Ala **[6]**
5/065 . . . the side chain of the first amino acid containing carbocyclic rings, e.g. Phe, Tyr **[6]**
5/068 . . . the side chain of the first amino acid containing more amino groups than carboxyl groups, or derivatives thereof, e.g. Lys, Arg **[6]**
5/072 . . . the side chain of the first amino acid containing more carboxyl groups than amino groups, or derivatives thereof, e.g. Asp, Glu, Asn **[6]**
5/075 . . . . Asp-Phe; Derivatives thereof, e.g. aspartame **[6]**
5/078 . . . the first amino acid being heterocyclic, e.g. Pro, His, Trp **[6]**
5/08 . . Tripeptides **[4]**
5/083 . . . the side chain of the first amino acid being acyclic, e.g. Gly, Ala **[6]**
5/087 . . . the side chain of the first amino acid containing carbocyclic rings, e.g. Phe, Tyr **[6]**
5/09 . . . the side chain of the first amino acid containing more amino groups than carboxyl groups, or derivatives thereof, e.g. Lys, Arg **[6]**
5/093 . . . the side chain of the first amino acid containing more carboxyl groups than amino groups, or derivatives thereof, e.g. Asp, Glu, Asn **[6]**
5/097 . . . the first amino acid being heterocyclic, e.g. Pro, His, Trp, e.g. thyroliberin, melanostatin **[6]**
5/10 . . Tetrapeptides **[4]**
5/103 . . . the side chain of the first amino acid being acyclic, e.g. Gly, Ala **[6]**
5/107 . . . the side chain of the first amino acid containing carbocyclic rings, e.g. Phe, Tyr **[6]**
5/11 . . . the side chain of the first amino acid containing more amino groups than carboxyl groups, or derivatives thereof, e.g. Lys, Arg **[6]**
5/113 . . . the side chain of the first amino acid containing more carboxyl groups than amino groups, or derivatives thereof, e.g. Asp, Glu, Asn **[6]**
5/117 . . . the first amino acid being heterocyclic, e.g. Pro, His, Trp **[6]**
5/12 . . Cyclic peptides **[4]**

7/00 Peptides having 5 to 20 amino acids in a fully defined sequence; Derivatives thereof [4,6]
7/02 . Linear peptides containing at least one abnormal peptide link **[4]**
7/04 . Linear peptides containing only normal peptide links **[4]**
7/06 . . having 5 to 11 amino acids **[4]**
7/08 . . having 12 to 20 amino acids **[4,6]**
7/14 . . Angiotensins; Related peptides **[4]**
7/16 . . Oxytocins; Vasopressins; Related peptides **[4]**
7/18 . . Kallidins; Bradykinins; Related peptides **[4]**
7/22 . . Eledoisins; Related peptides **[4]**
7/23 . . Luteinising hormone-releasing hormone (LHRH); Related peptides **[6]**
7/28 . . Gramicidins A, B, D; Related peptides **[4]**
7/50 . Cyclic peptides containing at least one abnormal peptide link **[4]**
7/52 . . with only normal peptide links in the ring **[4]**
7/54 . . with at least one abnormal peptide link in the ring **[4]**
7/56 . . . the cyclisation not occurring through 2,4-diamino-butanoic acid **[4]**
7/58 . . . . Bacitracins; Related peptides **[4]**
7/60 . . . the cyclisation occurring through the 4-amino group of 2,4-diamino-butanoic acid **[4]**
7/62 . . . . Polymyxins; Related peptides **[4]**
7/64 . Cyclic peptides containing only normal peptide links **[4]**
7/66 . . Gramicidins S, C; Tyrocidins A, B, C; Related peptides **[4]**

9/00 Peptides having up to 20 amino acids, containing saccharide radicals and having a fully defined sequence; Derivatives thereof [4,6]

11/00 Depsipeptides having up to 20 amino acids in a fully defined sequence; Derivatives thereof [4,6]
11/02 . cyclic, e.g. valinomycins **[4]**

14/00 Peptides having more than 20 amino acids; Gastrins; Somatostatins; Melanotropins; Derivatives thereof [6]
14/005 . from viruses **[6]**

14/01 . . DNA viruses **[6]**
14/015 . . . Parvoviridae, e.g. feline panleukopenia virus, human parvovirus **[6]**
14/02 . . . Hepadnaviridae, e.g. hepatitis B virus **[6]**
14/025 . . . Papovaviridae, e.g. papillomavirus, polyomavirus, SV40, BK virus, JC virus **[6]**
14/03 . . . Herpetoviridae, e.g. pseudorabies virus **[6]**
14/035 . . . . Herpes simplex virus I or II **[6]**
14/04 . . . . Varicella-zoster virus **[6]**
14/045 . . . . Cytomegalovirus **[6]**
14/05 . . . . Epstein-Barr virus **[6]**
14/055 . . . . Marek's disease virus **[6]**
14/06 . . . . Infectious bovine rhinotracheitis virus **[6]**
14/065 . . . Poxviridae, e.g. avipoxvirus **[6]**
14/07 . . . . Vaccinia virus; Variola virus **[6]**
14/075 . . . Adenoviridae **[6]**
14/08 . . RNA viruses **[6]**
14/085 . . . Picornaviridae, e.g. coxsackie virus, echovirus, enterovirus **[6]**
14/09 . . . . Foot-and-mouth disease virus **[6]**
14/095 . . . . Rhinovirus **[6]**
14/10 . . . . Hepatitis A virus **[6]**
14/105 . . . . Poliovirus **[6]**
14/11 . . . Orthomyxoviridae, e.g. influenza virus **[6]**
14/115 . . . Paramyxoviridae, e.g. parainfluenza virus **[6]**
14/12 . . . . Mumps virus; Measles virus **[6]**
14/125 . . . . Newcastle disease virus **[6]**
14/13 . . . . Canine distemper virus **[6]**
14/135 . . . . Respiratory syncytial virus **[6]**
14/14 . . . Reoviridae, e.g. rotavirus, bluetongue virus, Colorado tick fever virus **[6]**
14/145 . . . Rhabdoviridae, e.g. rabies virus, Duvenhage virus, Mokda virus, vesicular stomatitis virus **[6]**
14/15 . . . Retroviridae, e.g. bovine leukaemia virus, feline leukaemia virus, human T-cell leukaemia-lymphoma virus **[6]**
14/155 . . . . Lentiviridae, e.g. human immunodeficiency virus (HIV), visna-maedi virus, equine infectious anaemia virus **[6]**
14/16 . . . . . HIV-1 **[6]**
14/165 . . . Coronaviridae, e.g. avian infectious bronchitis virus **[6]**
14/17 . . . . Porcine transmissible gastroenteritis virus **[6]**
14/175 . . . Bunyaviridae, e.g. California encephalitis virus, Rift valley fever virus, Hantaan virus **[6]**
14/18 . . . Togaviridae, e.g. flavivirus, pestivirus, yellow fever virus, hepatitis C virus, japanese encephalitis virus **[6]**
14/185 . . . . Hog cholera virus **[6]**
14/19 . . . . Rubella virus **[6]**
14/195 . from bacteria **[6]**

Note

In groups C07K 14/20 to C07K 14/365, where appropriate, after the bacteria terminology, the indication of the order (O), family (F) or genus (G) of the bacteria is given in brackets. **[6]**

14/20 . . from Spirochaetales (O), e.g. Treponema, Leptospira **[6]**
14/205 . . from Campylobacter (G) **[6]**
14/21 . . from Pseudomonadaceae (F) **[6]**
14/215 . . from Halobacteriaceae (F) **[6]**
14/22 . . from Neisseriaceae (F), e.g. Acinetobacter **[6]**
14/225 . . from Alcaligenes (G) **[6]**
14/23 . . from Brucella (G) **[6]**
14/235 . . from Bordetella (G) **[6]**
14/24 . . from Enterobacteriaceae (F), e.g. Citrobacter, Serratia, Proteus, Providencia, Morganella, Yersinia **[6]**
14/245 . . . Escherichia (G) **[6]**
14/25 . . . Shigella (G) **[6]**
14/255 . . . Salmonella (G) **[6]**
14/26 . . . Klebsiella (G) **[6]**
14/265 . . . Enterobacter (G) **[6]**
14/27 . . . Erwinia (G) **[6]**
14/275 . . . Hafnia (G) **[6]**
14/28 . . from Vibrionaceae (F) **[6]**
14/285 . . from Pasteurellaceae (F), e.g. Haemophilus influenza **[6]**
14/29 . . from Richettsiales (O) **[6]**
14/295 . . from Chlamydiales (O) **[6]**
14/30 . . from Mycoplasmatales, e.g. Pleuropneumonia-like organisms (PPLO) **[6]**
14/305 . . from Micrococcaceae (F) **[6]**
14/31 . . . from Staphylococcus (G) **[6]**
14/315 . . from Streptococcus (G), e.g. Enterococci **[6]**
14/32 . . from Bacillus (G) **[6]**
14/325 . . . Bacillus thuringiensis crystal peptide (delta-endotoxin) **[6]**
14/33 . . from Clostridium (G) **[6]**
14/335 . . from Lactobacillus (G) **[6]**
14/34 . . from Corynebacterium (G) **[6]**
14/345 . . from Brevibacterium (G) **[6]**
14/35 . . from Mycobacteriaceae (F) **[6]**
14/355 . . from Nocardia (G) **[6]**
14/36 . . from Actinomyces; from Streptomyces (G) **[6]**
14/365 . . from Actinoplanes (G) **[6]**
14/37 . from fungi **[6]**
14/375 . . from Basidiomycetes **[6]**
14/38 . . from Aspergillus **[6]**
14/385 . . from Penicillium **[6]**
14/39 . . from yeasts **[6]**
14/395 . . . from Saccharomyces **[6]**
14/40 . . . from Candida **[6]**
14/405 . from algae **[6]**
14/41 . from lichens **[6]**
14/415 . from plants **[6]**
14/42 . . Lectins, e.g. concanavalin, phytohaemagglutinin **[6]**
14/425 . . Zeins **[6]**
14/43 . . Thaumatin **[6]**
14/435 . from animals; from humans **[6]**
14/44 . . from protozoa **[6]**
14/445 . . . Plasmodium **[6]**
14/45 . . . Toxoplasma **[6]**
14/455 . . . Eimeria **[6]**
14/46 . . from vertebrates **[6]**
14/465 . . . from birds **[6]**
14/47 . . . from mammals **[6]**
14/475 . . Growth factors; Growth regulators **[6]**
14/48 . . . Nerve growth factor (NGF) **[6]**
14/485 . . . Epidermal growth factor (EGF) (urogastrone) **[6]**
14/49 . . . Platelet-derived growth factor (PDGF) **[6]**

14/495 . . . Transforming growth factor (TGF) **[6]**
14/50 . . . Fibroblast growth factor (FGF) **[6]**
14/505 . . . Erythropoietin (EPO) **[6]**
14/51 . . . Bone morphogenic factor; Osteogenin; Osteogenic factor; Bone-inducing factor **[6]**
14/515 . . . Angiogenic factor; Angiogenin **[6]**
14/52 . . Cytokines; Lymphokines; Interferons **[6]**
14/525 . . . Tumour necrosis factor (TNF) **[6]**
14/53 . . . Colony-stimulating factor (CSF) **[6]**
14/535 . . . . Granulocyte CSF; Granulocyte-macrophage CSF **[6]**
14/54 . . . Interleukins (IL) **[6]**
14/545 . . . . IL-1 **[6]**
14/55 . . . . IL-2 **[6]**
14/555 . . . Interferons (IFN) **[6]**
14/56 . . . . IFN-alpha **[6]**
14/565 . . . . IFN-beta **[6]**
14/57 . . . . IFN-gamma **[6]**
14/575 . . Hormones **[6]**
14/58 . . . Atrial natriuretic factor complex; Atriopeptin; Atrial natriuretic peptide (ANP); Cardionatrin; Cardiodilatin **[6]**
14/585 . . . Calcitonins **[6]**
14/59 . . . Follicle-stimulating hormone (FSH); Chorionic gonadotropins, e.g. HCG; Luteinising hormone (LH); Thyroid-stimulating hormone (TSH) **[6]**
14/595 . . . Gastrins; Cholecystokinins (CCK) **[6]**
14/60 . . . Growth hormone-releasing factor (GH-RF) (Somatoliberin) **[6]**
14/605 . . . Glucagons **[6]**
14/61 . . . Growth hormone (GH) (Somatotropin) **[6]**
14/615 . . . . Extraction from natural sources **[6]**
14/62 . . . Insulins **[6]**
14/625 . . . . Extraction from natural sources **[6]**
14/63 . . . Motilins **[6]**
14/635 . . . Parathyroid hormone (parathormone); Parathyroid hormone-related peptides **[6]**
14/64 . . . Relaxins **[6]**
14/645 . . . Secretins **[6]**
14/65 . . . Insulin-like growth factors (Somatomedins), e.g. IGF-1, IGF-2 **[6]**
14/655 . . . Somatostatins **[6]**
14/66 . . . Thymopoietins **[6]**
14/665 . . derived from pro-opiomelanocortin, pro-enkephalin or pro-dynorphin **[6]**
14/67 . . . Lipotropins, e.g. beta- or gamma-lipotropin **[6]**
14/675 . . . Beta-endorphins **[6]**
14/68 . . . Melanocyte-stimulating hormone (MSH) **[6]**
14/685 . . . . Alpha-melanotropin **[6]**
14/69 . . . . Beta-melanotropin **[6]**
14/695 . . . Corticotropin (ACTH) **[6]**
14/70 . . . Enkephalins **[6]**
14/705 . . Receptors; Cell surface antigens; Cell surface determinants **[6]**
14/71 . . . for growth factors; for growth regulators **[6]**
14/715 . . . for cytokines; for lymphokines; for interferons **[6]**
14/72 . . . for hormones **[6]**
14/725 . . . T-cell receptors **[6]**
14/73 . . . . CD4 **[6]**
14/735 . . . Fc receptors **[6]**
14/74 . . . Major histocompatibility complex (MHC) **[6]**
14/745 . . Blood coagulation or fibrinolysis factors **[6]**
14/75 . . . Fibrinogen **[6]**
14/755 . . . Factors VIII **[6]**
14/76 . . Albumins **[6]**
14/765 . . . Serum albumin, e.g. HSA **[6]**
14/77 . . . Ovalbumin **[6]**
14/775 . . Apolipopeptides **[6]**
14/78 . . Connective tissue peptides, e.g. collagen, elastin, laminin, fibronectin, vitronectin, cold insoluble globulin (CIG) **[6]**
14/785 . . Alveolar surfactant peptides; Pulmonary surfactant peptides **[6]**
14/79 . . Transferrins, e.g. lactoferrins, ovotransferrins **[6]**
14/795 . Porphyrin- or corrin-ring-containing peptides **[6]**
14/80 . . Cytochromes **[6]**
14/805 . . Haemoglobins; Myoglobins **[6]**
14/81 . Protease inhibitors **[6]**
14/815 . . from leeches, e.g. hirudin, eglin **[6]**
14/82 . Translation products from oncogenes **[6]**
14/825 . Metallothioneins **[6]**

16/00 Immunoglobulins, e.g. monoclonal or polyclonal antibodies [6]

16/02 . from eggs **[6]**
16/04 . from milk **[6]**
16/06 . from serum **[6]**
16/08 . against material from viruses **[6]**
16/10 . . from RNA viruses **[6]**
16/12 . against material from bacteria **[6]**
16/14 . against material from fungi, algae or lichens **[6]**
16/16 . against material from plants **[6]**
16/18 . against material from animals or humans **[6]**
16/20 . . from protozoa **[6]**
16/22 . . against growth factors **[6]**
16/24 . . against cytokines, lymphokines or interferons **[6]**
16/26 . . against hormones **[6]**
16/28 . . against receptors, cell surface antigens or cell surface determinants **[6]**
16/30 . . . from tumour cells **[6]**
16/32 . . against translation products from oncogenes **[6]**
16/34 . . against blood group antigens **[6]**
16/36 . . against blood coagulation factors **[6]**
16/38 . against protease inhibitors of peptide structure **[6]**
16/40 . against enzymes **[6]**
16/42 . against immunoglobulins (anti-idiotypic antibodies) **[6]**
16/44 . against material not provided for elsewhere **[6]**
16/46 . Hybrid immunoglobulins (hybrids of an immunoglobulin with a peptide not being an immunoglobulin C07K 19/00) **[6]**

17/00 Carrier-bound or immobilised peptides; **Preparation thereof [4]**

17/02 . Peptides being immobilised on, or in, an organic carrier **[4]**
17/04 . . entrapped within the carrier, e.g. gel, hollow fibre **[4]**
17/06 . . attached to the carrier via a bridging agent **[4]**
17/08 . . the carrier being a synthetic polymer **[4]**
17/10 . . the carrier being a carbohydrate **[4]**
17/12 . . . Cellulose or derivatives thereof **[4]**
17/14 . Peptides being immobilised on, or in, an inorganic carrier **[4]**

19/00 Hybrid peptides (hybrid immunoglobulins composed solely of immunoglobulins C07K 16/46) **[6]**

C08 ORGANIC MACROMOLECULAR COMPOUNDS; THEIR PREPARATION OR CHEMICAL WORKING-UP; COMPOSITIONS BASED THEREON

(1) Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P. **[8]**

(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S.

C08B POLYSACCHARIDES; **DERIVATIVES THEREOF** (polysaccharides containing less than six saccharide radicals attached to each other by glycosidic linkages C07H; fermentation or enzyme-using processes C12P 19/00; sugar industry C13; production of cellulose D21) **[4]**

Note

Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

Subclass index

Preparation

1/00 Preparatory treatment of cellulose for making derivatives thereof
1/02 . Rendering cellulose suitable for esterification
1/04 . . for the preparation of cellulose nitrate
1/06 . Rendering cellulose suitable for etherification
1/08 . Alkali cellulose
1/10 . . Apparatus for the preparation of alkali cellulose
1/12 . . . Steeping devices
1/14 . . . Ripening devices

3/00 Preparation of cellulose esters of organic acids
3/02 . Catalysts used for the esterification
3/04 . Cellulose formate
3/06 . Cellulose acetate
3/08 . of monobasic organic acids with three or more carbon atoms
3/10 . . with five or more carbon atoms
3/12 . of polybasic organic acids
3/14 . in which the organic acid residue contains substituents, e.g. NH_2, Cl
3/16 . Preparation of mixed organic cellulose esters
3/18 . . Aceto-butyrates
3/20 . Esterification with maintenance of the fibrous structure of the cellulose (surface esterification of textiles D06M 13/00)
3/22 . Post-esterification treatments, including purification
3/24 . . Hydrolysis or ripening
3/26 . . Isolation of the cellulose ester
3/28 . . . by precipitation
3/30 . . Stabilisation (by addition of stabilisers C08K)

5/00 Preparation of cellulose esters of inorganic acids
5/02 . Cellulose nitrate
5/04 . . Post-esterification treatments, including purification
5/06 . . . Isolation of the cellulose nitrate
5/08 . . . Stabilisation (by addition of stabilisers C08K)
5/10 . . . Reducing the viscosity
5/12 . . . Replacing the water by organic liquids
5/14 . Cellulose sulfate

7/00 Preparation of cellulose esters of both organic and inorganic acids

9/00 Preparation of cellulose xanthate or viscose
9/02 . Sulfidisers; Dissolvers
9/04 . Continuous processes
9/06 . Single-stage processes

11/00 Preparation of cellulose ethers
11/02 . Alkyl or cycloalkyl ethers
11/04 . . with substituted hydrocarbon radicals
11/06 . . . with halogen-substituted hydrocarbon radicals
11/08 . . . with hydroxylated hydrocarbon radicals; Esters, ethers, or acetals thereof
11/10 . . . substituted with acid radicals
11/12 . . . . substituted with carboxylic radicals
11/14 . . . with nitrogen-containing groups

11/145 . . . . with basic nitrogen, e.g. aminoalkyl ethers **[2]**
11/15 . . . . with carbamoyl groups **[2]**
11/155 . . . . with cyano groups, e.g. cyanoalkyl ethers **[2]**
11/16 . Aryl or aralkyl ethers
11/18 . . with substituted hydrocarbon radicals
11/187 . with olefinic unsaturated groups **[2]**
11/193 . Mixed ethers, i.e. ethers with two or more different etherifying groups **[2]**
11/20 . Post-etherification treatments, including purification
11/22 . . Isolation

13/00 Preparation of cellulose ether-esters
13/02 . Cellulose ether xanthates

15/00 Preparation of other cellulose derivatives or modified cellulose
15/02 . Oxycellulose; Hydrocellulose; Cellulose hydrate
15/04 . . Carboxycellulose, e.g. prepared by oxidation with nitrogen dioxide
15/05 . Derivatives containing elements other than carbon, hydrogen, oxygen, halogen, or sulfur (esters of phosphorus acids C08B 5/00) **[2]**
15/06 . . containing nitrogen **[2]**
15/08 . Fractionation of cellulose, e.g. separation of cellulose crystallites **[2]**
15/10 . Crosslinking of cellulose **[2]**

16/00 Regeneration of cellulose [2]

17/00 Apparatus for esterification or etherification of cellulose
17/02 . for making organic esters of cellulose
17/04 . for making cellulose nitrate
17/06 . for making cellulose ethers

30/00 Preparation of starch, degraded or non-chemically modified starch, amylose, or amylopectin [4]
30/02 . Preparatory treatment, e.g. crushing of raw materials (machines for preliminary washing A23N) **[4]**
30/04 . Extraction or purification **[4]**
30/06 . Drying; Forming **[4]**
30/08 . Concentration of starch suspensions **[4]**
30/10 . Working-up residues from the starch extraction, including pressing water from the starch-extracted material **[4]**
30/12 . Degraded or non-chemically modified starch; Bleaching of starch (preparation of chemical derivatives of starch C08B 31/00) **[4]**
30/14 . . Cold water dispersible or pregelatinised starch **[4]**
30/16 . . Apparatus therefor **[4]**
30/18 . . Dextrin **[4]**
30/20 . Amylose or amylopectin (chemical derivatives thereof C08B 33/00, C08B 35/00) **[4]**

31/00 Preparation of chemical derivatives of starch (chemical derivatives of amylose C08B 33/00; chemical derivatives of amylopectin C08B 35/00) **[2]**
31/02 . Esters **[2]**
31/04 . . of organic acids **[2]**
31/06 . . of inorganic acids **[2]**
31/08 . Ethers **[2]**
31/10 . . Alkyl or cycloalkyl ethers **[2]**
31/12 . . having alkyl or cycloalkyl radicals substituted by hetero atoms **[2]**
31/14 . . Aryl or aralkyl ethers **[2]**
31/16 . Ether-esters **[2]**
31/18 . Oxidised starch **[2]**

33/00 Preparation of chemical derivatives of amylose [2]
33/02 . Esters **[2]**
33/04 . Ethers **[2]**
33/06 . Ether-esters **[2]**
33/08 . Oxidised amylose **[2]**

35/00 Preparation of chemical derivatives of amylopectin [2]
35/02 . Esters **[2]**
35/04 . Ethers **[2]**
35/06 . Ether-esters **[2]**
35/08 . Oxidised amylopectin **[2]**

37/00 Preparation of polysaccharides not provided for in groups C08B 1/00 to C08B 35/00; **Derivatives thereof** (cellulose D21) **[4]**
37/02 . Dextran; Derivatives thereof **[2]**
37/04 . Alginic acid; Derivatives thereof (foodstuff preparations A23L 1/05) **[2]**
37/06 . Pectin; Derivatives thereof **[2]**
37/08 . Chitin; Chondroitin sulfate; Hyaluronic acid; Derivatives thereof **[2]**
37/10 . Heparin; Derivatives thereof **[2]**
37/12 . Agar-agar; Derivatives thereof **[2]**
37/14 . Hemicellulose; Derivatives thereof **[2]**
37/16 . Cyclodextrin; Derivatives thereof **[2]**
37/18 . Reserve carbohydrates, e.g. glycogen, inulin, laminarin; Derivatives thereof **[4]**

C08C TREATMENT OR CHEMICAL MODIFICATION OF RUBBERS

Note

This subclass covers:
– processes directed to natural rubber or to conjugated diene rubbers (synthesis thereof C08F); **[2]**
– processes directed to rubbers in general (to a specific rubber, other than provided for above, C08F to C08H). **[2]**

Preparation

1/00 Treatment of rubber latex
1/02 . Chemical or physical treatment of rubber latex before or during concentration
1/04 . . Purifying; Deproteinising
1/06 . . Preservation of rubber latex (preserving ingredients C08K)
1/065 . . Increasing the size of dispersed rubber particles **[2]**
1/07 . . . characterised by the agglomerating agents used **[2]**
1/075 . . Concentrating **[2]**

1/08 . . . with the aid of creaming agents **[2]**
1/10 . . . by centrifugation **[2]**
1/12 . . . by evaporation **[2]**
1/14 . Coagulation
1/15 . . characterised by the coagulants used **[2]**
1/16 . . in floc form

2/00 **Treatment of rubber solutions [2]**
2/02 . Purification **[2]**
2/04 . . Removal of catalyst residues **[2]**
2/06 . Winning of rubber from solutions **[2]**

3/00 **Treatment of coagulated rubber**
3/02 . Purification **[2]**

4/00 **Treatment of rubber before vulcanisation, not provided for in groups C08C 1/00 to C08C 3/02 [2]**

19/00 **Chemical modification of rubber** (crosslinking agents, other than provided for by group C08C 19/30, C08K) **[2]**

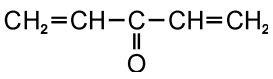
Note

In groups C08C 19/02 to C08C 19/30 in the absence of an indication to the contrary, a process is classified in the last appropriate place. **[2]**

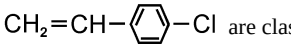
19/02 . Hydrogenation **[2]**
19/04 . Oxidation **[2]**
19/06 . . Epoxidation **[2]**
19/08 . Depolymerisation **[2]**
19/10 . Isomerisation; Cyclisation **[2]**
19/12 . Incorporating halogen atoms into the molecule **[2]**
19/14 . . by reaction with halogens **[2]**
19/16 . . by reaction with hydrogen halides **[2]**
19/18 . . by reaction with hydrocarbons substituted by halogen **[2]**
19/20 . Incorporating sulfur atoms into the molecule **[2]**
19/22 . Incorporating nitrogen atoms into the molecule **[2]**
19/24 . Incorporating phosphorus atoms into the molecule **[2]**
19/25 . Incorporating silicon atoms into the molecule **[5]**
19/26 . Incorporating metal atoms into the molecule **[2]**
19/28 . Reaction with compounds containing carbon-to-carbon unsaturated bonds (graft polymers C08F) **[2]**
19/30 . Addition of a reagent which reacts with a hetero atom or a group containing hetero atoms of the macromolecule **[2]**
19/32 . . reacting with halogens or halogen-containing groups **[2]**
19/34 . . reacting with oxygen or oxygen-containing groups **[2]**
19/36 . . . with carboxy radicals **[2]**
19/38 . . . with hydroxy radicals **[2]**
19/40 . . . with epoxy radicals **[2]**
19/42 . . reacting with metals or metal-containing groups **[2]**
19/44 . . . of polymers containing metal atoms exclusively at one or both ends of the skeleton **[2]**

C08F **MACROMOLECULAR COMPOUNDS OBTAINED BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS** (production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation, C10G 50/00; graft polymerisation of monomers containing carbon-to-carbon unsaturated bonds on to fibres, threads, yarns, fabrics or fibrous goods made from such materials D06M 14/00) **[2]**

(1) In this subclass, boron or silicon are considered as metals. **[2]**
(2) In this subclass, the following expression is used with the meaning indicated:
– "aliphatic radical" means an acyclic or a non-aromatic carbocyclic carbon skeleton which is considered to be terminated by every bond to:
(a) an element other than carbon;
(b) a carbon atom having a double bond to one atom other than carbon;
(c) an aromatic carbocyclic ring or a heterocyclic ring.
Examples: Polymers of
(a) $CH_2{=}CH{-}O{-}CH_2{-}CH_2{-}NH{-}COO{-}CH_2{-}CH_2{-}OH$ are classified in group C08F 16/28;
(b)



are classified in group C08F 16/36;
(c)



are classified in group C08F 12/18. **[2]**

(3) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**
(4) In this subclass, in the absence of an indication to the contrary, a catalyst or a polymer is classified in the last appropriate place. **[2]**
(5) In this subclass:
(a) macromolecular compounds and their preparation are classified in the groups for the type of compound prepared. General processes for the preparation of macromolecular compounds according to more than one main group are classified in the groups for the processes employed (C08F 2/00 to C08F 8/00). Processes for the preparation of macromolecular compounds are also classified in the groups for the types of reactions employed, if of interest; **[2]**
(b) subject matter relating to both homopolymers and copolymers is classified in groups C08F 10/00 to C08F 38/00; **[2]**
(c) subject matter limited to homopolymers is classified only in groups C08F 110/00 to C08F 138/00; **[2]**
(d) subject matter limited to copolymers is classified only in groups C08F 210/00 to C08F 246/00; **[2]**
(e) in groups C08F 210/00 to C08F 238/00, in the absence of an indication to the contrary, a copolymer is classified according to the major monomeric component. **[2]**

(6) This subclass covers also compositions based on monomers which form macromolecular compounds classifiable in this subclass (paints C09D 4/00; adhesives C09J 4/00). **[7]**
In this subclass: **[7]**
(a) if the monomers are defined, classification is made according to the polymer to be formed: **[7]**
– in groups C08F 10/00 to C08F 246/00 if no preformed polymer is present; **[7]**
– in groups C08F 251/00 to C08F 291/00 if a preformed polymer is present, considering the reaction to take place as a graft or cross-linking reaction; **[7]**
(b) if the presence of compounding ingredients is of interest, classification is made in group C08F 2/44 (sensitising agents C08F 2/50; catalysts C08F 4/00); **[7]**
(c) if the compounding ingredients are of interest per se, classification is also made in subclass C08K. **[7]**

Subclass index

Processes; **Catalysts**

2/00 **Processes of polymerisation** **[2]**
2/01 . characterised by special features of the polymerisation apparatus used **[7]**
2/02 . Polymerisation in bulk **[2]**
2/04 . Polymerisation in solution (C08F 2/32 takes precedence) **[2]**
2/06 . . Organic solvent **[2]**
2/08 . . . with the aid of dispersing agents for the polymer **[2]**
2/10 . . Aqueous solvent **[2]**
2/12 . Polymerisation in non-solvents (C08F 2/32 takes precedence) **[2]**
2/14 . . Organic medium **[2]**
2/16 . . Aqueous medium **[2]**
2/18 . . . Suspension polymerisation **[2]**
2/20 . . . . with the aid of macromolecular dispersing agents **[2]**
2/22 . . . Emulsion polymerisation **[2]**
2/24 . . . . with the aid of emulsifying agents **[2]**
2/26 . . . . . anionic **[2]**
2/28 . . . . . cationic **[2]**
2/30 . . . . . non-ionic **[2]**
2/32 . Polymerisation in water-in-oil emulsions **[2]**
2/34 . Polymerisation in gaseous state **[2]**
2/36 . Polymerisation in solid state **[2]**
2/38 . Polymerisation using regulators, e.g. chain terminating agents **[2]**
2/40 . . using retarding agents **[2]**
2/42 . . using short-stopping agents **[2]**
2/44 . Polymerisation in the presence of compounding ingredients, e.g. plasticisers, dyestuffs, fillers **[2]**
2/46 . Polymerisation initiated by wave energy or particle radiation **[2]**
2/48 . . by ultra-violet or visible light **[2]**
2/50 . . . with sensitising agents **[2]**
2/52 . . by electric discharge, e.g. voltolisation **[2]**
2/54 . . by X-rays or electrons **[2]**
2/56 . . by ultrasonic vibrations **[2]**
2/58 . Polymerisation initiated by direct application of electric current (electrolytic processes, e.g. electrophoresis, C25) **[2]**
2/60 . Polymerisation by the diene synthesis **[2]**

4/00 **Polymerisation catalysts** (catalysts in general B01J) **[2]**
4/02 . Carriers therefor **[2]**

Note

When classifying in groups C08F 4/04 to C08F 4/42, classification may also be made in group C08F 4/02, if a carrier is of particular interest. **[2]**

4/04 . Azo-compounds **[2]**
4/06 . Metallic compounds other than hydrides and other than metallo-organic compounds; Boron halide or aluminium halide complexes with organic compounds containing oxygen **[2]**
4/08 . . of alkali metals **[2]**

4/10 . . of alkaline earth metals, zinc, cadmium, mercury, copper, or silver **[2]**
4/12 . . of boron, aluminium, gallium, indium, thallium, or rare earths **[2]**
4/14 . . . Boron halides or aluminium halides; Complexes thereof with organic compounds containing oxygen **[2]**
4/16 . . of silicon, germanium, tin, lead, titanium, zirconium or hafnium **[2]**
4/18 . . . Oxides **[2]**
4/20 . . of antimony, bismuth, vanadium, niobium, or tantalum **[2]**
4/22 . . of chromium, molybdenum, or tungsten **[2]**
4/24 . . . Oxides **[2]**
4/26 . . of manganese, iron group metals, or platinum group metals **[2]**
4/28 . Oxygen or compounds releasing free oxygen (redox systems C08F 4/40) **[2]**
4/30 . . Inorganic compounds **[2]**
4/32 . . Organic compounds **[2]**
4/34 . . . Per-compounds with one peroxy-radical **[2]**
4/36 . . . Per-compounds with more than one peroxy-radical **[2]**
4/38 . . . Mixtures of peroxy-compounds **[2]**
4/40 . Redox systems **[2]**
4/42 . Metals; Metal hydrides; Metallo-organic compounds; Use thereof as catalyst precursors **[2]**
4/44 . . selected from light metals, zinc, cadmium, mercury, copper, silver, gold, boron, gallium, indium, thallium, rare earths, or actinides **[2]**
4/46 . . . selected from alkali metals **[2]**
4/48 . . . . selected from lithium, rubidium, caesium, or francium **[2]**
4/50 . . . selected from alkaline earth metals, zinc, cadmium, mercury, copper, or silver **[2]**
4/52 . . . selected from boron, aluminium, gallium, indium, thallium, or rare earths (C08F 4/14 takes precedence) **[2]**
4/54 . . . together with other compounds thereof **[2]**
4/56 . . . . Alkali metals being the only metals present, e.g. Alfin catalysts **[2]**
4/58 . . . together with silicon, germanium, tin, lead, antimony, bismuth, or compounds thereof **[2]**
4/60 . . . together with refractory metals, iron group metals, platinum group metals, manganese, technetium, rhenium, or compounds thereof **[2,5]**

Note

In groups C08F 4/602 to C08F 4/62, the following term is used with the meaning indicated:
– "component" comprises a transition metal or a compound thereof, pretreated or not (pretreatment C08F 4/61, C08F 4/63, C08F 4/65). **[5]**

4/602 . . . . Component covered by group C08F 4/60 with an organo-aluminium compound **[5]**
4/603 . . . . Component covered by group C08F 4/60 with a metal or compound covered by group C08F 4/44 other than an organo-aluminium compound **[5]**
4/605 . . . . Component covered by group C08F 4/60 with a metal or compound covered by group C08F 4/44, not provided for in a single group of groups C08F 4/602 or C08F 4/603 **[5]**
4/606 . . . . Catalysts comprising at least two different metals, in metallic form or as compounds thereof, in addition to the component covered by group C08F 4/60 **[5]**
4/607 . . . . Catalysts containing a specific non-metal or metal-free compound **[5]**
4/608 . . . . . inorganic **[5]**
4/609 . . . . . organic **[5]**
4/61 . . . . Pretreating the metal or compound covered by group C08F 4/60 before the final contacting with the metal or compound covered by group C08F 4/44 **[5]**
4/611 . . . . . Pretreating with non-metals or metal-free compounds **[5]**
4/612 . . . . . Pretreating with metals or metal-containing compounds **[5]**
4/613 . . . . . with metals covered by group C08F 4/60 or compounds thereof **[5]**
4/614 . . . . . with magnesium or compounds thereof **[5]**
4/615 . . . . . with aluminium or compounds thereof **[5]**
4/616 . . . . . with silicon or compounds thereof **[5]**
4/617 . . . . . with metals or metal-containing compounds, not provided for in groups C08F 4/613 to C08F 4/616 **[5]**
4/618 . . . . . with metals or metal-containing compounds, provided for in at least two of the groups C08F 4/613 to C08F 4/617 **[5]**
4/619 . . . . Component covered by group C08F 4/60 containing a transition metal-carbon bond **[8]**
4/6192 . . . . . containing at least one cyclopentadienyl ring, condensed or not, e.g. an indenyl or a fluorenyl ring **[8]**
4/62 . . . . Refractory metals or compounds thereof **[2]**
4/622 . . . . . Component covered by group C08F 4/62 with an organo-aluminium compound **[5]**
4/623 . . . . . Component covered by group C08F 4/62 with a metal or compound covered by group C08F 4/44 other than an organo-aluminium compound **[5]**
4/625 . . . . . Component covered by group C08F 4/62 with a metal or compound covered by group C08F 4/44, not provided for in a single group of groups C08F 4/622 or C08F 4/623 **[5]**
4/626 . . . . . Catalysts comprising at least two different metals, in metallic form or as compounds thereof, in addition to the component covered by group C08F 4/62 **[5]**
4/627 . . . . . Catalysts containing a specific non-metal or metal-free compound **[5]**
4/628 . . . . . inorganic **[5]**
4/629 . . . . . organic **[5]**
4/63 . . . . . Pretreating the metal or compound covered by group C08F 4/62 before the final contacting with the metal or compound covered by group C08F 4/44 **[5]**
4/631 . . . . . Pretreating with non-metals or metal-free compounds **[5]**
4/632 . . . . . Pretreating with metals or metal-containing compounds **[5]**

4/633 . . . . . with metals covered by group C08F 4/62 or compounds thereof **[5]**
4/634 . . . . . with magnesium or compounds thereof **[5]**
4/635 . . . . . with aluminium or compounds thereof **[5]**
4/636 . . . . . with silicon or compounds thereof **[5]**
4/637 . . . . . with metals or metal-containing compounds, not provided for in groups C08F 4/633 to C08F 4/636 **[5]**
4/638 . . . . . with metals or metal-containing compounds, not provided for in a single group of groups C08F 4/633 to C08F 4/637 **[5]**
4/639 . . . . Component covered by group C08F 4/62 containing a transition metal-carbon bond **[8]**
4/6392 . . . . . containing at least one cyclopentadienyl ring, condensed or not, e.g. an indenyl or a fluorenyl ring **[8]**
4/64 . . . . Titanium, zirconium, hafnium, or compounds thereof **[2]**
4/642 . . . . . Component covered by group C08F 4/64 with an organo-aluminium compound **[5]**
4/643 . . . . . Component covered by group C08F 4/64 with a metal or compound covered by group C08F 4/44 other than an organo-aluminium compound **[5]**
4/645 . . . . . Component covered by group C08F 4/64 with a metal or compound covered by group C08F 4/44, not provided for in a single group of groups C08F 4/642 to C08F 4/643 **[5]**
4/646 . . . . . Catalysts comprising at least two different metals, in metallic form or as compounds thereof, in addition to the component covered by group C08F 4/64 **[5]**
4/647 . . . . . Catalysts containing a specific non-metal or metal-free compound **[5]**
4/648 . . . . . inorganic **[5]**
4/649 . . . . . organic **[5]**
4/65 . . . . Pretreating the metal or compound covered by group C08F 4/64 before the final contacting with the metal or compound covered by group C08F 4/44 **[5]**
4/651 . . . . . Pretreating with non-metals or metal-free compounds **[5]**
4/652 . . . . . Pretreating with metals or metal-containing compounds **[5]**
4/653 . . . . . with metals covered by group C08F 4/64 or compounds thereof **[5]**
4/654 . . . . . with magnesium or compounds thereof **[5]**
4/655 . . . . . with aluminium or compounds thereof **[5]**
4/656 . . . . . with metals or metal-containing compounds, not provided for in groups C08F 4/653 to C08F 4/656 **[5]**
4/657 . . . . . with metals or metal-containing compounds, not provided for in a single group of groups C08F 4/653 to C08F 4/657 **[5]**
4/658 . . . . . Component covered by group C08F 4/64 containing a transition metal-carbon bond **[8]**
4/6592 . . . . . containing at least one cyclopentadienyl ring, condensed or not, e.g. an indenyl or a fluorenyl ring **[8]**
4/68 . . . . Vanadium, niobium, tantalum, or compounds thereof **[2]**
4/685 . . . . . Vanadium or compounds thereof in combination with titanium or compounds thereof **[5]**
4/69 . . . . Chromium, molybdenum, tungsten or compounds thereof **[5]**
4/695 . . . . Manganese, technetium, rhenium or compounds thereof **[5]**
4/70 . . . . Iron group metals, platinum group metals, or compounds thereof **[2]**
4/72 . . selected from metals not provided for in group C08F 4/44 (C08F 4/54 to C08F 4/70 take precedence) **[2]**
4/74 . . . selected from refractory metals **[2]**
4/76 . . . . selected from titanium, zirconium, hafnium, vanadium, niobium, or tantalum **[2]**
4/78 . . . . selected from chromium, molybdenum, or tungsten **[2]**
4/80 . . . selected from iron group metals or platinum group metals **[2]**
4/82 . . . . pi-Allyl complexes **[2]**

6/00 **Post-polymerisation treatments** (C08F 8/00 takes precedence; of conjugated diene rubbers C08C) **[2]**
6/02 . Neutralisation of the polymerisation mass, e.g. killing the catalyst (short-stopping C08F 2/42) **[2]**
6/04 . Fractionation **[2]**
6/06 . Treatment of polymer solutions **[2]**
6/08 . . Removal of catalyst residues **[2]**
6/10 . . Removal of volatile materials, e.g. monomers, solvents **[2]**
6/12 . . Separation of polymers from solutions **[2]**
6/14 . Treatment of polymer emulsions **[2]**
6/16 . . Purification **[2]**
6/18 . . Increasing the size of the dispersed particles **[2]**
6/20 . . Concentration **[2]**
6/22 . . Coagulation **[2]**
6/24 . Treatment of polymer suspensions **[2]**
6/26 . Treatment of polymers prepared in bulk **[2]**
6/28 . . Purification **[2]**

8/00 **Chemical modification by after-treatment** (graft polymers, block polymers, crosslinking with unsaturated monomers or with polymers C08F 251/00 to C08F 299/00; of conjugated diene rubbers C08C; crosslinking in general C08J) **[2]**

Note

In groups C08F 8/02 to C08F 8/50, in the absence of an indication to the contrary, a process is classified in the last appropriate place. **[2]**

8/02 . Alkylation **[2]**
8/04 . Reduction, e.g. hydrogenation **[2]**
8/06 . Oxidation **[2]**
8/08 . Epoxidation **[2]**
8/10 . Acylation **[2]**
8/12 . Hydrolysis **[2]**
8/14 . Esterification **[2]**
8/16 . . Lactonisation **[2]**
8/18 . Introducing halogen atoms or halogen-containing groups **[2]**
8/20 . . Halogenation **[2]**
8/22 . . . by reaction with free halogens **[2]**
8/24 . . Haloalkylation **[2]**
8/26 . Removing halogen atoms or halogen-containing groups from the molecule **[2]**
8/28 . Condensation with aldehydes or ketones **[2]**
8/30 . Introducing nitrogen atoms or nitrogen-containing groups (polymeric products of isocyanates or thiocyanates C08G) **[2]**
8/32 . . by reaction with amines **[2]**
8/34 . Introducing sulfur atoms or sulfur-containing groups **[2]**
8/36 . . Sulfonation; Sulfation **[2]**
8/38 . . Sulfohalogenation **[2]**
8/40 . Introducing phosphorus atoms or phosphorus-containing groups **[2]**
8/42 . Introducing metal atoms or metal-containing groups **[2]**
8/44 . Preparation of metal salts or ammonium salts **[2]**
8/46 . Reaction with unsaturated dicarboxylic acids or anhydrides thereof, e.g. maleinisation **[2]**
8/48 . Isomerisation; Cyclisation **[2]**
8/50 . Partial depolymerisation **[2]**

Homopolymers or copolymers [2]

10/00 Homopolymers or copolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond [2]
10/02 . Ethene **[2]**
10/04 . Monomers containing three or four carbon atoms **[2]**
10/06 . . Propene **[2]**
10/08 . . Butenes **[2]**
10/10 . . . Isobutene **[2]**
10/14 . Monomers containing five or more carbon atoms **[2]**

12/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an aromatic carbocyclic ring [2]
12/02 . Monomers containing only one unsaturated aliphatic radical **[2]**
12/04 . . containing one ring **[2]**
12/06 . . . Hydrocarbons **[2]**
12/08 . . . . Styrene **[2]**
12/12 . . . . containing a branched unsaturated aliphatic radical or an alkyl radical attached to the ring **[2]**
12/14 . . . substituted by hetero atoms or groups containing hetero atoms **[2]**
12/16 . . . . Halogens **[2]**
12/18 . . . . . Chlorine **[2]**
12/20 . . . . . Fluorine **[2]**
12/22 . . . . Oxygen **[2]**
12/24 . . . . . Phenols or alcohols **[2]**
12/26 . . . . Nitrogen **[2]**
12/28 . . . . . Amines **[2]**
12/30 . . . . Sulfur **[2]**
12/32 . . containing two or more rings **[2]**
12/34 . Monomers containing two or more unsaturated aliphatic radicals **[2]**
12/36 . . Divinylbenzene **[2]**

14/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a halogen [2]
14/02 . Monomers containing chlorine **[2]**
14/04 . . Monomers containing two carbon atoms **[2]**
14/06 . . . Vinyl chloride **[2]**
14/08 . . . Vinylidene chloride **[2]**
14/12 . . . 1, 2-Dichloroethene **[2]**
14/14 . . Monomers containing three or more carbon atoms **[2]**
14/16 . Monomers containing bromine or iodine **[2]**
14/18 . Monomers containing fluorine **[2]**
14/20 . . Vinyl fluoride **[2]**
14/22 . . Vinylidene fluoride **[2]**
14/24 . . Trifluorochloroethene **[2]**
14/26 . . Tetrafluoroethene **[2]**
14/28 . . Hexafluoropropene **[2]**

16/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an alcohol, ether, aldehydo, ketonic, acetal, or ketal radical [2]
16/02 . by an alcohol radical **[2]**
16/04 . . Acyclic compounds **[2]**
16/06 . . . Polyvinyl alcohol **[2]**
16/08 . . . Allyl alcohol **[2]**
16/10 . . Carbocyclic compounds **[2]**
16/12 . by an ether radical **[2]**
16/14 . . Monomers containing only one unsaturated aliphatic radical **[2]**
16/16 . . . Monomers containing no hetero atoms other than the ether oxygen **[2]**
16/18 . . . . Acyclic compounds **[2]**
16/20 . . . . . Monomers containing three or more carbon atoms in the unsaturated aliphatic radical **[2]**
16/22 . . . . Carbocyclic compounds **[2]**
16/24 . . . Monomers containing halogen **[2]**
16/26 . . . Monomers containing oxygen atoms in addition to the ether oxygen **[2]**
16/28 . . . Monomers containing nitrogen **[2]**
16/30 . . . Monomers containing sulfur **[2]**
16/32 . . Monomers containing two or more unsaturated aliphatic radicals **[2]**
16/34 . by an aldehydo radical **[2]**
16/36 . by a ketonic radical **[2]**
16/38 . by an acetal or ketal radical **[2]**

18/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid, or of a haloformic acid [2]

18/02 . Esters of monocarboxylic acids **[2]**
18/04 . . Vinyl esters **[2]**
18/06 . . . Vinyl formate **[2]**
18/08 . . . Vinyl acetate **[2]**
18/10 . . . of monocarboxylic acids containing three or more carbon atoms **[2]**
18/12 . . with unsaturated alcohols containing three or more carbon atoms **[2]**
18/14 . Esters of polycarboxylic acids **[2]**
18/16 . . with alcohols containing three or more carbon atoms **[2]**
18/18 . . . Diallyl phthalate **[2]**
18/20 . Esters containing halogen **[2]**
18/22 . Esters containing nitrogen **[2]**
18/24 . Esters of carbonic or haloformic acids **[2]**

20/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and only one being terminated by only one carboxyl radical or a salt, anhydride, ester, amide, imide, or nitrile thereof [2]

20/02 . Monocarboxylic acids having less than ten carbon atoms; Derivatives thereof **[2]**
20/04 . . Acids; Metal salts or ammonium salts thereof **[2]**
20/06 . . . Acrylic acid; Methacrylic acid; Metal salts or ammonium salts thereof **[2]**
20/08 . . Anhydrides **[2]**
20/10 . . Esters **[2]**
20/12 . . . of monohydric alcohols or phenols **[2]**
20/14 . . . . Methyl esters **[2]**
20/16 . . . . of phenols or of alcohols containing two or more carbon atoms **[2]**
20/18 . . . . . with acrylic or methacrylic acids **[2]**
20/20 . . . of polyhydric alcohols or phenols **[2]**
20/22 . . . Esters containing halogen **[2]**
20/24 . . . . containing perhaloalkyl radicals **[2]**
20/26 . . . Esters containing oxygen in addition to the carboxy oxygen **[2]**
20/28 . . . . containing no aromatic rings in the alcohol moiety **[2]**
20/30 . . . . containing aromatic rings in the alcohol moiety **[2]**
20/32 . . . . containing epoxy radicals **[2]**
20/34 . . . Esters containing nitrogen **[2]**
20/36 . . . . containing oxygen in addition to the carboxy oxygen **[2]**
20/38 . . . Esters containing sulfur **[2]**
20/40 . . . Esters of unsaturated alcohols **[2]**
20/42 . . Nitriles **[2]**
20/44 . . . Acrylonitrile **[2]**
20/50 . . . containing four or more carbon atoms **[2]**
20/52 . . Amides or imides **[2]**
20/54 . . . Amides **[2]**
20/56 . . . . Acrylamide; Methacrylamide **[2]**
20/58 . . . . containing oxygen in addition to the carbonamido oxygen **[2]**
20/60 . . . . containing nitrogen in addition to the carbonamido nitrogen **[2]**
20/62 . Monocarboxylic acids having ten or more carbon atoms; Derivatives thereof **[2]**
20/64 . . Acids; Metal salts or ammonium salts thereof **[2]**
20/66 . . Anhydrides **[2]**
20/68 . . Esters **[2]**
20/70 . . Nitriles; Amides; Imides **[2]**

22/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a carboxyl radical and containing at least one other carboxyl radical in the molecule; **Salts, anhydrides, esters, amides, imides, or nitriles thereof [2]**

22/02 . Acids; Metal salts or ammonium salts thereof **[2]**
22/04 . Anhydrides, e.g. cyclic anhydrides **[2]**
22/06 . . Maleic anhydride **[2]**
22/10 . Esters **[2]**
22/12 . . of phenols or saturated alcohols **[2]**
22/14 . . . Esters having no free carboxylic acid groups **[2]**
22/16 . . . Esters having free carboxylic acid groups **[2]**
22/18 . . . Esters containing halogen **[2]**
22/20 . . . Esters containing oxygen in addition to the carboxy oxygen **[2]**
22/22 . . . Esters containing nitrogen **[2]**
22/24 . . . Esters containing sulfur **[2]**
22/26 . . of unsaturated alcohols **[2]**
22/28 . . . Diallyl maleate **[2]**
22/30 . Nitriles **[2]**
22/32 . . Alpha-cyano-acrylic acid; Esters thereof **[2]**
22/34 . . Vinylidene cyanide **[2]**
22/36 . Amides or imides **[2]**
22/38 . . Amides **[2]**
22/40 . . Imides, e.g. cyclic imides **[2]**

24/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a heterocyclic ring containing oxygen (cyclic esters of polyfunctional acids C08F 18/00; cyclic anhydrides of unsaturated acids C08F 20/00, C08F 22/00) **[2]**

26/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a single or double bond to nitrogen or by a heterocyclic ring containing nitrogen [2]

26/02 . by a single or double bond to nitrogen **[2]**
26/04 . . Diallylamine **[2]**
26/06 . by a heterocyclic ring containing nitrogen **[2]**
26/08 . . N-Vinyl-pyrrolidine **[2]**
26/10 . . N-Vinyl-pyrrolidone **[2]**
26/12 . . N-Vinyl-carbazole **[2]**

28/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a bond to sulfur or by a heterocyclic ring containing sulfur [2]

28/02 . by a bond to sulfur **[2]**
28/04 . . Thioethers **[2]**
28/06 . by a heterocyclic ring containing sulfur **[2]**

30/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and containing phosphorus, selenium, tellurium or a metal (metal salts, e.g. phenolates or alcoholates, see the parent compounds) **[2]**

30/02 . containing phosphorus **[2]**
30/04 . containing a metal **[2]**
30/06 . . containing boron **[2]**
30/08 . . containing silicon **[2]**
30/10 . . containing germanium **[2]**

32/00 Homopolymers or copolymers of cyclic compounds having no unsaturated aliphatic radicals in a side chain, and having one or more carbon-to-carbon double bonds in a carbocyclic ring system [2]

32/02 . having no condensed rings **[2]**
32/04 . . having one carbon-to-carbon double bond **[2]**
32/06 . . having two or more carbon-to-carbon double bonds **[2]**
32/08 . having condensed rings (coumarone-indene polymers C08F 244/00) **[2]**

34/00 Homopolymers or copolymers of cyclic compounds having no unsaturated aliphatic radicals in a side chain and having one or more carbon-to-carbon double bonds in a heterocyclic ring (cyclic esters of polyfunctional acids C08F 18/00; cyclic anhydrides or imides C08F 22/00) **[2]**

34/02 . in a ring containing oxygen (coumarone-indene polymers C08F 244/00) **[2]**
34/04 . in a ring containing sulfur **[2]**

36/00 Homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, at least one having two or more carbon-to-carbon double bonds (C08F 32/00 takes precedence) **[2]**

36/02 . the radical having only two carbon-to-carbon double bonds **[2]**
36/04 . . conjugated **[2]**
36/06 . . . Butadiene **[2]**
36/08 . . . Isoprene **[2]**
36/14 . . . containing elements other than carbon and hydrogen **[2]**
36/16 . . . . containing halogen **[2]**
36/18 . . . . . containing chlorine **[2]**
36/20 . . unconjugated **[2]**
36/22 . the radical having three or more carbon-to-carbon double bonds **[2]**

38/00 Homopolymers or copolymers of compounds having one or more carbon-to-carbon triple bonds [2]

38/02 . Acetylene **[2]**
38/04 . Vinylacetylene **[2]**

Homopolymers [2]

110/00 Homopolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond [2]

110/02 . Ethene **[2]**
110/04 . Monomers containing three or four carbon atoms **[2]**
110/06 . . Propene **[2]**
110/08 . . Butenes **[2]**
110/10 . . . Isobutene **[2]**
110/14 . Monomers containing five or more carbon atoms **[2]**

112/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an aromatic carbocyclic ring [2]

112/02 . Monomers containing only one unsaturated aliphatic radical **[2]**
112/04 . . containing one ring **[2]**
112/06 . . . Hydrocarbons **[2]**
112/08 . . . . Styrene **[2]**
112/12 . . . . containing a branched unsaturated aliphatic radical or an alkyl radical attached to the ring **[2]**
112/14 . . . substituted by hetero atoms or groups containing hetero atoms **[2]**
112/32 . . containing two or more rings **[2]**
112/34 . Monomers containing two or more unsaturated aliphatic radicals **[2]**
112/36 . . Divinylbenzene **[2]**

114/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a halogen [2]

114/02 . Monomers containing chlorine **[2]**
114/04 . . Monomers containing two carbon atoms **[2]**
114/06 . . . Vinyl chloride **[2]**
114/08 . . . Vinylidene chloride **[2]**
114/12 . . . 1,2-Dichloroethene **[2]**
114/14 . . Monomers containing three or more carbon atoms **[2]**
114/16 . Monomers containing bromine or iodine **[2]**
114/18 . Monomers containing fluorine **[2]**
114/20 . . Vinyl fluoride **[2]**
114/22 . . Vinylidene fluoride **[2]**
114/24 . . Trifluorochloroethene **[2]**
114/26 . . Tetrafluoroethene **[2]**
114/28 . . Hexafluoropropene **[2]**

116/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an alcohol, ether, aldehydo, ketonic, acetal, or ketal radical [2]

116/02 . by an alcohol radical **[2]**
116/04 . . Acyclic compounds **[2]**
116/06 . . . Polyvinyl alcohol **[2]**
116/08 . . . Allyl alcohol **[2]**
116/10 . . Carbocyclic compounds **[2]**
116/12 . by an ether radical **[2]**
116/14 . . Monomers containing only one unsaturated aliphatic radical **[2]**
116/16 . . . Monomers containing no hetero atoms other than the ether oxygen **[2]**
116/18 . . . . Acyclic compounds **[2]**
116/20 . . . . . Monomers containing three or more carbon atoms in the unsaturated aliphatic radical **[2]**
116/34 . by an aldehydo radical **[2]**
116/36 . by a ketonic radical **[2]**
116/38 . by an acetal or ketal radical **[2]**

118/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid, or of a haloformic acid [2]

118/02 . Esters of monocarboxylic acids **[2]**
118/04 . . Vinyl esters **[2]**
118/06 . . . Vinyl formate **[2]**
118/08 . . . Vinyl acetate **[2]**
118/10 . . . of monocarboxylic acids containing three or more carbon atoms **[2]**
118/12 . . with unsaturated alcohols containing three or more carbon atoms **[2]**
118/14 . Esters of polycarboxylic acids **[2]**
118/16 . . with alcohols containing three or more carbon atoms **[2]**
118/18 . . . Diallyl phthalate **[2]**

120/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and only one being terminated by only one carboxyl radical or a salt, anhydride, ester, amide, imide, or nitrile thereof [2]

120/02 . Monocarboxylic acids having less than ten carbon atoms; Derivatives thereof **[2]**
120/04 . . Acids; Metal salts or ammonium salts thereof **[2]**
120/06 . . . Acrylic acid; Methacrylic acid; Metal salts or ammonium salts thereof **[2]**
120/08 . . Anhydrides **[2]**
120/10 . . Esters **[2]**
120/12 . . . of monohydric alcohols or phenols **[2]**
120/14 . . . . Methyl esters **[2]**
120/16 . . . . of phenols or of alcohols containing two or more carbon atoms **[2]**
120/18 . . . . . with acrylic or methacrylic acids **[2]**
120/20 . . . of polyhydric alcohols or phenols **[2]**
120/22 . . . Esters containing halogen **[2]**
120/24 . . . . containing perhaloalkyl radicals **[2]**
120/26 . . . Esters containing oxygen in addition to the carboxy oxygen **[2]**
120/28 . . . . containing no aromatic rings in the alcohol moiety **[2]**
120/30 . . . . containing aromatic rings in the alcohol moiety **[2]**
120/32 . . . . containing epoxy radicals **[2]**
120/34 . . . Esters containing nitrogen **[2]**
120/36 . . . . containing oxygen in addition to the carboxy oxygen **[2]**
120/38 . . . Esters containing sulfur **[2]**
120/40 . . . Esters of unsaturated alcohols **[2]**
120/42 . . Nitriles **[2]**
120/44 . . . Acrylonitrile **[2]**
120/50 . . . containing four or more carbon atoms **[2]**
120/52 . . Amides or imides **[2]**
120/54 . . . Amides **[2]**
120/56 . . . . Acrylamide; Methacrylamide **[2]**
120/58 . . . . containing oxygen in addition to the carbonamido oxygen **[2]**
120/60 . . . . containing nitrogen in addition to the carbonamido nitrogen **[2]**
120/62 . Monocarboxylic acids having ten or more carbon atoms; Derivatives thereof **[2]**
120/64 . . Acids; Metal salts or ammonium salts thereof **[2]**
120/66 . . Anhydrides **[2]**
120/68 . . Esters **[2]**
120/70 . . Nitriles; Amides; Imides **[2]**

122/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a carboxyl radical and containing at least one other carboxyl radical in the molecule; **Salts, anhydrides, esters, amides, imides, or nitriles thereof [2]**

122/02 . Acids; Metal salts or ammonium salts thereof **[2]**
122/04 . Anhydrides, e.g. cyclic anhydrides **[2]**
122/06 . . Maleic anhydride **[2]**
122/10 . Esters **[2]**
122/12 . . of phenols or saturated alcohols **[2]**
122/14 . . . Esters having no free carboxylic acid groups **[2]**
122/16 . . . Esters having free carboxylic acid groups **[2]**
122/18 . . . Esters containing halogen **[2]**
122/20 . . . Esters containing oxygen in addition to the carboxy oxygen **[2]**
122/22 . . . Esters containing nitrogen **[2]**
122/24 . . . Esters containing sulfur **[2]**
122/26 . . of unsaturated alcohols **[2]**
122/28 . . . Diallyl maleate **[2]**
122/30 . Nitriles **[2]**
122/32 . . Alpha-cyano-acrylic acid; Esters thereof **[2]**
122/34 . . Vinylidene cyanide **[2]**
122/36 . Amides or imides **[2]**
122/38 . . Amides **[2]**
122/40 . . Imides, e.g. cyclic imides **[2]**

124/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a heterocyclic ring containing oxygen (cyclic esters of polyfunctional acids C08F 118/00; cyclic anhydrides of unsaturated acids C08F 120/00, C08F 122/00) **[2]**

126/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a single or double bond to nitrogen or by a heterocyclic ring containing nitrogen [2]

126/02 . by a single or double bond to nitrogen **[2]**
126/04 . . Diallylamine **[2]**
126/06 . by a heterocyclic ring containing nitrogen **[2]**
126/08 . . N-Vinyl-pyrrolidine **[2]**
126/10 . . N-Vinyl-pyrrolidone **[2]**
126/12 . . N-Vinyl-carbazole **[2]**

128/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon bond, and at least one being terminated by a bond to sulfur or by a heterocyclic ring containing sulfur [2]

128/02 . by a bond to sulfur **[2]**
128/04 . . Thioethers **[2]**
128/06 . by a heterocyclic ring containing sulfur **[2]**

130/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and containing phosphorus, selenium, tellurium, or a metal (metal salts, e.g. phenolates or alcoholates, see the parent compounds) **[2]**

130/02 . containing phosphorus **[2]**

130/04 . containing a metal **[2]**
130/06 . . containing boron **[2]**
130/08 . . containing silicon **[2]**
130/10 . . containing germanium **[2]**

132/00 Homopolymers of cyclic compounds containing no unsaturated aliphatic radicals in a side chain, and having one or more carbon-to-carbon double bonds in a carbocyclic ring system [2]
132/02 . having no condensed rings **[2]**
132/04 . . having one carbon-to-carbon double bond **[2]**
132/06 . . having two or more carbon-to-carbon double bonds **[2]**
132/08 . having condensed rings **[2]**

134/00 Homopolymers of cyclic compounds having no unsaturated aliphatic radicals in a side chain and having one or more carbon-to-carbon double bonds in a heterocyclic ring (cyclic esters of polyfunctional acids C08F 118/00; cyclic anhydrides or imides C08F 122/00) **[2]**
134/02 . in a ring containing oxygen **[2]**
134/04 . in a ring containing sulfur **[2]**

136/00 Homopolymers of compounds having one or more unsaturated aliphatic radicals, at least one having two or more carbon-to-carbon double bonds (C08F 132/00 takes precedence) **[2]**
136/02 . the radical having only two carbon-to-carbon double bonds **[2]**
136/04 . . conjugated **[2]**
136/06 . . . Butadiene **[2]**
136/08 . . . Isoprene **[2]**
136/14 . . . containing elements other than carbon and hydrogen **[2]**
136/16 . . . . containing halogen **[2]**
136/18 . . . . . containing chlorine **[2]**
136/20 . . unconjugated **[2]**
136/22 . the radical having three or more carbon-to-carbon double bonds **[2]**

138/00 Homopolymers of compounds having one or more carbon-to-carbon triple bonds [2]
138/02 . Acetylene **[2]**
138/04 . Vinylacetylene **[2]**

Copolymers [2]

(1) When classifying in groups C08F 210/00 to C08F 297/00, any monomeric components not identified by the classification according to Note (4) after the title of subclass C08F within this classification range, and where the use of such monomeric components is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups C08F 210/00 to C08F 238/00. **[8]**

(2) Any monomeric components not identified by the classification according to Note (4) after the title of subclass C08F or Note (1) above, and where the use of such monomeric components is considered to represent information of interest for search, may also be classified in the last appropriate place in groups C08F 210/00 to C08F 238/00. This can for example be the case when it is considered of interest to enable searching of copolymers using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. **[8]**

210/00 Copolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond [2]
210/02 . Ethene **[2]**
210/04 . Monomers containing three or four carbon atoms **[2]**
210/06 . . Propene **[2]**
210/08 . . Butenes **[2]**
210/10 . . . Isobutene **[2]**
210/12 . . . . with conjugated diolefins, e.g. butyl rubber **[2]**
210/14 . Monomers containing five or more carbon atoms **[2]**
210/16 . Copolymers of ethene with alpha-alkenes, e.g. EP rubbers **[2]**
210/18 . . with non-conjugated dienes, e.g. EPT rubbers **[2]**

212/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an aromatic carbocyclic ring [2]
212/02 . Monomers containing only one unsaturated aliphatic radical **[2]**
212/04 . . containing one ring **[2]**
212/06 . . . Hydrocarbons **[2]**
212/08 . . . . Styrene **[2]**
212/10 . . . . . with nitriles **[2]**
212/12 . . . . containing a branched unsaturated aliphatic radical or an alkyl radical attached to the ring **[2]**
212/14 . . . substituted by hetero atoms or groups containing hetero atoms **[2]**
212/32 . . containing two or more rings **[2]**
212/34 . Monomers containing two or more unsaturated aliphatic radicals **[2]**
212/36 . . Divinylbenzene **[2]**

214/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a halogen [2]
214/02 . Monomers containing chlorine **[2]**
214/04 . . Monomers containing two carbon atoms **[2]**
214/06 . . . Vinyl chloride **[2]**
214/08 . . . Vinylidene chloride **[2]**
214/10 . . . . with nitriles **[2]**
214/12 . . . 1,2-Dichloroethene **[2]**
214/14 . . Monomers containing three or more carbon atoms **[2]**
214/16 . Monomers containing bromine or iodine **[2]**
214/18 . Monomers containing fluorine **[2]**
214/20 . . Vinyl fluoride **[2]**
214/22 . . Vinylidene fluoride **[2]**
214/24 . . Trifluorochloroethene **[2]**
214/26 . . Tetrafluoroethene **[2]**
214/28 . . Hexafluoropropene **[2]**

216/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an alcohol, ether, aldehydo, ketonic, acetal, or ketal radical [2]

216/02 . by an alcohol radical **[2]**
216/04 . . Acyclic compounds **[2]**
216/06 . . . Polyvinyl alcohol **[2]**
216/08 . . . Allyl alcohol **[2]**
216/10 . . Carbocyclic compounds **[2]**
216/12 . by an ether radical **[2]**
216/14 . . Monomers containing only one unsaturated aliphatic radical **[2]**
216/16 . . . Monomers containing no hetero atoms other than the ether oxygen **[2]**
216/18 . . . . Acyclic compounds **[2]**
216/20 . . . . . Monomers containing three or more carbon atoms in the unsaturated aliphatic radical **[2]**
216/34 . by an aldehydo radical **[2]**
216/36 . by a ketonic radical **[2]**
216/38 . by an acetal or ketal radical **[2]**

218/00 Copolymers having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid, or of a haloformic acid [2]

218/02 . Esters of monocarboxylic acids **[2]**
218/04 . . Vinyl esters **[2]**
218/06 . . . Vinyl formate **[2]**
218/08 . . . Vinyl acetate **[2]**
218/10 . . . of monocarboxylic acids containing three or more carbon atoms **[2]**
218/12 . . with unsaturated alcohols containing three or more carbon atoms **[2]**
218/14 . Esters of polycarboxylic acids **[2]**
218/16 . . with alcohols containing three or more carbon atoms **[2]**
218/18 . . . Diallyl phthalate **[2]**

220/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and only one being terminated by only one carboxyl radical or a salt, anhydride, ester, amide, imide, or nitrile thereof [2]

220/02 . Monocarboxylic acids having less than ten carbon atoms; Derivatives thereof **[2]**
220/04 . . Acids; Metals salts or ammonium salts thereof **[2]**
220/06 . . . Acrylic acid; Methacrylic acid; Metal salts or ammonium salts thereof **[2]**
220/08 . . Anhydrides **[2]**
220/10 . . Esters **[2]**
220/12 . . . of monohydric alcohols or phenols **[2]**
220/14 . . . . Methyl esters **[2]**
220/16 . . . . of phenols or of alcohols containing two or more carbon atoms **[2]**
220/18 . . . . . with acrylic or methacrylic acids **[2]**
220/20 . . . of polyhydric alcohols or phenols **[2]**
220/22 . . . Esters containing halogen **[2]**
220/24 . . . . containing perhaloalkyl radicals **[2]**
220/26 . . . Esters containing oxygen in addition to the carboxy oxygen **[2]**
220/28 . . . . containing no aromatic rings in the alcohol moiety **[2]**
220/30 . . . . containing aromatic rings in the alcohol moiety **[2]**
220/32 . . . . containing epoxy radicals **[2]**
220/34 . . . Esters containing nitrogen **[2]**
220/36 . . . . containing oxygen in addition to the carboxy oxygen **[2]**
220/38 . . . Esters containing sulfur **[2]**
220/40 . . . Esters of unsaturated alcohols **[2]**
220/42 . . Nitriles **[2]**
220/44 . . . Acrylonitrile **[2]**
220/46 . . . . with carboxylic acids, sulfonic acids or salts thereof **[2]**
220/48 . . . . with nitrogen-containing monomers **[2]**
220/50 . . . containing four or more carbon atoms **[2]**
220/52 . . Amides or imides **[2]**
220/54 . . . Amides **[2]**
220/56 . . . . Acrylamide; Methacrylamide **[2]**
220/58 . . . . containing oxygen in addition to the carbonamido oxygen **[2]**
220/60 . . . . containing nitrogen in addition to the carbonamido nitrogen **[2]**
220/62 . Monocarboxylic acids having ten or more carbon atoms; Derivatives thereof (copolymers of drying-oils C08F 242/00) **[2]**
220/64 . . Acids; Metal salts or ammonium salts thereof **[2]**
220/66 . . Anhydrides **[2]**
220/68 . . Esters **[2]**
220/70 . . Nitriles; Amides; Imides **[2]**

222/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a carboxyl radical and containing at least one other carboxyl radical in the molecule; **Salts, anhydrides, esters, amides, imides, or nitriles thereof [2]**

222/02 . Acids; Metal salts or ammonium salts thereof **[2]**
222/04 . Anhydrides, e.g. cyclic anhydrides **[2]**
222/06 . . Maleic anhydride **[2]**
222/08 . . . with vinyl aromatic monomers **[2]**
222/10 . Esters **[2]**
222/12 . . of phenols or saturated alcohols **[2]**
222/14 . . . Esters having no free carboxylic acid groups **[2]**
222/16 . . . Esters having free carboxylic acid groups **[2]**
222/18 . . . Esters containing halogen **[2]**
222/20 . . . Esters containing oxygen in addition to the carboxy oxygen **[2]**
222/22 . . . Esters containing nitrogen **[2]**
222/24 . . . Esters containing sulfur **[2]**
222/26 . . of unsaturated alcohols **[2]**
222/28 . . . Diallyl maleate **[2]**
222/30 . Nitriles **[2]**
222/32 . . Alpha-cyano-acrylic acid; Esters thereof **[2]**
222/34 . . Vinylidene cyanide **[2]**
222/36 . Amides or imides **[2]**
222/38 . . Amides **[2]**
222/40 . . Imides, e.g. cyclic imides **[2]**

224/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a heterocyclic ring containing oxygen (cyclic esters of polyfunctional acids C08F 218/00; cyclic anhydrides of unsaturated acids C08F 220/00, C08F 222/00) **[2]**

226/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a single or double bond to nitrogen or by a heterocyclic ring containing nitrogen [2]

226/02 . by a single or double bond to nitrogen **[2]**
226/04 . . Diallylamine **[2]**
226/06 . by a heterocyclic ring containing nitrogen **[2]**
226/08 . . N-Vinyl-pyrrolidine **[2]**
226/10 . . N-Vinyl-pyrrolidone **[2]**
226/12 . . N-Vinyl-carbazole **[2]**

228/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a bond to sulfur or by a heterocyclic ring containing sulfur [2]

228/02 . by a bond to sulfur **[2]**
228/04 . . Thioethers **[2]**
228/06 . by a heterocyclic ring containing sulfur **[2]**

230/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and containing phosphorus, selenium, tellurium, or a metal (metal salts, e.g. phenolates or alcoholates, see the parent compounds) **[2]**

230/02 . containing phosphorus **[2]**
230/04 . containing a metal **[2]**
230/06 . . containing boron **[2]**
230/08 . . containing silicon **[2]**
230/10 . . containing germanium **[2]**

232/00 Copolymers of cyclic compounds containing no unsaturated aliphatic radicals in a side chain, and having one or more carbon-to-carbon double bonds in a carbocyclic ring system [2]

232/02 . having no condensed rings **[2]**
232/04 . . having one carbon-to-carbon double bond **[2]**
232/06 . . having two or more carbon-to-carbon double bonds **[2]**
232/08 . having condensed rings (coumarone-indene polymers C08F 244/00) **[2]**

234/00 Copolymers of cyclic compounds having no unsaturated aliphatic radicals in a side chain and having one or more carbon-to-carbon double bonds in a heterocyclic ring (cyclic esters of polyfunctional acids C08F 218/00; cyclic anhydrides or imides C08F 222/00) **[2]**

234/02 . in a ring containing oxygen (coumarone-indene polymers C08F 244/00) **[2]**
234/04 . in a ring containing sulfur **[2]**

236/00 Copolymers of compounds having one or more unsaturated aliphatic radicals, at least one having two or more carbon-to-carbon double bonds (C08F 232/00 takes precedence) **[2]**

236/02 . the radical having only two carbon-to-carbon double bonds **[2]**
236/04 . . conjugated **[2]**
236/06 . . . Butadiene **[2]**
236/08 . . . Isoprene **[2]**
236/10 . . . with vinyl aromatic monomers **[2]**
236/12 . . . with nitriles **[2]**
236/14 . . . containing elements other than carbon and hydrogen **[2]**
236/16 . . . . containing halogen **[2]**
236/18 . . . . . containing chlorine **[2]**
236/20 . . unconjugated **[2]**
236/22 . the radical having three or more carbon-to-carbon double bonds **[2]**

238/00 Copolymers of compounds having one or more carbon-to-carbon triple bonds [2]

238/02 . Acetylene **[2]**
238/04 . Vinylacetylene **[2]**

240/00 Copolymers of hydrocarbons and mineral oils, e.g. petroleum resins [2]

242/00 Copolymers of drying-oils with other monomers [2]

244/00 Coumarone-indene copolymers [2]

246/00 Copolymers in which the nature of only the monomers in minority is defined [2]

Graft polymers; **Polymers crosslinked with unsaturated monomers [2]**

251/00 Macromolecular compounds obtained by polymerising monomers on to polysaccharides or derivatives thereof [2]

251/02 . on to cellulose or derivatives thereof **[2]**

253/00 Macromolecular compounds obtained by polymerising monomers on to natural rubbers or derivatives thereof [2]

255/00 Macromolecular compounds obtained by polymerising monomers on to polymers of hydrocarbons as defined in group C08F 10/00 [2]

255/02 . on to polymers of olefins having two or three carbon atoms **[2]**
255/04 . . on to ethene-propene copolymers **[2]**
255/06 . . on to ethene-propene-diene terpolymers **[2]**
255/08 . on to polymers of olefins having four or more carbon atoms **[2]**
255/10 . . on to butene polymers **[2]**

257/00 Macromolecular compounds obtained by polymerising monomers on to polymers of aromatic monomers as defined in group C08F 12/00 [2]

257/02 . on to polymers of styrene or alkyl-substituted styrenes **[2]**

259/00 Macromolecular compounds obtained by polymerising monomers on to polymers of halogen containing monomers as defined in group C08F 14/00 [2]

259/02 . on to polymers containing chlorine **[2]**
259/04 . . on to polymers of vinyl chloride **[2]**
259/06 . . on to polymers of vinylidene chloride **[2]**
259/08 . on to polymers containing fluorine **[2]**

261/00 Macromolecular compounds obtained by polymerising monomers on to polymers of oxygen-containing monomers as defined in group C08F 16/00 [2]

261/02 . on to polymers of unsaturated alcohols **[2]**
261/04 . . on to polymers of vinyl alcohol **[2]**
261/06 . on to polymers of unsaturated ethers **[2]**
261/08 . on to polymers of unsaturated aldehydes **[2]**
261/10 . on to polymers of unsaturated ketones **[2]**
261/12 . on to polymers of unsaturated acetals or ketals **[2]**

263/00 Macromolecular compounds obtained by polymerising monomers on to polymers of esters of unsaturated alcohols with saturated acids as defined in group C08F 18/00 [2]

263/02 . on to polymers of vinyl esters with monocarboxylic acids **[2]**

263/04 . . on to polymers of vinyl acetate **[2]**

263/06 . on to polymers of esters with polycarboxylic acids **[2]**

263/08 . . Polymerisation of diallyl phthalate prepolymers **[2]**

265/00 Macromolecular compounds obtained by polymerising monomers on to polymers of unsaturated monocarboxylic acids or derivatives thereof as defined in group C08F 20/00 [2]

265/02 . on to polymers of acids, salts or anhydrides **[2]**

265/04 . on to polymers of esters **[2]**

265/06 . . Polymerisation of acrylate or methacrylate esters on to polymers thereof **[2]**

265/08 . on to polymers of nitriles **[2]**

265/10 . on to polymers of amides or imides **[2]**

267/00 Macromolecular compounds obtained by polymerising monomers on to polymers of unsaturated polycarboxylic acids or derivatives thereof as defined in group C08F 22/00 [2]

267/02 . on to polymers of acids or salts **[2]**

267/04 . on to polymers of anhydrides **[2]**

267/06 . on to polymers of esters **[2]**

267/08 . on to polymers of nitriles **[2]**

267/10 . on to polymers of amides or imides **[2]**

269/00 Macromolecular compounds obtained by polymerising monomers on to polymers of heterocyclic oxygen-containing monomers as defined in group C08F 24/00 [2]

271/00 Macromolecular compounds obtained by polymerising monomers on to polymers of nitrogen-containing monomers as defined in group C08F 26/00 [2]

271/02 . on to polymers of monomers containing heterocyclic nitrogen **[2]**

273/00 Macromolecular compounds obtained by polymerising monomers on to polymers of sulfur-containing monomers as defined in group C08F 28/00 [2]

275/00 Macromolecular compounds obtained by polymerising monomers on to polymers of monomers containing phosphorus, selenium, tellurium, or a metal as defined in group C08F 30/00 [2]

277/00 Macromolecular compounds obtained by polymerising monomers on to polymers of carbocyclic or heterocyclic monomers as defined respectively in group C08F 32/00 or in group C08F 34/00 [2]

279/00 Macromolecular compounds obtained by polymerising monomers on to polymers of monomers having two or more carbon-to-carbon double bonds as defined in group C08F 36/00 [2]

279/02 . on to polymers of conjugated dienes **[2]**

279/04 . . Vinyl aromatic monomers and nitriles as the only monomers **[2]**

279/06 . . Vinyl aromatic monomers and methacrylates as the only monomers **[2]**

281/00 Macromolecular compounds obtained by polymerising monomers on to polymers of monomers having carbon-to-carbon triple bonds as defined in group C08F 38/00 [2]

283/00 Macromolecular compounds obtained by polymerising monomers on to polymers provided for in subclass C08G [4]

283/01 . on to unsaturated polyesters **[4]**

283/02 . on to polycarbonates or saturated polyesters **[2]**

283/04 . on to polycarbonamides, polyesteramides or polyimides **[2]**

283/06 . on to polyethers, polyoxymethylenes or polyacetals **[2]**

283/08 . . on to polyphenylene oxides **[2]**

283/10 . on to polymers containing more than one epoxy radical per molecule **[2]**

283/12 . on to polysiloxanes **[2]**

283/14 . on to polymers obtained by ring-opening polymerisation of carbocyclic compounds having one or more carbon-to-carbon double bonds in the carbocyclic ring, i.e. polyalkeneamers **[2]**

285/00 Macromolecular compounds obtained by polymerising monomers on to preformed graft polymers [2]

287/00 Macromolecular compounds obtained by polymerising monomers on to block polymers [2]

289/00 Macromolecular compounds obtained by polymerising monomers on to macromolecular compounds not provided for in groups C08F 251/00 to C08F 287/00 [2]

290/00 Macromolecular compounds obtained by polymerising monomers on to polymers modified by introduction of aliphatic unsaturated end or side groups [6]

290/02 . on to polymers modified by introduction of unsaturated end groups **[6]**

290/04 . . Polymers provided for in subclasses C08C or C08F **[6]**

290/06 . . Polymers provided for in subclass C08G **[6]**

290/08 . on to polymers modified by introduction of unsaturated side groups **[6]**

290/10 . . Polymers provided for in subclass C08B **[6]**

290/12 . . Polymers provided for in subclasses C08C or C08F **[6]**

290/14 . . Polymers provided for in subclass C08G **[6]**

291/00 Macromolecular compounds obtained by polymerising monomers on to macromolecular compounds according to more than one of the groups C08F 251/00 to C08F 289/00 [2]

291/02 . on to elastomers **[2]**

291/04 . on to halogen-containing macromolecules **[2]**

291/06 . on to oxygen-containing macromolecules **[2]**

291/08 . . on to macromolecules containing hydroxy radicals **[2]**

291/10 . . on to macromolecules containing epoxy radicals **[2]**

291/12 . on to nitrogen-containing macromolecules **[2]**

291/14 . on to sulfur-containing macromolecules **[2]**

291/16 . on to macromolecules containing more than two metal atoms **[2]**

291/18 . on to irradiated or oxidised macromolecules (epoxidised C08F 291/10) **[2]**

292/00 Macromolecular compounds obtained by polymerising monomers on to inorganic materials [3]

Block polymers [2]

293/00 Macromolecular compounds obtained by polymerisation on to a macromolecule having groups capable of inducing the formation of new polymer chains bound exclusively at one or both ends of the starting macromolecule (on to polymers modified by introduction of unsaturated end groups C08F 290/02) **[2]**

295/00 Macromolecular compounds obtained by polymerisation using successively different catalyst types without deactivating the intermediate polymer [2]

297/00 Macromolecular compounds obtained by successively polymerising different monomer systems using a catalyst of the ionic or coordination type without deactivating the intermediate polymer [2]

297/02 . using a catalyst of the anionic type **[2]**

297/04 . . polymerising vinyl aromatic monomers and conjugated dienes **[2]**

297/06 . using a catalyst of the coordination type **[2]**

297/08 . . polymerising mono-olefins **[2]**

299/00 Macromolecular compounds obtained by interreacting polymers involving only carbon-to-carbon unsaturated bond reactions, in the absence of non-macromolecular monomers (in the presence of non-macromolecular monomers C08F 251/00 to C08F 291/00; involving other reactions C08G 81/00) **[2,6]**

299/02 . from unsaturated polycondensates **[2]**

299/04 . . from polyesters **[2]**

299/06 . . from polyurethanes **[2]**

299/08 . . from polysiloxanes **[2]**

301/00 Macromolecular compounds not provided for in groups C08F 10/00 to C08F 299/00 [8]

C08G MACROMOLECULAR COMPOUNDS OBTAINED OTHERWISE THAN BY REACTIONS ONLY INVOLVING CARBON-TO-CARBON UNSATURATED BONDS [2]

(1) Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

(2) In this subclass, group C08G 18/00 takes precedence over the other groups. A further classification is given if the polymers are obtained by reactions forming specific linkages for which an appropriate group is provided. **[2]**

(3) Within each main group of this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2]**

(4) This subclass covers also compositions based on monomers which form macromolecular compounds classifiable in this subclass. **[7]** In this subclass: **[7]**

(a) if the monomers are defined, classification is made in groups C08G 2/00 to C08G 79/00, C08G 83/00 according to the polymer to be formed; **[7]**

(b) if the monomers are defined in a way that a composition cannot be classified within one main group of this subclass, the composition is classified in group C08G 85/00; **[7]**

(c) if the compounding ingredients are of interest per se, classification is also made in subclass C08K. **[7]**

Subclass index

2/00 Addition polymers of aldehydes or cyclic oligomers thereof or of ketones; **Addition copolymers thereof with less than 50 molar percent of other substances [2]**

2/02 . Polymerisation initiated by wave energy or by particle radiation **[2]**

2/04 . Polymerisation by using compounds which act upon the molecular weight, e.g. chain-transferring agents **[2]**

2/06 . Catalysts (catalysts in general B01J) **[2]**

2/08 . Polymerisation of formaldehyde **[2]**

2/10 . Polymerisation of cyclic oligomers of formaldehyde **[2]**

2/12 . Polymerisation of acetaldehyde or cyclic oligomers thereof **[2]**

2/14 . Polymerisation of single aldehydes not provided for in groups C08G 2/08 to C08G 2/12 **[2]**

2/16 . Polymerisation of single ketones **[2]**
2/18 . Copolymerisation of aldehydes or ketones **[2]**
2/20 . . with other aldehydes or ketones **[2]**
2/22 . . with epoxy compounds **[2]**
2/24 . . with acetals **[2]**
2/26 . . with compounds containing carbon-to-carbon unsaturation **[2]**
2/28 . Post-polymerisation treatments **[2]**
2/30 . Chemical modification by after-treatment **[2]**
2/32 . . by esterification **[2]**
2/34 . . by etherification **[2]**
2/36 . . by depolymerisation **[2]**
2/38 . Block or graft polymers prepared by polymerisation of aldehydes or ketones on to macromolecular compounds **[2]**

4/00 Condensation polymers of aldehydes or ketones with polyalcohols; **Addition polymers of heterocyclic oxygen compounds containing in the ring at least once the grouping −O−C−O−**(of cyclic oligomers of aldehydes C08G 2/00) **[2]**

6/00 Condensation polymers of aldehydes or ketones only [2]
6/02 . of aldehydes with ketones **[2]**

8/00 Condensation polymers of aldehydes or ketones with phenols only [2]
8/02 . of ketones **[2]**
8/04 . of aldehydes **[2]**
8/06 . . of furfural **[2]**
8/08 . . of formaldehyde, e.g. of formaldehyde formed in situ **[2]**
8/10 . . . with phenol **[2]**
8/12 . . . with monohydric phenols having only one hydrocarbon substituent ortho or para to the OH group, e.g. p-tert.-butyl phenol **[2]**
8/14 . . . with halogenated phenols **[2]**
8/16 . . . with amino- or nitrophenols **[2]**
8/18 . . . with phenols substituted by carboxylic or sulfonic acid groups **[2]**
8/20 . . . with polyhydric phenols **[2]**
8/22 . . . . Resorcinol **[2]**
8/24 . . . with mixtures of two or more phenols which are not covered by only one of the groups C08G 8/10 to C08G 8/20 **[2]**
8/26 . from mixtures of aldehydes and ketones **[2]**
8/28 . Chemically modified polycondensates **[2]**
8/30 . . by unsaturated compounds, e.g. terpenes **[2]**
8/32 . . by organic acids or derivatives thereof, e.g. fatty oils **[2]**
8/34 . . by natural resins or resin acids, e.g. rosin **[2]**
8/36 . . by etherifying **[2]**
8/38 . Block or graft polymers prepared by polycondensation of aldehydes or ketones on to macromolecular compounds **[2]**

10/00 Condensation polymers of aldehydes or ketones with aromatic hydrocarbons or halogenated aromatic hydrocarbons only [2]
10/02 . of aldehydes **[2]**
10/04 . . Chemically modified polycondensates **[2]**
10/06 . Block or graft polymers prepared by polycondensation of aldehydes or ketones on to macromolecular compounds **[2]**

12/00 Condensation polymers of aldehydes or ketones with only compounds containing hydrogen attached to nitrogen (amino phenols C08G 8/16) **[2]**
12/02 . of aldehydes **[2]**
12/04 . . with acyclic or carbocyclic compounds **[2]**
12/06 . . . Amines **[2]**
12/08 . . . . aromatic **[2]**
12/10 . . . with acyclic compounds having the moiety $X=C(-N\langle)_2$ in which X is O, S, or −N **[2]**
12/12 . . . . Ureas; Thioureas **[2]**
12/14 . . . . Dicyandiamides; Dicyandiamidines; Guanidines; Biguanides; Biuret; Semicarbazides **[2]**
12/16 . . . . . Dicyandiamides **[2]**
12/18 . . . with cyanamide **[2]**
12/20 . . . with urethanes or thiourethanes **[2]**
12/22 . . . with carboxylic acid amides (reaction polyamides with aldehydes C08G 69/50) **[2]**
12/24 . . . with sulfonic acid amides **[2]**
12/26 . . with heterocyclic compounds **[2]**
12/28 . . . with substituted diazines, diazoles or triazoles **[2]**
12/30 . . . with substituted triazines **[2]**
12/32 . . . . Melamines **[2]**
12/34 . . . and acyclic or carbocyclic compounds **[2]**
12/36 . . . . Ureas; Thioureas **[2]**
12/38 . . . . . and melamines **[2]**
12/40 . . Chemically modified polycondensates **[2]**
12/42 . . . by etherifying **[2]**
12/44 . . . by esterifying **[2]**
12/46 . Block or graft polymers prepared by polycondensation of aldehydes or ketones on to macromolecular compounds **[2]**

14/00 Condensation polymers of aldehydes or ketones with two or more other monomers covered by at least two of the groups C08G 8/00 to C08G 12/00 [2]
14/02 . of aldehydes **[2]**
14/04 . . with phenols **[2]**
14/06 . . . and monomers containing hydrogen attached to nitrogen **[2]**
14/067 . . . . Acyclic or carbocyclic monomers **[5]**
14/073 . . . . . Amines **[5]**
14/08 . . . . . Ureas; Thioureas **[2,5]**
14/09 . . . . Heterocyclic monomers **[5]**
14/10 . . . . . Melamines **[2,5]**
14/12 . . . Chemically modified polycondensates **[2]**
14/14 . Block or graft polymers prepared by polycondensation of aldehydes or ketones on to macromolecular compounds **[2]**

16/00 Condensation polymers of aldehydes or ketones with monomers not provided for in the groups C08G 4/00 to C08G 14/00 (with polynitriles C08G 69/38) **[2]**
16/02 . of aldehydes **[2]**
16/04 . . Chemically modified polycondensates **[2]**
16/06 . Block or graft polymers prepared by polycondensation of aldehydes or ketones on to macromolecular compounds **[2]**

18/00 **Polymeric products of isocyanates or isothiocyanates** (preparatory processes of porous or cellular materials, in which the monomers or catalysts are not specific C08J) **[2]**

Note

In this group, it is desirable to add the indexing code of group C08G 101/00. **[5]**

18/02 . of isocyanates or isothiocyanates only **[2]**
18/04 . with vinyl compounds **[2]**
18/06 . with compounds having active hydrogen **[2]**
18/08 . . Processes **[2]**
18/09 . . . comprising oligomerisation of isocyanates or isothiocyanates involving reaction of a part of the isocyanate or isothiocyanate groups with each other in the reaction mixture (use of preformed oligomers C08G 18/79) **[7]**
18/10 . . . Prepolymer processes involving reaction of isocyanates or isothiocyanates with compounds having active hydrogen in a first reaction step (masked polyisocyanates C08G 18/80) **[2]**
18/12 . . . . using two or more compounds having active hydrogen in the first polymerisation step **[2]**
18/16 . . . Catalysts (catalysts in general B01J) **[2]**
18/18 . . . . containing secondary or tertiary amines or salts thereof **[2]**
18/20 . . . . . Heterocyclic amines; Salts thereof **[2]**
18/22 . . . . containing metal compounds **[2]**
18/24 . . . . . of tin **[2]**
18/26 . . . . . of lead **[2]**
18/28 . . characterised by the compounds used containing active hydrogen **[2]**

Note

For the purpose of this group, the addition of water for the preparation of cellular materials is not taken into consideration. **[2]**

18/30 . . . Low-molecular-weight compounds **[2]**
18/32 . . . . Polyhydroxy compounds; Polyamines; Hydroxy amines **[2]**
18/34 . . . . Carboxylic acids; Esters thereof with monohydroxyl compounds **[2]**
18/36 . . . . Hydroxylated esters of higher fatty acids **[2]**
18/38 . . . . having hetero atoms other than oxygen (C08G 18/32 takes precedence) **[2]**
18/40 . . . High-molecular-weight compounds **[2]**
18/42 . . . . Polycondensates having carboxylic or carbonic ester groups in the main chain **[2]**
18/44 . . . . . Polycarbonates **[2]**
18/46 . . . . . having hetero atoms other than oxygen **[2]**
18/48 . . . . Polyethers **[2]**
18/50 . . . . . having hetero atoms other than oxygen **[2]**
18/52 . . . . Polythioethers **[2]**
18/54 . . . . Polycondensates of aldehydes **[2]**
18/56 . . . . Polyacetals **[2]**
18/58 . . . . Epoxy resins **[2]**
18/60 . . . . Polyamides or polyester-amides **[2]**
18/61 . . . . Polysiloxanes **[2]**
18/62 . . . . Polymers of compounds having carbon-to-carbon double bonds **[2]**
18/63 . . . . Block or graft polymers obtained by polymerising compounds having carbon-to-carbon double bonds on to polymers **[2]**
18/64 . . . . Macromolecular compounds not provided for by groups C08G 18/42 to C08G 18/63 **[2]**
18/65 . . . Low-molecular-weight compounds having active hydrogen with high-molecular-weight compounds having active hydrogen **[2]**
18/66 . . . . Compounds of groups C08G 18/42, C08G 18/48, or C08G 18/52 **[2]**
18/67 . . . Unsaturated compounds having active hydrogen **[2]**
18/68 . . . . Unsaturated polyesters **[2]**
18/69 . . . . Polymers of conjugated dienes **[2]**
18/70 . . characterised by the isocyanates or isothiocyanates used **[2]**
18/71 . . . Monoisocyanates or monoisothiocyanates **[2]**
18/72 . . . Polyisocyanates or polyisothiocyanates **[2]**
18/73 . . . . acyclic **[2]**
18/74 . . . . cyclic **[2]**
18/75 . . . . . cycloaliphatic **[2]**
18/76 . . . . . aromatic **[2]**
18/77 . . . . having hetero atoms in addition to the isocyanate or isothiocyanate nitrogen and oxygen or sulfur **[2]**
18/78 . . . . . Nitrogen **[2]**
18/79 . . . . . characterised by the polyisocyanates used, these having groups formed by oligomerisation of isocyanates or isothiocyanates **[2]**
18/80 . . . . Masked polyisocyanates **[2]**
18/81 . . . Unsaturated isocyanates or isothiocyanates **[2]**
18/82 . . Post-polymerisation treatment **[2]**
18/83 . . Chemically modified polymers **[2]**
18/84 . . . by aldehydes **[2]**
18/85 . . . by azo compounds **[2]**
18/86 . . . by peroxides **[2]**
18/87 . . . by sulfur **[2]**

59/00 **Polycondensates containing more than one epoxy group per molecule** (low-molecular-weight polyepoxy compounds C07); **Macromolecules obtained by reaction of epoxy polycondensates with monofunctional low-molecular-weight compounds**; **Macromolecules obtained by polymerising compounds containing more than one epoxy group per molecule using curing agents or catalysts which react with the epoxy groups** **[2]**

59/02 . Polycondensates containing more than one epoxy group per molecule **[2]**
59/04 . . of polyhydroxy compounds with epihalohydrins or precursors thereof **[2]**
59/06 . . . of polyhydric phenols **[2]**
59/08 . . . . from phenol-aldehyde condensates **[2]**
59/10 . . of polyamines with epihalohydrins or precursors thereof **[2]**
59/12 . . of polycarboxylic acids with epihalohydrins or precursors thereof **[2]**
59/14 . Polycondensates modified by chemical after-treatment **[2]**
59/16 . . by monocarboxylic acids or by anhydrides, halides or low-molecular-weight esters thereof **[2]**
59/17 . . . by acrylic or methacrylic acid **[4]**

59/18 . Macromolecules obtained by polymerising compounds containing more than one epoxy group per molecule using curing agents or catalysts which react with the epoxy groups **[2]**

59/20 . . characterised by the epoxy compounds used **[2]**

Note

Preparation and curing of epoxy polycondensates, in which the epoxy polycondensate is not exclusively a low-molecular-weight compound and in which the method of curing is not important, are classified only in group C08G 59/02. **[2]**

59/22 . . . Di-epoxy compounds **[2]**
59/24 . . . . carbocyclic **[2]**
59/26 . . . . heterocyclic **[2]**
59/28 . . . . containing acyclic nitrogen atoms **[2]**
59/30 . . . . containing atoms other than carbon, hydrogen, oxygen, and nitrogen **[2]**
59/32 . . . Epoxy compounds containing three or more epoxy groups **[2]**
59/34 . . . . obtained by epoxidation of an unsaturated polymer **[2]**
59/36 . . . . together with mono-epoxy compounds **[2]**
59/38 . . . . together with di-epoxy compounds **[2]**
59/40 . . characterised by the curing agents used **[2]**
59/42 . . . Polycarboxylic acids; Anhydrides, halides, or low-molecular-weight esters thereof **[2]**
59/44 . . . Amides **[2]**
59/46 . . . . together with other curing agents **[2]**
59/48 . . . . . with polycarboxylic acids or with anhydrides, halides, or low-molecular-weight esters thereof **[2]**
59/50 . . . Amines **[2]**
59/52 . . . . Amino carboxylic acids **[2]**
59/54 . . . . Amino amides **[2]**
59/56 . . . . together with other curing agents **[2]**
59/58 . . . . . with polycarboxylic acids or with anhydrides, halides, or low-molecular-weight esters thereof **[2]**
59/60 . . . . . with amides **[2]**
59/62 . . . Alcohols or phenols **[2]**
59/64 . . . . Amino alcohols **[2]**
59/66 . . . Mercaptans **[2]**
59/68 . . characterised by the catalysts used **[2]**
59/70 . . . Chelates **[2]**
59/72 . . . Complexes of boron halides **[2]**

Note

In groups C08G 61/00 to C08G 79/00, in the absence of an indication to the contrary, macromolecular compounds obtained by reactions forming two different linkages in the main chain are classified only according to the linkage present in excess. **[2]**

61/00 Macromolecular compounds obtained by reactions forming a carbon-to-carbon link in the main chain of the macromolecule (C08G 2/00 to C08G 16/00 take precedence) **[2]**

61/02 . Macromolecular compounds containing only carbon atoms in the main chain of the macromolecule, e.g. polyxylylenes **[2]**
61/04 . . only aliphatic carbon atoms **[2]**
61/06 . . . prepared by ring-opening of carbocyclic compounds **[2]**
61/08 . . . . of carbocyclic compounds containing one or more carbon-to-carbon double bonds in the ring **[2]**
61/10 . . only aromatic carbon atoms, e.g. polyphenylenes **[2]**
61/12 . Macromolecular compounds containing atoms other than carbon in the main chain of the macromolecule **[2]**

63/00 Macromolecular compounds obtained by reactions forming a carboxylic ester link in the main chain of the macromolecule (polyester-amides C08G 69/44; polyester-imides C08G 73/16) **[2,5]**

Note

Compounds characterised by the chemical constitution of the polyesters are classified in the groups for the type of polyester compound. Compounds characterised by the preparation process of the polyesters are classified in the groups for the process employed (groups C08G 63/78 to C08G 63/87). Compounds characterised both by the chemical constitution and by the preparation process are classified according to each of these aspects. **[5]**

63/02 . Polyesters derived from hydroxy carboxylic acids or from polycarboxylic acids and polyhydroxy compounds **[2]**
63/06 . . derived from hydroxy carboxylic acids **[2]**
63/08 . . . Lactones or lactides **[2]**
63/12 . . derived from polycarboxylic acids and polyhydroxy compounds **[2]**
63/123 . . . the acids or hydroxy compounds containing carbocyclic rings **[5]**
63/127 . . . . Acids containing aromatic rings **[5]**
63/13 . . . . . containing two or more aromatic rings **[5]**
63/133 . . . . Hydroxy compounds containing aromatic rings **[5]**
63/137 . . . . Acids or hydroxy compounds containing cycloaliphatic rings **[5]**
63/16 . . . Dicarboxylic acids and dihydroxy compounds **[2]**
63/18 . . . . the acids or hydroxy compounds containing carbocyclic rings **[2]**
63/181 . . . . . Acids containing aromatic rings **[5]**
63/183 . . . . . Terephthalic acids **[5]**
63/185 . . . . . containing two or more aromatic rings **[5]**
63/187 . . . . . containing condensed aromatic rings **[5]**
63/189 . . . . . containing a naphthalene ring **[5]**
63/19 . . . . . Hydroxy compounds containing aromatic rings **[5]**
63/191 . . . . . Hydroquinones **[5]**
63/193 . . . . . containing two or more aromatic rings **[5]**
63/195 . . . . . Bisphenol A **[5]**
63/197 . . . . . containing condensed aromatic rings **[5]**
63/199 . . . . . Acids or hydroxy compounds containing cycloaliphatic rings **[5]**
63/20 . . . . Polyesters having been prepared in the presence of compounds having one reactive group or more than two reactive groups **[2]**

63/21 . . . . . in the presence of unsaturated monocarboxylic acids or unsaturated monohydric alcohols or reactive derivatives thereof **[5]**

63/40 . . . Polyesters derived from ester-forming derivatives of polycarboxylic acids or of polyhydroxy compounds, other than from esters thereof **[2]**

63/42 . . . . Cyclic ethers (C08G 59/00 takes precedence); Cyclic carbonates; Cyclic sulfites; Cyclic orthoesters **[2,7]**

63/44 . . . . Polyamides; Polynitriles **[2]**

63/46 . . . Polyesters chemically modified by esterification (C08G 63/20 takes precedence; by after-treatment C08G 63/91) **[2]**

63/47 . . . . by unsaturated monocarboxylic acids or unsaturated monohydric alcohols or reactive derivatives thereof **[5]**

63/48 . . . . by unsaturated higher fatty oils or their acids; by resin acids **[2]**

63/49 . . . . . Alkyd resins **[5]**

63/50 . . . . by monohydric alcohols **[2]**

63/52 . . . Polycarboxylic acids or polyhydroxy compounds in which at least one of the two components contains aliphatic unsaturation **[2]**

63/54 . . . . the acids or hydroxy compounds containing carbocyclic rings **[2]**

63/547 . . . . . Hydroxy compounds containing aromatic rings **[5]**

63/553 . . . . . Acids or hydroxy compounds containing cycloaliphatic rings, e.g. Diels-Alder adducts **[5]**

63/56 . . . . Polyesters derived from ester-forming derivatives of polycarboxylic acids or of polyhydroxy compounds, other than from esters thereof **[2]**

63/58 . . . . . Cyclic ethers (C08G 59/00 takes precedence); Cyclic carbonates; Cyclic sulfites **[2]**

63/60 . . derived from the reaction of a mixture of hydroxy carboxylic acids, polycarboxylic acids and polyhydroxy compounds **[2]**

63/64 . Polyesters containing both carboxylic ester groups and carbonate groups **[2]**

63/66 . Polyesters containing oxygen in the form of ether groups (C08G 63/42, C08G 63/58 take precedence) **[2]**

63/664 . . derived from hydroxycarboxylic acids **[5]**

63/668 . . derived from polycarboxylic acids and polyhydroxy compounds **[5]**

63/672 . . . Dicarboxylic acids and dihydroxy compounds **[5]**

63/676 . . . in which at least one of the two components contains aliphatic unsaturation **[5]**

63/68 . Polyesters containing atoms other than carbon, hydrogen, and oxygen (C08G 63/64 takes precedence) **[4]**

63/682 . . containing halogens **[5]**

63/685 . . containing nitrogen **[5]**

63/688 . . containing sulfur **[5]**

63/692 . . containing phosphorus **[5]**

63/695 . . containing silicon **[5]**

63/698 . . containing boron **[5]**

63/78 . Preparation processes **[5]**

63/79 . . Interfacial processes, i.e. processes involving a reaction at the interface of two non-miscible liquids **[5]**

63/80 . . Solid-state polycondensation **[5]**

63/81 . . using solvents (C08G 63/79 takes precedence) **[5]**

63/82 . . characterised by the catalyst used **[5]**

63/83 . . . Alkali metals, alkaline earth metals, beryllium, magnesium, copper, silver, gold, zinc, cadmium, mercury, manganese, or compounds thereof **[5]**

63/84 . . . Boron, aluminium, gallium, indium, thallium, rare-earth metals, or compounds thereof **[5]**

63/85 . . . Germanium, tin, lead, arsenic, antimony, bismuth, titanium, zirconium, hafnium, vanadium, niobium, tantalum, or compounds thereof **[5]**

63/86 . . . . Germanium, antimony, or compounds thereof **[5]**

63/87 . . . Non-metals or inter-compounds thereof (boron C08G 63/84) **[5]**

63/88 . Post-polymerisation treatment **[5]**

63/89 . . Recovery of the polymer **[5]**

63/90 . . Purification; Drying **[5]**

63/91 . Polymers modified by chemical after-treatment **[5]**

64/00 Macromolecular compounds obtained by reactions forming a carbonic ester link in the main chain of the macromolecule (polycarbonate-amides C08G 69/44; polycarbonate-imides C08G 73/16) **[5]**

Note

Polymers containing both carboxylic ester groups and carbonate groups are always classified in group C08G 63/64, even when the carbonate groups are present in excess. **[5]**

64/02 . Aliphatic polycarbonates **[5]**

64/04 . Aromatic polycarbonates **[5]**

64/06 . . not containing aliphatic unsaturation **[5]**

64/08 . . . containing atoms other than carbon, hydrogen or oxygen **[5]**

64/10 . . . . containing halogens **[5]**

64/12 . . . . containing nitrogen **[5]**

64/14 . . . containing a chain-terminating or -crosslinking agent **[5]**

64/16 . Aliphatic-aromatic or araliphatic polycarbonates **[5]**

64/18 . Block or graft polymers **[5]**

64/20 . General preparatory processes **[5]**

64/22 . . using carbonyl halides **[5]**

64/24 . . . and phenols **[5]**

64/26 . . using halocarbonates **[5]**

64/28 . . . and phenols **[5]**

64/30 . . using carbonates **[5]**

64/32 . . using carbon dioxide **[5]**

64/34 . . . and cyclic ethers **[5]**

64/36 . . using carbon monoxide **[5]**

64/38 . . using other monomers **[5]**

64/40 . Post-polymerisation treatment **[5]**

64/42 . Chemical after-treatment **[5]**

65/00 Macromolecular compounds obtained by reactions forming an ether link in the main chain of the macromolecule (polyacetals C08G 2/00, C08G 4/00; epoxy resins C08G 59/00; polythioether-ethers C08G 75/12; polyethers containing less than eleven monomer units C07C) **[2]**

65/02 . from cyclic ethers by opening of the heterocyclic ring **[2]**

65/04 . . from cyclic ethers only **[2]**

65/06 . . . Cyclic ethers having no atoms other than carbon and hydrogen outside the ring **[2]**
65/08 . . . . Saturated oxiranes **[2]**
65/10 . . . . . characterised by the catalysts used **[2]**
65/12 . . . . . containing organo-metallic compounds or metal hydrides **[2]**
65/14 . . . . Unsaturated oxiranes **[2]**
65/16 . . . . Cyclic ethers having four or more ring atoms **[2]**
65/18 . . . . . Oxetanes **[2]**
65/20 . . . . . Tetrahydrofuran **[2]**
65/22 . . . Cyclic ethers having at least one atom other than carbon and hydrogen outside the ring **[2]**
65/24 . . . . Epihalohydrins **[2]**
65/26 . . from cyclic ethers and other compounds **[2]**
65/28 . . . Cyclic ethers and hydroxy compounds **[2]**
65/30 . . Post-polymerisation treatment, e.g. recovery, purification, drying **[2]**
65/32 . . Polymers modified by chemical after-treatment **[2]**
65/321 . . . with inorganic compounds **[7]**
65/322 . . . . containing hydrogen **[7]**
65/323 . . . . containing halogens **[7]**
65/324 . . . . containing oxygen **[7]**
65/325 . . . . containing nitrogen **[7]**
65/326 . . . . containing sulfur **[7]**
65/327 . . . . containing phosphorus **[7]**
65/328 . . . . containing other elements **[7]**
65/329 . . . with organic compounds **[7]**
65/331 . . . . containing oxygen **[7]**
65/332 . . . . . containing carboxyl groups, or halides or esters thereof **[7]**
65/333 . . . . containing nitrogen **[7]**
65/334 . . . . containing sulfur **[7]**
65/335 . . . . containing phosphorus **[7]**
65/336 . . . . containing silicon **[7]**
65/337 . . . . containing other elements (organic compounds containing halogens only as halides of a carboxyl group C08G 65/332) **[7]**
65/338 . . . with inorganic and organic compounds **[7]**
65/34 . from hydroxy compounds or their metallic derivatives (C08G 65/28 takes precedence) **[2]**
65/36 . . Furfuryl alcohol **[2]**
65/38 . . derived from phenols **[2]**
65/40 . . . from phenols and other compounds **[2]**
65/42 . . . . Phenols and polyhydroxy ethers **[2]**
65/44 . . . by oxidation of phenols **[2]**
65/46 . . Post-polymerisation treatment, e.g. recovery, purification, drying **[2]**
65/48 . . Polymers modified by chemical after-treatment **[2]**

67/00 Macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing oxygen or oxygen and carbon, not provided for in groups C08G 2/00 to C08G 65/00 [2]

67/02 . Copolymers of carbon monoxide and aliphatic unsaturated compounds **[2]**
67/04 . Polyanhydrides **[2]**

69/00 Macromolecular compounds obtained by reactions forming a carboxylic amide link in the main chain of the macromolecule (products obtained from isocyanates or isothiocyanates C08G 18/00; polyhydrazides C08G 73/08; polyamide acids C08G 73/10; polyamide-imides C08G 73/14) **[2]**

69/02 . Polyamides derived from amino carboxylic acids or from polyamines and polycarboxylic acids **[2]**
69/04 . . Preparatory processes **[2]**
69/06 . . . Solid state polycondensation **[2]**
69/08 . . derived from amino carboxylic acids **[2]**
69/10 . . . Alpha-amino-carboxylic acids **[2]**
69/12 . . . with both amino and carboxylic groups aromatically bound **[2]**
69/14 . . . Lactams **[2]**
69/16 . . . . Preparatory processes **[2]**
69/18 . . . . . Anionic polymerisation **[2]**
69/20 . . . . . characterised by the catalysts used **[2]**
69/22 . . . . Beta-lactams **[2]**
69/24 . . . . Pyrrolidones or piperidones **[2]**
69/26 . . derived from polyamines and polycarboxylic acids **[2]**
69/28 . . . Preparatory processes **[2]**
69/30 . . . . Solid state polycondensation **[2]**
69/32 . . . from aromatic diamines and aromatic dicarboxylic acids with both amino and carboxylic groups aromatically bound **[2]**
69/34 . . . using polymerised unsaturated fatty acids **[2]**
69/36 . . derived from amino acids, polyamines, and polycarboxylic acids **[2]**
69/38 . Polyamides prepared from aldehydes and polynitriles **[2]**
69/40 . Polyamides containing oxygen in the form of ether groups (C08G 69/12, C08G 69/32 take precedence) **[2]**
69/42 . Polyamides containing atoms other than carbon, hydrogen, oxygen, and nitrogen (C08G 69/12, C08G 69/32 take precedence) **[2]**
69/44 . Polyester-amides **[2]**
69/46 . Post-polymerisation treatment **[2]**
69/48 . Polymers modified by chemical after-treatment **[2]**
69/50 . . with aldehydes **[2]**

71/00 Macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a ureide or urethane link, otherwise than from isocyanate radicals [2]

71/02 . Polyureas **[2]**
71/04 . Polyurethanes **[2]**

73/00 Macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing nitrogen, with or without oxygen or carbon, not provided for in groups C08G 12/00 to C08G 71/00 [2]

73/02 . Polyamines (containing less than eleven monomer units C07C) **[2]**
73/04 . . derived from alkyleneimines **[2]**
73/06 . Polycondensates having nitrogen-containing heterocyclic rings in the main chain of the macromolecule; Polyhydrazides; Polyamide acids or similar polyimide precursors **[2]**
73/08 . . Polyhydrazides; Polytriazoles; Polyaminotriazoles; Polyoxadiazoles **[2]**
73/10 . . Polyimides; Polyester-imides; Polyamide-imides; Polyamide acids or similar polyimide precursors **[2]**

73/12 . . . Unsaturated polyimide precursors **[2]**
73/14 . . . Polyamide-imides **[2]**
73/16 . . . Polyester-imides **[2]**
73/18 . . Polybenzimidazoles **[2]**
73/20 . . Pyrrones **[2]**
73/22 . . Polybenzoxazoles **[2]**
73/24 . Copolymers of a fluoronitroso organic compound and another fluoro organic compound, e.g. nitroso rubbers **[2]**
73/26 . . of trifluoronitrosomethane with a fluoro-olefin **[2]**

75/00 Macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing sulfur, with or without nitrogen, oxygen, or carbon [2]

75/02 . Polythioethers **[2]**
75/04 . . from mercapto compounds or metallic derivatives thereof **[2]**
75/06 . . from cyclic thioethers **[2]**
75/08 . . . from thiiranes **[2]**
75/10 . . from sulfur or sulfur-containing compounds and aldehydes or ketones **[2]**
75/12 . Polythioether-ethers **[2]**
75/14 . Polysulfides **[2]**
75/16 . . by polycondensation of organic compounds with inorganic polysulfides **[2]**
75/18 . Polysulfoxides **[2]**
75/20 . Polysulfones **[2]**
75/22 . . Copolymers of sulfur dioxide with unsaturated aliphatic compounds **[2]**
75/23 . . Polyethersulfones **[2]**
75/24 . Polysulfonates **[2]**
75/26 . Polythioesters **[2]**
75/28 . Polythiocarbonates **[2]**
75/30 . Polysulfonamides; Polysulfonimides **[2]**
75/32 . Polythiazoles; Polythiadiazoles **[2]**

77/00 Macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing silicon, with or without sulfur, nitrogen, oxygen, or carbon [2]

77/02 . Polysilicates **[2]**
77/04 . Polysiloxanes **[2]**
77/06 . . Preparatory processes **[2]**
77/08 . . . characterised by the catalysts used **[2]**
77/10 . . . Equilibration processes **[2]**
77/12 . . containing silicon bound to hydrogen **[2]**
77/14 . . containing silicon bound to oxygen-containing groups **[2]**
77/16 . . . to hydroxy groups **[2]**
77/18 . . . to alkoxy or aryloxy groups **[2]**
77/20 . . containing silicon bound to unsaturated aliphatic groups **[2]**
77/22 . . containing silicon bound to organic groups containing atoms other than carbon, hydrogen, and oxygen **[2]**
77/24 . . . halogen-containing groups **[2]**
77/26 . . . nitrogen-containing groups **[2]**
77/28 . . . sulfur-containing groups **[2]**
77/30 . . . phosphorus-containing groups **[2]**
77/32 . . Post-polymerisation treatment (chemical after-treatment C08G 77/38) **[2]**
77/34 . . . Purification **[2]**
77/36 . . . Fractionation **[2]**
77/38 . . Polysiloxanes modified by chemical after-treatment **[2]**
77/382 . . . containing atoms other than carbon, hydrogen, oxygen or silicon **[5]**
77/385 . . . . containing halogens **[5]**
77/388 . . . . containing nitrogen **[5]**
77/392 . . . . containing sulfur **[5]**
77/395 . . . . containing phosphorus **[5]**
77/398 . . . . containing boron or metal atoms **[5]**
77/42 . Block- or graft-polymers containing polysiloxane sequences (polymerising aliphatic unsaturated monomers on to a polysiloxane C08F 283/12) **[2]**
77/44 . . containing only polysiloxane sequences **[2]**
77/442 . . containing vinyl polymer sequences **[5]**
77/445 . . containing polyester sequences **[5]**
77/448 . . containing polycarbonate sequences **[5]**
77/452 . . containing nitrogen-containing sequences **[5]**
77/455 . . . containing polyamide, polyesteramide or polyimide sequences **[5]**
77/458 . . . containing polyurethane sequences **[5]**
77/46 . . containing polyether sequences **[2]**
77/48 . in which at least two but not all the silicon atoms are connected by linkages other than oxygen atoms (C08G 77/42 takes precedence) **[2]**
77/50 . . by carbon linkages **[2]**
77/52 . . . containing aromatic rings **[2]**
77/54 . . Nitrogen-containing linkages **[2]**
77/56 . . Boron-containing linkages **[2]**
77/58 . . Metal-containing linkages **[2]**
77/60 . in which all the silicon atoms are connected by linkages other than oxygen atoms **[2]**
77/62 . . Nitrogen atoms **[2]**

79/00 Macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing atoms other than silicon, sulfur, nitrogen, oxygen, and carbon [2]

79/02 . a linkage containing phosphorus **[2]**
79/04 . . Phosphorus linked to oxygen or to oxygen and carbon **[2]**
79/06 . . Phosphorus linked to carbon only **[2]**
79/08 . a linkage containing boron **[2]**
79/10 . a linkage containing aluminium **[2]**
79/12 . a linkage containing tin **[2]**
79/14 . a linkage containing two or more elements other than carbon, oxygen, nitrogen, sulfur, and silicon **[2]**

81/00 Macromolecular compounds obtained by interreacting polymers in the absence of monomers, e.g. block polymers (involving only carbon-to-carbon unsaturated bond reactions C08F 299/00) **[2]**

81/02 . at least one of the polymers being obtained by reactions involving only carbon-to-carbon unsaturated bonds **[2]**

83/00 Macromolecular compounds not provided for in groups C08G 2/00 to C08G 81/00 [2]

85/00 General processes for preparing compounds provided for in this subclass [2]

Indexing scheme associated with group C08G 18/00, relating to cellular products. [5]

101/00 Manufacture of cellular products [5]

C08H DERIVATIVES OF NATURAL MACROMOLECULAR COMPOUNDS (polysaccharides C08B; natural rubber C08C; natural resins or their derivatives C09F; bituminous materials C10)

Note

Therapeutic activity of compounds is further classified in subclass A61P. **[7]**

1/00 Macromolecular products derived from proteins (food proteins A23; glue, gelatine C09H)

1/02 . Protein-aldehyde condensates

1/04 . . Casein-aldehyde condensates

1/06 . derived from horn, hoofs, hair, skin, or leather

3/00 Vulcanised oils, e.g. factice

6/00 Macromolecular compounds derived from lignin [2010.01]

7/00 Lignin; Modified lignin; High-molecular-weight products derived therefrom *(low-molecular-weight derivatives of lignin C07G 1/00)* **[2011.01]**

8/00 Macromolecular compounds derived from lignocellulosic materials [2010.01]

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

C08J WORKING-UP; GENERAL PROCESSES OF COMPOUNDING; AFTER-TREATMENT NOT COVERED BY SUBCLASSES C08B, C08C, C08F, C08G OR C08H (working, e.g. shaping, of plastics B29) **[2]**

(1) This subclass covers processes, not covered by subclasses C08B to C08H, for treating polymers. **[4]**
(2) In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2]**
(3) When classifying in this subclass, additional classification may be made in class C08L relating to the materials used. **[8]**

3/00 Processes of treating or compounding macromolecular substances [2]

3/02 . Making solutions, dispersions, lattices or gels by other methods than by solution, emulsion or suspension polymerisation techniques **[2]**

3/03 . . in aqueous media **[5]**

3/05 . . . from solid polymers **[5]**

3/07 . . . from polymer solutions **[5]**

3/075 . . . Macromolecular gels **[6]**

3/09 . . in organic liquids **[5]**

3/11 . . . from solid polymers **[5]**

3/12 . Powdering or granulating **[2]**

3/14 . . by precipitation from solutions **[2]**

3/16 . . by coagulating dispersions **[2]**

3/18 . Plasticising macromolecular compounds (plasticisers C08K) **[2]**

3/20 . Compounding polymers with additives, e.g. colouring **[2]**

3/205 . . in the presence of a liquid phase **[5]**

3/21 . . . the polymer being premixed with a liquid phase **[5]**

3/215 . . . . at least one additive being also premixed with a liquid phase **[5]**

3/22 . . using masterbatch techniques **[2]**

3/24 . Crosslinking, e.g. vulcanising, of macromolecules (mechanical aspects B29C 35/00; crosslinking agents C08K) **[2]**

3/26 . . of latex **[2]**

3/28 . Treatment by wave energy or particle radiation **[2]**

5/00 Manufacture of articles or shaped materials containing macromolecular substances (manufacture of semi-permeable membranes B01D 67/00 to B01D 71/00) **[2]**

5/02 . Direct processing of dispersions, e.g. latex, to articles **[2]**

5/04 . Reinforcing macromolecular compounds with loose or coherent fibrous material **[2]**

5/06 . . using pretreated fibrous materials **[2]**

5/08 . . . glass fibres **[2]**

5/10 . . characterised by the additives used in the polymer mixture **[2]**

5/12 . Bonding of a preformed macromolecular material to the same or other solid material such as metal, glass, leather, e.g. using adhesives **[2]**

5/14 . Manufacture of abrasive or friction articles or materials **[2]**

5/16 . Manufacture of articles or materials having reduced friction **[2]**

5/18 . Manufacture of films or sheets **[2]**

5/20 . Manufacture of shaped structures of ion-exchange resins **[2]**

5/22 . . Films, membranes or diaphragms **[2]**

5/24 . Impregnating materials with prepolymers which can be polymerised in situ, e.g. manufacture of prepregs **[2]**

7/00 Chemical treatment or coating of shaped articles made of macromolecular substances (coating with metallic material C23C; electrolytic deposition of metals C25) **[2]**

7/02 . with solvents, e.g. swelling agents **[2]**

7/04 . Coating **[2]**

7/06 . . with compositions not containing macromolecular substances **[2]**

7/12 . Chemical modification **[2]**
7/14 . . with acids, their salts or anhydrides **[2]**
7/16 . . with polymerisable compounds **[2]**
7/18 . . . using wave energy or particle radiation **[2]**

9/00 Working-up of macromolecular substances to porous or cellular articles or materials; **After-treatment thereof** (mechanical aspects of shaping of plastics or substances in a plastic state for the production of porous or cellular articles B29C) **[2]**
9/02 . using blowing gases generated by the reacting monomers or modifying agents during the preparation or modification of macromolecules **[2]**
9/04 . using blowing gases generated by a previously added blowing agent **[2]**
9/06 . . by a chemical blowing agent **[2]**
9/08 . . . developing carbon dioxide **[2]**
9/10 . . . developing nitrogen **[2]**
9/12 . . by a physical blowing agent **[2]**
9/14 . . . organic **[2]**

Note

In groups C08J 9/16 to C08J 9/22, the following term is used with the meaning indicated:
– "expandable" includes also expanding, pre-expanded or expanded. **[5]**

9/16 . Making expandable particles **[2,5]**
9/18 . . by impregnating polymer particles with the blowing agent **[2]**
9/20 . . by suspension polymerisation in the presence of the blowing agent **[2]**
9/22 . After-treatment of expandable particles; Forming foamed products **[2,5]**
9/224 . . Surface treatment **[5]**
9/228 . . Forming foamed products **[5]**
9/232 . . . by sintering expandable particles **[5]**
9/236 . . . using binding agents **[5]**
9/24 . by surface fusion and bonding of particles to form voids, e.g. sintering (of expandable particles C08J 9/232) **[2,5]**
9/26 . by elimination of a solid phase from a macromolecular composition or article, e.g. leaching out **[2]**
9/28 . by elimination of a liquid phase from a macromolecular composition or article, e.g. drying of coagulum **[2]**
9/30 . by mixing gases into liquid compositions or plastisols, e.g. frothing with air **[2]**
9/32 . from compositions containing micro-balloons, e.g. syntactic foams **[2]**
9/33 . Agglomerating foam fragments, e.g. waste foam **[5]**
9/34 . Chemical features in the manufacture of articles consisting of a foamed macromolecular core and a macromolecular surface layer having a higher density than the core **[2]**
9/35 . Composite foams, i.e. continuous macromolecular foams containing discontinuous cellular particles or fragments **[5]**
9/36 . After-treatment (C08J 9/22 takes precedence) **[2,5]**
9/38 . . Destruction of cell membranes **[2]**
9/40 . . Impregnation **[2]**
9/42 . . . with macromolecular compounds **[2]**

11/00 Recovery or working-up of waste materials (recovery of plastics B29B 17/00; polymerisation processes involving purification or recycling of waste polymers or their depolymerisation products C08B, C08C, C08F, C08G, C08H) **[4]**
11/02 . of solvents, plasticisers or unreacted monomers **[4]**
11/04 . of polymers **[2]**
11/06 . . without chemical reactions **[4]**
11/08 . . . using selective solvents for polymer components **[4]**
11/10 . . by chemically breaking down the molecular chains of polymers or breaking of crosslinks, e.g. devulcanisation (depolymerisation to the original monomer C07) **[4]**
11/12 . . . by dry-heat treatment only **[4]**
11/14 . . . by treatment with steam or water **[4]**
11/16 . . . by treatment with inorganic material (C08J 11/14 takes precedence) **[4]**
11/18 . . . by treatment with organic material **[4]**
11/20 . . . . by treatment with hydrocarbons or halogenated hydrocarbons **[4]**
11/22 . . . . by treatment with organic oxygen-containing compounds **[4]**
11/24 . . . . . containing hydroxyl groups **[4]**
11/26 . . . . . containing carboxylic acid groups, their anhydrides or esters **[4]**
11/28 . . . . by treatment with organic compounds containing nitrogen, sulfur or phosphorus **[4]**

99/00 Subject matter not provided for in other groups of this subclass [8]

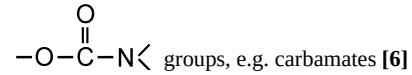
C08K USE OF INORGANIC OR NON-MACROMOLECULAR ORGANIC SUBSTANCES AS COMPOUNDING INGREDIENTS (paints, inks, varnishes, dyes, polishes, adhesives C09) **[2]**

(1) In this subclass, in the absence of an indication to the contrary, an ingredient is classified in the last appropriate place. **[2]**
(2) In this subclass:
– a mixture of ingredients is classified in the most indented group covering all the essential ingredients of the mixture, e.g.:
a mixture of a monohydroxylic and a polyhydroxylic alcohol C08K 5/05; **[4]**
a mixture of two polyhydroxylic alcohols C08K 5/053; **[6]**
a mixture of an alcohol and an ether C08K 5/04; **[4]**
a mixture of an ether and an amine C08K 5/00; **[4]**
a mixture of an amine and a metal C08K 13/02; **[4]**
– ammonium salts are classified in the same way as metal salts. **[2]**
(3) In this subclass, any ingredient of a mixture which is not identified by the classification according to Note (2) above, and the use of which is determined to be novel and non-obvious, must also be classified in this subclass according to Note (1). The ingredient can be either a single compound or a composition in itself. **[8]**

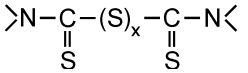
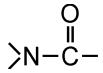
(4) Any ingredient of a mixture which is not identified by the classification according to Notes (2) or (3) above, and which is considered to represent information of interest for search, may also be classified in this subclass according to Note (1). This can, for example, be the case when it is considered of interest to enable searching of mixtures using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

3/00 Use of inorganic ingredients [2]
3/02 . Elements **[2]**
3/04 . . Carbon **[2]**
3/06 . . Sulfur **[2]**
3/08 . . Metals **[2]**
3/10 . Metal compounds **[2]**
3/12 . . Hydrides **[2]**
3/14 . . Carbides **[2]**
3/16 . Halogen-containing compounds **[2]**
3/18 . Oxygen-containing compounds, e.g. metal carbonyls **[2]**
3/20 . . Oxides; Hydroxides **[2]**
3/22 . . . of metals **[2]**
3/24 . . Acids; Salts thereof **[2]**
3/26 . . . Carbonates; Bicarbonates **[2]**
3/28 . Nitrogen-containing compounds **[2]**
3/30 . Sulfur-, selenium-, or tellurium-containing compounds **[2]**
3/32 . Phosphorus-containing compounds **[2]**
3/34 . Silicon-containing compounds **[2]**
3/36 . . Silica **[2]**
3/38 . Boron-containing compounds **[2]**
3/40 . Glass **[2]**

5/00 Use of organic ingredients [2]
5/01 . Hydrocarbons **[2]**
5/02 . Halogenated hydrocarbons **[2]**
5/03 . . aromatic **[2]**
5/04 . Oxygen-containing compounds **[2]**
5/05 . . Alcohols; Metal alcoholates **[2]**
5/053 . . . Polyhydroxylic alcohols **[6]**
5/057 . . . Metal alcoholates **[6]**
5/06 . . Ethers; Acetals; Ketals; Ortho-esters **[2]**
5/07 . . Aldehydes; Ketones **[2]**
5/08 . . . Quinones **[2]**
5/09 . . Carboxylic acids; Metal salts thereof; Anhydrides thereof **[2]**
5/092 . . . Polycarboxylic acids **[6]**
5/095 . . . Carboxylic acids containing halogens **[6]**
5/098 . . . Metal salts of carboxylic acids **[6]**
5/10 . . Esters; Ether-esters **[2]**
5/101 . . . of monocarboxylic acids **[6]**
5/103 . . . . with polyalcohols **[6]**
5/105 . . . . with phenols **[6]**
5/107 . . . . . with polyphenols **[6]**
5/109 . . . of carbonic acid **[6]**
5/11 . . . of acyclic polycarboxylic acids **[2]**
5/12 . . . of cyclic polycarboxylic acids **[2]**
5/13 . . Phenols; Phenolates **[2]**
5/132 . . . Phenols containing keto groups **[6]**
5/134 . . . Phenols containing ester groups **[6]**
5/136 . . . Phenols containing halogens **[6]**
5/138 . . . Phenolates **[6]**
5/14 . . Peroxides **[2]**
5/15 . . Heterocyclic compounds having oxygen in the ring **[2]**
5/151 . . . having one oxygen atom in the ring **[7]**
5/1515 . . . . Three-membered rings **[7]**
5/1525 . . . . Four-membered rings **[7]**
5/1535 . . . . Five-membered rings **[7]**
5/1539 . . . . . Cyclic anhydrides **[7]**
5/1545 . . . . Six-membered rings **[7]**
5/156 . . . having two oxygen atoms in the ring **[7]**
5/1565 . . . . Five-membered rings **[7]**
5/1575 . . . . Six-membered rings **[7]**
5/159 . . . having more than two oxygen atoms in the ring **[7]**
5/16 . Nitrogen-containing compounds **[2]**
5/17 . . Amines; Quaternary ammonium compounds **[2]**
5/18 . . . with aromatically bound amino groups **[2]**
5/19 . . . Quaternary ammonium compounds **[2]**
5/20 . . Carboxylic acid amides **[2]**
5/205 . . Compounds containing



groups, e.g. carbamates **[6]**
5/21 . . Urea; Derivatives thereof, e.g. biuret **[2]**
5/22 . . Compounds containing nitrogen bound to another nitrogen atom **[2]**
5/23 . . . Azo-compounds **[2]**
5/24 . . . Derivatives of hydrazine **[2]**
5/25 . . . . Carboxylic acid hydrazides **[2]**
5/26 . . . . Semicarbazides **[2]**
5/27 . . . Compounds containing a nitrogen atom bound to two other nitrogen atoms, e.g. diazoamino-compounds **[2]**
5/28 . . . . Azides **[2]**
5/29 . . Compounds containing carbon-to-nitrogen double bonds **[2]**
5/30 . . . Hydrazones; Semicarbazones **[2]**
5/31 . . . Guanidine; Derivatives thereof **[2]**
5/315 . . Compounds containing carbon-to-nitrogen triple bonds **[6]**
5/32 . . Compounds containing nitrogen bound to oxygen **[2]**
5/33 . . . Oximes **[2]**
5/34 . . Heterocyclic compounds having nitrogen in the ring **[2]**
5/3412 . . . having one nitrogen atom in the ring **[5]**
5/3415 . . . . Five-membered rings **[5]**
5/3417 . . . . . condensed with carbocyclic rings **[5]**
5/3432 . . . . Six-membered rings **[5]**
5/3435 . . . . . Piperidines **[5]**
5/3437 . . . . . condensed with carbocyclic rings **[5]**
5/3442 . . . having two nitrogen atoms in the ring **[5]**
5/3445 . . . . Five-membered rings **[5]**
5/3447 . . . . . condensed with carbocyclic rings **[5]**
5/3462 . . . . Six-membered rings **[5]**
5/3465 . . . . . condensed with carbocyclic rings **[5]**
5/3467 . . . having more than two nitrogen atoms in the ring **[5]**
5/3472 . . . . Five-membered rings **[5]**
5/3475 . . . . . condensed with carbocyclic rings **[5]**
5/3477 . . . . Six-membered rings **[5]**
5/3492 . . . . . Triazines **[5]**
5/3495 . . . . . condensed with carbocyclic rings **[5]**

5/35 . . . having also oxygen in the ring **[2]**
5/353 . . . . Five-membered rings **[5]**
5/357 . . . . Six-membered rings **[5]**
5/36 . Sulfur-, selenium-, or tellurium-containing compounds **[2]**
5/37 . . Thiols **[2,7]**
5/372 . . Sulfides **[6,7]**
5/375 . . . containing six-membered aromatic rings **[6,7]**
5/378 . . . containing heterocyclic rings **[6,7]**
5/38 . . Thiocarbonic acids; Derivatives thereof, e.g. xanthates **[2]**
5/39 . . Thiocarbamic acids; Derivatives thereof, e.g. dithiocarbamates **[2]**
5/40 . . . Thiuramsulfides; Thiurampolysulfides, e.g. compounds containing  groups **[2]**
5/405 . . Thioureas; Derivatives thereof **[6]**
5/41 . . Compounds containing sulfur bound to oxygen **[2]**
5/42 . . . Sulfonic acids; Derivatives thereof **[2]**
5/43 . . Compounds containing sulfur bound to nitrogen **[2]**
5/435 . . . Sulfonamides **[6]**
5/44 . . . Sulfenamides **[2]**
5/45 . . Heterocyclic compounds having sulfur in the ring **[2]**
5/46 . . . with oxygen or nitrogen in the ring **[2]**
5/47 . . . . Thiazoles **[2]**
5/48 . . Selenium- or tellurium-containing compounds **[2]**
5/49 . Phosphorus-containing compounds **[2]**
5/50 . . Phosphorus bound to carbon only **[2,5]**
5/51 . . Phosphorus bound to oxygen **[2]**
5/52 . . . bound to oxygen only **[2]**
5/521 . . . . Esters of phosphoric acids, e.g. of H_3PO_4 **[5]**
5/523 . . . . . with hydroxyaryl compounds **[5]**
5/524 . . . . Esters of phosphorous acids, e.g. of H_3PO_3 **[5]**
5/526 . . . . . with hydroxyaryl compounds **[5]**
5/527 . . . . Cyclic esters **[5]**
5/529 . . . . Esters containing heterocyclic rings not representing cyclic esters of phosphoric or phosphorous acids **[5]**
5/53 . . . bound to oxygen and to carbon only **[2,5]**
5/5313 . . . . Phosphinic compounds, e.g. $R_2{=}P(:O)OR'$ **[5]**
5/5317 . . . . Phosphonic compounds, e.g. $R{-}P(:O)(OR')_2$ **[5]**
5/5333 . . . . . Esters of phosphonic acids **[5]**
5/5337 . . . . . containing also halogens **[5]**
5/5353 . . . . . containing also nitrogen **[5]**
5/5357 . . . . . cyclic **[5]**
5/5373 . . . . . containing heterocyclic rings not representing cyclic esters of phosphonic acids **[5]**
5/5377 . . . . Phosphinous compounds, e.g. $R_2{=}P{-}OR'$ **[5]**
5/5393 . . . . Phosphonous compounds, e.g. $R{-}P(OR')_2$ **[5]**
5/5397 . . . . Phosphine oxides **[5]**
5/5398 . . Phosphorus bound to sulfur **[5]**
5/5399 . . Phosphorus bound to nitrogen **[5]**
5/54 . Silicon-containing compounds **[2]**
5/541 . . containing oxygen **[7]**
5/5415 . . . containing at least one $Si{-}O$ bond **[7]**
5/5419 . . . . containing at least one $Si{-}C$ bond **[7]**
5/5425 . . . containing at least one $C{=}C$ bond **[7]**
5/5435 . . . containing oxygen in a ring **[7]**
5/544 . . containing nitrogen **[7]**
5/5445 . . . containing at least one $Si{-}N$ bond **[7]**
5/5455 . . . containing at least one  group **[7]**
5/5465 . . . containing at least one $C{=}N$ bond **[7]**
5/5475 . . . containing at least one $C{\equiv}N$ bond **[7]**
5/548 . . containing sulfur **[7]**
5/549 . . containing silicon in a ring **[7]**
5/55 . Boron-containing compounds **[2]**
5/56 . Organo-metallic compounds, i.e. organic compounds containing a metal-to-carbon bond **[2]**
5/57 . . Organo-tin compounds **[2]**
5/58 . . . containing sulfur **[2]**
5/59 . Arsenic- or antimony-containing compounds **[2]**

7/00 Use of ingredients characterised by shape [2]
7/02 . Fibres or whiskers **[2]**
7/04 . . inorganic **[2]**
7/06 . . . Elements **[2]**
7/08 . . . Oxygen-containing compounds **[2]**
7/10 . . . Silicon-containing compounds **[2]**
7/12 . . . . Asbestos **[2]**
7/14 . . . Glass **[2]**
7/16 . Solid spheres **[2]**
7/18 . . inorganic **[2]**
7/20 . . . Glass **[2]**
7/22 . Expanded, porous or hollow particles **[2]**
7/24 . . inorganic **[2]**
7/26 . . . Silicon-containing compounds **[2]**
7/28 . . . Glass **[2]**

9/00 Use of pretreated ingredients (use of pretreated fibrous materials in the manufacture of articles or shaped materials containing macromolecular substances C08J 5/06) **[2]**
9/02 . Ingredients treated with inorganic substances **[2]**
9/04 . Ingredients treated with organic substances **[2]**
9/06 . . with silicon-containing compounds **[2]**
9/08 . Ingredients agglomerated by treatment with a binding agent **[2]**
9/10 . Encapsulated ingredients **[2]**
9/12 . Adsorbed ingredients **[2]**

11/00 Use of ingredients of unknown constitution, e.g. undefined reaction products [2]

13/00 Use of mixtures of ingredients not covered by any single one of main groups C08K 3/00 to C08K 11/00, each of these compounds being essential [4]
13/02 . Organic and inorganic ingredients **[4]**
13/04 . Ingredients characterised by their shape and organic or inorganic ingredients **[4]**
13/06 . Pretreated ingredients and ingredients covered by the main groups C08K 3/00 to C08K 7/00 **[4]**
13/08 . Ingredients of unknown constitution and ingredients covered by the main groups C08K 3/00 to C08K 9/00 **[4]**

C08L COMPOSITIONS OF MACROMOLECULAR COMPOUNDS (pesticides, herbicides A01N; pharmaceuticals, cosmetics A61K; explosives C06B; compositions based on polymerisable monomers C08F, C08G; paints, inks, varnishes, dyes, polishes, adhesives C09; lubricants C10M; detergents C11D; artificial filaments or fibres D01F; textile treating compositions D06) **[2]**

(1) In this subclass, the following term is used with the meaning indicated:
– "rubber" includes:
(a) natural or conjugated diene rubbers;
(b) rubber in general (for a specific rubber, other than a natural rubber or a conjugated diene rubber, see the group provided for compositions of such macromolecular compounds). **[2]**

(2) In this subclass:
(a) compositions are classified according to the mutual proportions by weight of only the macromolecular constituents; **[2]**
(b) compositions are classified according to the macromolecular constituent or constituents present in the highest proportion; if all these constituents are present in equal proportions the composition is classified according to each of these constituents. **[2]**

(3) Any macromolecular constituent of a composition which is not identified by the classification according to Note (2) above, and the use of which is determined to be novel and non-obvious, must also be classified in this subclass. For example, a composition containing 80 parts polyethene and 20 parts polyvinyl chloride is classified in both groups C08L 23/06 and C08L 27/06, if the use of polyvinyl chloride is determined to be novel and non-obvious. **[8]**

(4) Any macromolecular constituent of a composition which is not identified by the classification according to Notes (2) or (3) above, and which is considered to represent information of interest for search, may also be classified in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

Subclass index

Compositions of polysaccharides or of their derivatives [2]

1/00 Compositions of cellulose, modified cellulose, or cellulose derivatives [2]
1/02 . Cellulose; Modified cellulose **[2]**
1/04 . . Oxycellulose; Hydrocellulose **[2]**
1/06 . . Cellulose hydrate **[2]**
1/08 . Cellulose derivatives **[2]**
1/10 . . Esters of organic acids **[2]**
1/12 . . . Cellulose acetate **[2]**
1/14 . . . Mixed esters, e.g. cellulose acetate-butyrate **[2]**
1/16 . . Esters of inorganic acids **[2]**
1/18 . . . Cellulose nitrate **[2]**
1/20 . . Esters of both organic acids and inorganic acids **[2]**
1/22 . . Cellulose xanthate **[2]**
1/24 . . . Viscose **[2]**
1/26 . . Cellulose ethers **[2]**
1/28 . . . Alkyl ethers **[2]**
1/30 . . . Aryl ethers; Aralkyl ethers **[2]**
1/32 . . Cellulose ether-esters **[2]**

3/00 Compositions of starch, amylose or amylopectin or of their derivatives or degradation products [2]
3/02 . Starch; Degradation products thereof, e.g. dextrin **[2]**
3/04 . Starch derivatives **[2]**
3/06 . . Esters **[2]**
3/08 . . Ethers **[2]**
3/10 . . Oxidised starch **[2]**
3/12 . Amylose; Amylopectin; Degradation products thereof **[2]**
3/14 . Amylose derivatives; Amylopectin derivatives **[2]**
3/16 . . Esters **[2]**
3/18 . . Ethers **[2]**
3/20 . . Oxidised amylose; Oxidised amylopectin **[2]**

5/00 Compositions of polysaccharides or of their derivatives not provided for in group C08L 1/00 or C08L 3/00 [2]
5/02 . Dextran; Derivatives thereof **[2]**
5/04 . Alginic acid; Derivatives thereof **[2]**
5/06 . Pectin; Derivatives thereof **[2]**
5/08 . Chitin; Chondroitin sulfate; Hyaluronic acid; Derivatives thereof **[2]**
5/10 . Heparin; Derivatives thereof **[2]**
5/12 . Agar-agar; Derivatives thereof **[2]**
5/14 . Hemicellulose; Derivatives thereof **[2]**
5/16 . Cyclodextrin; Derivatives thereof **[2]**

Compositions of rubbers or of their derivatives [2]

7/00 Compositions of natural rubber [2]
7/02 . Latex **[2]**

9/00 Compositions of homopolymers or copolymers of conjugated diene hydrocarbons [2]
9/02 . Copolymers with acrylonitrile **[2]**
9/04 . . Latex **[2]**
9/06 . Copolymers with styrene **[2]**

9/08 . . Latex **[2]**
9/10 . Latex (C08L 9/04, C08L 9/08 take precedence) **[2]**

11/00 Compositions of homopolymers or copolymers of chloroprene [2]
11/02 . Latex **[2]**

13/00 Compositions of rubbers containing carboxyl groups [2]
13/02 . Latex **[2]**

15/00 Compositions of rubber derivatives (C08L 11/00, C08L 13/00 take precedence) **[4]**
15/02 . Rubber derivatives containing halogen **[2]**

17/00 Compositions of reclaimed rubber [2]

19/00 Compositions of rubbers not provided for in groups C08L 7/00 to C08L 17/00 [2]
19/02 . Latex **[2]**

21/00 Compositions of unspecified rubbers [2]
21/02 . Latex **[2]**

Compositions of macromolecular compounds obtained by reactions involving only carbon-to-carbon unsaturated bonds [2]

(1) In groups C08L 23/00 to C08L 49/00, "aliphatic radical" means an acyclic or a non-aromatic carbocyclic carbon skeleton which is considered to be terminated by every bond to: **[8]**
(a) an element other than carbon; **[8]**
(b) a carbon atom having a double bond to one atom other than carbon; **[8]**
(c) an aromatic carbocyclic ring or a heterocyclic ring. **[8]**

(2) In groups C08L 23/00 to C08L 49/00, in the absence of an indication to the contrary, a copolymer is classified according to the major monomeric component. **[8]**

23/00 Compositions of homopolymers or copolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond; **Compositions of derivatives of such polymers [2]**
23/02 . not modified by chemical after-treatment **[2]**
23/04 . . Homopolymers or copolymers of ethene **[2]**
23/06 . . . Polyethene **[2]**
23/08 . . . Copolymers of ethene (C08L 23/16 takes precedence) **[2]**
23/10 . . Homopolymers or copolymers of propene **[2]**
23/12 . . . Polypropene **[2]**
23/14 . . . Copolymers of propene (C08L 23/16 takes precedence) **[2]**
23/16 . . Ethene-propene or ethene-propene-diene copolymers **[2]**
23/18 . . Homopolymers or copolymers of hydrocarbons having four or more carbon atoms **[2]**
23/20 . . . having four to nine carbon atoms **[2]**
23/22 . . . . Copolymers of isobutene; Butyl rubber **[2]**
23/24 . . . having ten or more carbon atoms **[2]**
23/26 . modified by chemical after-treatment **[2]**
23/28 . . by reaction with halogens or halogen-containing compounds (C08L 23/32 takes precedence) **[2]**
23/30 . . by oxidation **[2]**
23/32 . . by reaction with phosphorus- or sulfur-containing compounds **[2]**
23/34 . . . by chlorosulfonation **[2]**
23/36 . . by reaction with nitrogen-containing compounds, e.g. by nitration **[2]**

25/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an aromatic carbocyclic ring; **Compositions of derivatives of such polymers [2]**
25/02 . Homopolymers or copolymers of hydrocarbons **[2]**
25/04 . . Homopolymers or copolymers of styrene **[2]**
25/06 . . . Polystyrene **[2]**
25/08 . . . Copolymers of styrene (C08L 29/08, C08L 35/06, C08L 55/02 take precedence) **[2]**
25/10 . . . . with conjugated dienes **[2]**
25/12 . . . . with unsaturated nitriles **[2]**
25/14 . . . . with unsaturated esters **[2]**
25/16 . . Homopolymers or copolymers of alkyl-substituted styrenes **[2]**
25/18 . Homopolymers or copolymers of aromatic monomers containing elements other than carbon and hydrogen **[2]**

27/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a halogen; **Compositions of derivatives of such polymers [2]**
27/02 . not modified by chemical after-treatment **[2]**
27/04 . . containing chlorine atoms **[2]**
27/06 . . . Homopolymers or copolymers of vinyl chloride **[2]**
27/08 . . . Homopolymers or copolymers of vinylidene chloride **[2]**
27/10 . . containing bromine or iodine atoms **[2]**
27/12 . . containing fluorine atoms **[2]**
27/14 . . . Homopolymers or copolymers of vinyl fluoride **[2]**
27/16 . . . Homopolymers or copolymers of vinylidene fluoride **[2]**
27/18 . . . Homopolymers or copolymers of tetrafluoroethene **[2]**
27/20 . . . Homopolymers or copolymers of hexafluoropropene **[2]**
27/22 . modified by chemical after-treatment **[2]**
27/24 . . halogenated **[2]**

29/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an alcohol, ether, aldehydo, ketonic, acetal, or ketal radical; **Compositions of hydrolysed polymers of esters of unsaturated alcohols with saturated carboxylic acids**; **Compositions of derivatives of such polymers [2]**
29/02 . Homopolymers or copolymers of unsaturated alcohols (C08L 29/14 takes precedence) **[2]**
29/04 . . Polyvinyl alcohol; Partially hydrolysed homopolymers or copolymers of esters of unsaturated alcohols with saturated carboxylic acids **[2]**
29/06 . . Copolymers of allyl alcohol **[2]**
29/08 . . . with vinyl aromatic monomers **[2]**
29/10 . Homopolymers or copolymers of unsaturated ethers (C08L 35/08 takes precedence) **[2]**

29/12 . Homopolymers or copolymers of unsaturated ketones **[2]**

29/14 . Homopolymers or copolymers of acetals or ketals obtained by polymerisation of unsaturated acetals or ketals or by after-treatment of polymers of unsaturated alcohols **[2]**

31/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid, or of a haloformic acid (of hydrolysed polymers C08L 29/00); **Compositions of derivatives of such polymers [2]**

31/02 . Homopolymers or copolymers of esters of monocarboxylic acids **[2]**

31/04 . . Homopolymers or copolymers of vinyl acetate **[2]**

31/06 . Homopolymers or copolymers of esters of polycarboxylic acids **[2]**

31/08 . . of phthalic acid **[2]**

33/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and only one being terminated by only one carboxyl radical, or of salts, anhydrides, esters, amides, imides, or nitriles thereof; **Compositions of derivatives of such polymers [2]**

33/02 . Homopolymers or copolymers of acids; Metal or ammonium salts thereof **[2]**

33/04 . Homopolymers or copolymers of esters **[2]**

33/06 . . of esters containing only carbon, hydrogen, and oxygen, the oxygen atom being present only as part of the carboxyl radical **[2]**

33/08 . . . Homopolymers or copolymers of acrylic acid esters **[2]**

33/10 . . . Homopolymers or copolymers of methacrylic acid esters **[2]**

33/12 . . . . Homopolymers or copolymers of methyl methacrylate **[2]**

33/14 . . of esters containing halogen, nitrogen, sulfur, or oxygen atoms in addition to the carboxy oxygen **[2]**

33/16 . . . Homopolymers or copolymers of esters containing halogen atoms **[2]**

33/18 . Homopolymers or copolymers of nitriles **[2]**

33/20 . . Homopolymers or copolymers of acrylonitrile (C08L 55/02 takes precedence) **[2]**

33/22 . . Homopolymers or copolymers of nitriles containing four or more carbon atoms **[2]**

33/24 . Homopolymers or copolymers of amides or imides **[2]**

33/26 . . Homopolymers or copolymers of acrylamide or methacrylamide **[2]**

35/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a carboxyl radical, and containing at least one other carboxyl radical in the molecule, or of salts, anhydrides, esters, amides, imides or nitriles thereof; **Compositions of derivatives of such polymers [2]**

35/02 . Homopolymers or copolymers of esters (C08L 35/06, C08L 35/08 take precedence) **[2]**

35/04 . Homopolymers or copolymers of nitriles (C08L 35/06, C08L 35/08 take precedence) **[2]**

35/06 . Copolymers with vinyl aromatic monomers **[2]**

35/08 . Copolymers with vinyl ethers **[2]**

37/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a heterocyclic ring containing oxygen (of cyclic esters of polyfunctional acids C08L 31/00; of cyclic anhydrides of unsaturated acids C08L 35/00); **Compositions of derivatives of such polymers [2]**

39/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a single or double bond to nitrogen or by a heterocyclic ring containing nitrogen; **Compositions of derivatives of such polymers [2]**

39/02 . Homopolymers or copolymers of vinylamine **[2]**

39/04 . Homopolymers or copolymers of monomers containing heterocyclic rings having nitrogen as ring member **[2]**

39/06 . . Homopolymers or copolymers of N-vinyl-pyrrolidones **[2]**

39/08 . . Homopolymers or copolymers of vinyl-pyridine **[2]**

41/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a bond to sulfur or by a heterocyclic ring containing sulfur; **Compositions of derivatives of such polymers [2]**

43/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and containing boron, silicon, phosphorus, selenium, tellurium, or a metal; **Compositions of derivatives of such polymers [2]**

43/02 . Homopolymers or copolymers of monomers containing phosphorus **[2]**

43/04 . Homopolymers or copolymers of monomers containing silicon **[2]**

45/00 Compositions of homopolymers or copolymers of compounds having no unsaturated aliphatic radicals in a side chain, and having one or more carbon-to-carbon double bonds in a carbocyclic or in a heterocyclic ring system; **Compositions of derivatives of such polymers** (of cyclic esters of polyfunctional acids C08L 31/00; of cyclic anhydrides or imides C08L 35/00) **[2]**

45/02 . of coumarone-indene polymers **[2]**

47/00 Compositions of homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, at least one having two or more carbon-to-carbon double bonds; **Compositions of derivatives of such polymers** (C08L 45/00 takes precedence; of conjugated diene rubbers C08L 9/00 to C08L 21/00) **[2]**

49/00 Compositions of homopolymers or copolymers of compounds having one or more carbon-to-carbon triple bonds; **Compositions of derivatives of such polymers [2]**

51/00 **Compositions of graft polymers in which the grafted component is obtained by reactions only involving carbon-to-carbon unsaturated bonds** (for ABS polymers C08L 55/02); **Compositions of derivatives of such polymers [2]**

51/02 . grafted on to polysaccharides **[2]**

51/04 . grafted on to rubbers **[2]**

51/06 . grafted on to homopolymers or copolymers of aliphatic hydrocarbons containing only one carbon-to-carbon double bond **[2]**

51/08 . grafted on to macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[2]**

51/10 . grafted on to inorganic materials **[3]**

53/00 **Compositions of block copolymers containing at least one sequence of a polymer obtained by reactions only involving carbon-to-carbon unsaturated bonds**; **Compositions of derivatives of such polymers [2]**

53/02 . of vinyl aromatic monomers and conjugated dienes **[2]**

55/00 **Compositions of homopolymers or copolymers, obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in groups C08L 23/00 to C08L 53/00 [2]**

55/02 . ABS [Acrylonitrile-Butadiene-Styrene] polymers **[2]**

55/04 . Polyadducts obtained by the diene synthesis **[2]**

57/00 **Compositions of unspecified polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds [2]**

57/02 . Copolymers of mineral oil hydrocarbons **[2]**

57/04 . Copolymers in which only the monomer in minority is defined **[2]**

57/06 . Homopolymers or copolymers containing elements other than carbon and hydrogen **[2]**

57/08 . . containing halogen atoms **[2]**

57/10 . . containing oxygen atoms **[2]**

57/12 . . containing nitrogen atoms **[2]**

Compositions of macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds [2]

59/00 **Compositions of polyacetals**; **Compositions of derivatives of polyacetals** (of polyvinyl acetals C08L 29/14) **[2]**

59/02 . Polyacetals containing polyoxymethylene sequences only **[2]**

59/04 . Copolyoxymethylenes **[3]**

61/00 **Compositions of condensation polymers of aldehydes or ketones** (with polyalcohols C08L 59/00; with polynitriles C08L 77/00); **Compositions of derivatives of such polymers [2]**

61/02 . Condensation polymers of aldehydes or ketones only **[2]**

61/04 . Condensation polymers of aldehydes or ketones with phenols only **[2]**

61/06 . . of aldehydes with phenols **[2]**

61/08 . . . with monohydric phenols **[2]**

61/10 . . . . Phenol-formaldehyde condensates **[2]**

61/12 . . . with polyhydric phenols **[2]**

61/14 . . . Modified phenol-aldehyde condensates **[2]**

61/16 . . of ketones with phenols **[2]**

61/18 . Condensation polymers of aldehydes or ketones with aromatic hydrocarbons or their halogen derivatives only **[2]**

61/20 . Condensation polymers of aldehydes or ketones with only compounds containing hydrogen attached to nitrogen (with amino phenols C08L 61/04) **[2]**

61/22 . . of aldehydes with acyclic or carbocyclic compounds **[2]**

61/24 . . . with urea or thiourea **[2]**

61/26 . . of aldehydes with heterocyclic compounds **[2]**

61/28 . . . with melamine **[2]**

61/30 . . of aldehydes with heterocyclic and acyclic or carbocyclic compounds **[2]**

61/32 . . Modified amine-aldehyde condensates **[2]**

61/34 . Condensation polymers of aldehydes or ketones with monomers covered by at least two of the groups C08L 61/04, C08L 61/18, and C08L 61/20 **[2]**

63/00 **Compositions of epoxy resins**; **Compositions of derivatives of epoxy resins [2]**

63/02 . Polyglycidyl ethers of bis-phenols **[2]**

63/04 . Epoxynovolacs **[2]**

63/06 . Triglycidylisocyanurates **[2]**

63/08 . Epoxidised polymerised polyenes **[2]**

63/10 . Epoxy resins modified by unsaturated compounds **[2]**

Note

In groups C08L 65/00 to C08L 85/00, in the absence of an indication to the contrary, compositions of macromolecular compounds obtained by reactions forming two different linkages in the main chain are classified only according to the linkage present in excess. **[2]**

65/00 **Compositions of macromolecular compounds obtained by reactions forming a carbon-to-carbon link in the main chain** (C08L 7/00 to C08L 57/00, C08L 61/00 take precedence); **Compositions of derivatives of such polymers [2]**

65/02 . Polyphenylenes **[2]**

65/04 . Polyxylylenes **[2]**

67/00 **Compositions of polyesters obtained by reactions forming a carboxylic ester link in the main chain** (of polyester-amides C08L 77/12; of polyester-imides C08L 79/08); **Compositions of derivatives of such polymers [2]**

67/02 . Polyesters derived from dicarboxylic acids and dihydroxy compounds (C08L 67/06 takes precedence) **[2]**

67/03 . . the dicarboxylic acids and dihydroxy compounds having the hydroxy and the carboxyl groups directly linked to aromatic rings **[5]**

67/04 . Polyesters derived from hydroxy carboxylic acids, e.g. lactones (C08L 67/06 takes precedence) **[2]**

67/06 . Unsaturated polyesters **[2]**

67/07 . . having terminal carbon-to-carbon unsaturated bonds **[5]**

67/08 . Polyesters modified with higher fatty oils or their acids, or with natural resins or resin acids **[2]**

69/00 **Compositions of polycarbonates**; **Compositions of derivatives of polycarbonates [2]**

71/00 **Compositions of polyethers obtained by reactions forming an ether link in the main chain** (of polyacetals C08L 59/00; of epoxy resins C08L 63/00; of polythioether-ethers C08L 81/02; of polyethersulfones C08L 81/06); **Compositions of derivatives of such polymers [2]**

71/02 . Polyalkylene oxides **[2]**

71/03 . . Polyepihalohydrins **[5]**
71/08 . Polyethers derived from hydroxy compounds or from their metallic derivatives (C08L 71/02 takes precedence) **[5]**
71/10 . . from phenols **[5]**
71/12 . . . Polyphenylene oxides **[5]**
71/14 . . Furfuryl alcohol polymers **[5]**

73/00 Compositions of macromolecular compounds obtained by reactions forming a linkage containing oxygen or oxygen and carbon in the main chain, not provided for in groups C08L 59/00 to C08L 71/00; **Compositions of derivatives of such polymers [2]**
73/02 . Polyanhydrides **[2]**

75/00 Compositions of polyureas or polyurethanes; **Compositions of derivatives of such polymers [2]**
75/02 . Polyureas **[2]**
75/04 . Polyurethanes **[2]**
75/06 . . from polyesters **[2]**
75/08 . . from polyethers **[2]**
75/10 . . from polyacetals **[2]**
75/12 . . from compounds containing nitrogen and active hydrogen, the nitrogen atom not being part of an isocyanate group **[2]**
75/14 . . Polyurethanes having carbon-to-carbon unsaturated bonds **[5]**
75/16 . . . having terminal carbon-to-carbon unsaturated bonds **[5]**

77/00 Compositions of polyamides obtained by reactions forming a carboxylic amide link in the main chain (of polyhydrazides C08L 79/06; of polyamide-imides or polyamide acids C08L 79/08); **Compositions of derivatives of such polymers [2]**
77/02 . Polyamides derived from omega-amino carboxylic acids or from lactams thereof (C08L 77/10 takes precedence) **[2]**
77/04 . Polyamides derived from alpha-amino carboxylic acids (C08L 77/10 takes precedence) **[2]**
77/06 . Polyamides derived from polyamines and polycarboxylic acids (C08L 77/10 takes precedence) **[2]**
77/08 . . from polyamines and polymerised unsaturated fatty acids **[2]**
77/10 . Polyamides derived from aromatically bound amino and carboxyl groups of amino carboxylic acids or of polyamines and polycarboxylic acids **[2]**
77/12 . Polyester-amides **[2]**

79/00 Compositions of macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing nitrogen with or without oxygen, or carbon only, not provided for in groups C08L 61/00 to C08L 77/00 [2]
79/02 . Polyamines **[2]**
79/04 . Polycondensates having nitrogen-containing heterocyclic rings in the main chain; Polyhydrazides; Polyamide acids or similar polyimide precursors **[2]**
79/06 . . Polyhydrazides; Polytriazoles; Polyamino-triazoles; Polyoxadiazoles **[2]**
79/08 . . Polyimides; Polyester-imides; Polyamide-imides; Polyamide acids or similar polyimide precursors **[2]**

81/00 Compositions of macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing sulfur with or without nitrogen, oxygen, or carbon only; **Compositions of polysulfones**; **Compositions of derivatives of such polymers [2]**
81/02 . Polythioethers; Polythioether-ethers **[2]**
81/04 . Polysulfides **[2]**
81/06 . Polysulfones; Polyethersulfones **[2]**
81/08 . Polysulfonates **[2]**
81/10 . Polysulfonamides; Polysulfonimides **[2]**

83/00 Compositions of macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing silicon with or without sulfur, nitrogen, oxygen, or carbon only; **Compositions of derivatives of such polymers [2]**
83/02 . Polysilicates **[2]**
83/04 . Polysiloxanes **[2]**
83/05 . . containing silicon bound to hydrogen **[4]**
83/06 . . containing silicon bound to oxygen-containing groups (C08L 83/12 takes precedence) **[2]**
83/07 . . containing silicon bound to unsaturated aliphatic groups **[4]**
83/08 . . containing silicon bound to organic groups containing atoms other than carbon, hydrogen, and oxygen **[2]**
83/10 . Block- or graft-copolymers containing polysiloxane sequences (obtained by polymerising a compound having a carbon-to-carbon double bond on to a polysiloxane C08L 51/08, C08L 53/00) **[2]**
83/12 . . containing polyether sequences **[2]**
83/14 . in which at least two but not all the silicon atoms are connected by linkages other than oxygen atoms (C08L 83/10 takes precedence) **[2]**
83/16 . in which all the silicon atoms are connected by linkages other than oxygen atoms **[2]**

85/00 Compositions of macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing atoms other than silicon, sulfur, nitrogen, oxygen, and carbon; **Compositions of derivatives of such polymers [2]**
85/02 . containing phosphorus **[2]**
85/04 . containing boron **[2]**

87/00 Compositions of unspecified macromolecular compounds, obtained otherwise than by polymerisation reactions only involving unsaturated carbon-to-carbon bonds [2]

Compositions of natural macromolecular compounds or of derivatives thereof [2]

89/00 Compositions of proteins; **Compositions of derivatives thereof** (foodstuff preparations A23J 3/00) **[2]**
89/02 . Casein-aldehyde condensates **[2]**
89/04 . Products derived from waste materials, e.g. horn, hoof or hair **[2]**
89/06 . . derived from leather or skin **[2]**

91/00 Compositions of oils, fats or waxes; **Compositions of derivatives thereof** (polishing compositions, ski waxes C09G; soaps, detergent compositions C11D) **[2]**
91/02 . Vulcanised oils, e.g. factice **[2]**
91/04 . Linoxyn **[2]**
91/06 . Waxes **[2]**
91/08 . . Mineral waxes **[2]**

93/00 **Compositions of natural resins**; **Compositions of derivatives thereof** (of polysaccharides C08L 1/00 to C08L 5/00; of natural rubber C08L 7/00; polishing compositions C09G) **[2]**

93/02 . Shellac (French polish C09F) **[2]**

93/04 . Rosin **[2]**

95/00 **Compositions of bituminous materials, e.g. asphalt, tar or pitch [2]**

97/00 **Compositions of lignin-containing materials** (of polysaccharides C08L 1/00 to C08L 5/00) **[2]**

97/02 . Lignocellulosic material, e.g. wood, straw or bagasse **[2]**

99/00 **Compositions of natural macromolecular compounds or of derivatives thereof not provided for in groups C08L 1/00 to C08L 7/00 or C08L 89/00 to C08L 97/00 [2]**

101/00 **Compositions of unspecified macromolecular compounds [2]**

101/02 . characterised by the presence of specified groups **[2]**

101/04 . . containing halogen atoms **[2]**

101/06 . . containing oxygen atoms **[2]**

101/08 . . . Carboxyl groups **[2]**

101/10 . . containing hydrolysable silane groups **[4]**

101/12 . characterised by physical features, e.g. anisotropy, viscosity or electrical conductivity (liquid crystal materials or compositions C09K 19/00) **[6]**

101/14 . . the macromolecular compounds being water soluble or water swellable, e.g. aqueous gels **[6]**

101/16 . the macromolecular compounds being biodegradable **[7]**

C09 DYES; PAINTS; POLISHES; NATURAL RESINS; ADHESIVES; COMPOSITIONS NOT OTHERWISE PROVIDED FOR; APPLICATIONS OF MATERIALS NOT OTHERWISE PROVIDED FOR

C09B ORGANIC DYES OR CLOSELY-RELATED COMPOUNDS FOR PRODUCING DYES; MORDANTS; LAKES
(fermentation or enzyme-using processes to synthesise a desired chemical compound C12P)

(1) In this subclass, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.
(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

Anthracene dyes

1/00 Dyes with an anthracene nucleus not condensed with any other ring

1/02 . Hydroxy anthraquinones; Ethers or esters thereof
1/04 . . Preparation by synthesis of the nucleus
1/06 . . Preparation from starting materials already containing the anthracene nucleus
1/08 . . . Dyes containing only OH groups
1/10 . . . Dyes containing halogen
1/12 . . . Dyes containing sulfonic acid groups
1/14 . . . Dyes containing ether groups
1/16 . Amino anthraquinones
1/18 . . Preparation by synthesis of the nucleus
1/20 . . Preparation from starting materials already containing the anthracene nucleus
1/22 . . . Dyes with unsubstituted amino groups
1/24 . . . . sulfonated
1/26 . . . Dyes with amino groups substituted by hydrocarbon radicals
1/28 . . . . substituted by alkyl, aralkyl, or cyclo-alkyl groups
1/30 . . . . . sulfonated
1/32 . . . . substituted by aryl groups (anthrimides C09B 1/48)
1/34 . . . . . sulfonated
1/36 . . . Dyes with acylated amino groups
1/38 . . . . Urea or thiourea derivatives
1/40 . . . . the acyl groups being residues of an aliphatic or araliphatic carboxylic acid
1/42 . . . . the acyl groups being residues of an aromatic carboxylic acid
1/43 . . . . . Dicarboxylic acids **[3]**
1/44 . . . . the acyl groups being residues of a heterocyclic carboxylic acid
1/46 . . . . the acyl groups being residues of cyanuric acid or an analogous heterocyclic compound
1/467 . . . . . attached to two or more anthraquinone rings **[3]**
1/473 . . . . the acyl groups being residues of a sulfonic acid **[3]**
1/48 . . . Anthrimides
1/50 . Amino-hydroxy anthraquinones; Ethers or esters thereof
1/503 . . unsubstituted amino-hydroxy anthraquinone **[2]**

1/51 . . N-substituted amino-hydroxy anthraquinone **[2]**
1/514 . . . N-aryl derivatives (N-aralkyl derivatives C09B 1/515) **[2]**
1/515 . . . N-alkyl, N-aralkyl, or N-cycloalkyl derivatives **[2]**
1/516 . . . N-acylated derivatives **[2]**
1/52 . . sulfonated
1/54 . . etherified
1/56 . Mercapto-anthraquinones
1/58 . . with mercapto groups substituted by aliphatic, cycloaliphatic, araliphatic or aryl radicals **[3]**
1/60 . . . substituted by aliphatic, cycloaliphatic or araliphatic radicals **[3]**
1/62 . . with mercapto groups substituted by a heterocyclic ring **[3]**

3/00 Dyes with anthracene nucleus condensed with one or more carbocyclic rings
3/02 . Benzanthrones
3/04 . . Preparation by synthesis of the nucleus
3/06 . . Preparation from starting materials already containing the benzanthrone nucleus
3/08 . . . by halogenation
3/10 . . . Amino derivatives
3/12 . . Dibenzanthronyls
3/14 . Perylene derivatives
3/16 . . Preparation by synthesis of the nucleus
3/18 . . Preparation from starting materials already containing the perylene nucleus
3/20 . . . by halogenation
3/22 . Dibenzanthrones; Isodibenzanthrones
3/24 . . Preparation by synthesis of the nucleus
3/26 . . . from dibenzanthronyls
3/28 . . . from perylene derivatives
3/30 . . Preparation from starting materials already containing the dibenzanthrone or isodibenzanthrone nucleus
3/32 . . . by halogenation
3/34 . . . by oxidation
3/36 . . . by etherification of hydroxy compounds
3/38 . . . by introduction of hydrocarbon or acyl residues into amino groups
3/40 . Pyranthrones
3/42 . . Preparation by synthesis of the nucleus
3/44 . . Preparation from starting materials already containing the pyranthrone nucleus
3/46 . . . by halogenation
3/48 . . . Amino derivatives
3/50 . Dibenzopyrenequinones
3/52 . . Preparation by synthesis of the nucleus
3/54 . . Preparation from starting materials already containing the dibenzopyrenequinone nucleus
3/56 . . . Amino derivatives
3/58 . Benzanthraquinones
3/60 . Anthanthrones
3/62 . . Preparation by synthesis of the nucleus
3/64 . . Preparation from starting materials already containing the anthanthrone nucleus
3/66 . . . by halogenation
3/68 . . . Amino derivatives
3/70 . Benzo-, naphtho-, or anthra-dianthrones
3/72 . . Preparation by synthesis of the nucleus
3/74 . . Preparation from starting materials already containing the benzo-, naphtho-, or anthra-dianthrone nucleus
3/76 . . . by halogenation
3/78 . Other dyes in which the anthracene nucleus is condensed with one or more carbocyclic rings
3/80 . . Preparation by synthesis of the nucleus
3/82 . . Preparation from starting materials already containing the condensed anthracene nucleus

5/00 Dyes with an anthracene nucleus condensed with one or more heterocyclic rings with or without carbocyclic rings
5/02 . the heterocyclic ring being condensed in peri position
5/04 . . Pyrazolanthrones
5/06 . . . Benzanthronyl-pyrazolanthrone condensation products
5/08 . . . Dipyrazolanthrones
5/10 . . Isothiazolanthrones; Isoxazolanthrones; Isoselenazolanthrones
5/12 . . Thiophenanthrones
5/14 . . Benz-azabenzanthrones (anthrapyridones)
5/16 . . Benz-diazabenzanthrones, e.g. anthrapyrimidones
5/18 . . Coeroxene; Coerthiene; Coeramidene; Derivatives thereof
5/20 . . Flavanthrones
5/22 . . . Preparation from starting materials already containing the flavanthrone nucleus
5/24 . the heterocyclic ring(s) being condensed with an anthraquinone nucleus in 1-2 or 2-3 position
5/26 . . Carbazoles of the anthracene series
5/28 . . . Anthrimide carbazoles
5/30 . . 1.2 azoles of the anthracene series
5/32 . . 1.3 azoles of the anthracene series
5/34 . . Anthraquinone acridones or thioxanthones
5/36 . . . Amino acridones
5/38 . . . Compounds containing acridone and carbazole rings
5/40 . . . Condensation products of benzanthronyl-amino anthraquinones
5/42 . . Pyridino anthraquinones
5/44 . . Azines of the anthracene series
5/46 . . . Para-diazines
5/48 . . . . Bis-anthraquinonediazines (indanthrone)
5/50 . . . . . Preparation by alkaline melting of 2-amino anthraquinones
5/52 . . . . . Preparation by condensation of 1.2-halogeno-amino anthraquinones
5/54 . . . . . Preparation from 2-amino anthrahydroquinones
5/56 . . . . . Preparation from starting materials already containing the indanthrene nucleus
5/58 . . . . . by halogenation
5/60 . . . Thiazines; Oxazines
5/62 . Cyclic imides or amidines of peri-dicarboxylic acids of the anthracene, benzanthrene, or perylene series

6/00 Anthracene dyes not provided for above [2]

7/00 Indigoid dyes
7/02 . Bis-indole indigos
7/04 . . Halogenation thereof
7/06 . Indone-thionaphthene indigos
7/08 . Other indole-indigos
7/10 . Bis-thionaphthene indigos
7/12 . Other thionaphthene indigos

9/00 Esters or ester-salts of leuco compounds of vat dyestuffs
9/02 . of anthracene dyes
9/04 . of indigoid dyes

11/00 Diaryl- or triarylmethane dyes
11/02 . derived from diarylmethanes
11/04 . derived from triarylmethanes
11/06 . . Hydroxy derivatives of triarylmethanes in which at least one −OH group is bound to an aryl nucleus
11/08 . . . Phthaleins
11/10 . . Amino derivatives of triarylmethanes
11/12 . . . without any −OH group bound to an aryl nucleus
11/14 . . . . Preparation from aromatic aldehydes, aromatic carboxylic acids or derivatives thereof, and aromatic amines
11/16 . . . . Preparation from diarylketones or diarylcarbinols
11/18 . . . . Preparation by oxidation
11/20 . . . . Preparation from other triarylmethane derivatives
11/22 . . . containing −OH groups bound to an aryl nucleus
11/24 . . . Phthaleins containing amino groups
11/26 . . Triarylmethane dyes in which at least one of the aromatic nuclei is heterocyclic
11/28 . Pyronines

13/00 Oxyketone dyes
13/02 . of the naphthalene series, e.g. naphthazarin
13/04 . of the pyrene series
13/06 . of the acetophenone series

Acridine, azine, oxazine, or thiazine dyes

15/00 Acridine dyes

17/00 Azine dyes
17/02 . of the benzene series
17/04 . of the naphthalene series
17/06 . Fluorindine or its derivatives

19/00 Oxazine dyes
19/02 . Bisoxazines prepared from amino quinones

21/00 Thiazine dyes

Quinoline or polymethine dyes

23/00 Methine or polymethine dyes, e.g. cyanine dyes
23/01 . characterised by the methine chain **[3]**
23/02 . . containing an odd number of >CH groups **[3]**
23/04 . . . one >CH group, e.g. cyanines, isocyanines, pseudocyanines **[3]**
23/06 . . . three >CH groups, e.g. carbocyanines **[3]**
23/08 . . . more than three >CH groups, e.g. polycarbocyanines **[3]**
23/10 . . containing an even number of >CH groups **[3]**
23/12 . the polymethine chain being branched
23/14 . Styryl dyes
23/16 . the polymethine chain containing hetero atoms

25/00 Quinophthalones

26/00 Hydrazone dyes; Triazene dyes [3]
26/02 . Hydrazone dyes (hydrazone-azo dyes C09B 56/18) **[3]**
26/04 . . cationic **[3]**
26/06 . Triazene dyes (triazene-azo dyes C09B 56/20) **[3]**

Azo dyes

Note

In groups C09B 27/00 to C09B 46/00, arrows in the formulae of the various types of azo dyes indicate which part of an azo dye, prepared by diazotising and coupling, is derived from the diazo component and which part is derived from the coupling component. The arrow is pointing to the part derived from the coupling component. **[4]**

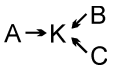
27/00 Azo dyes in which the azo group is formed in any way other than by diazotising and coupling
27/06 . Tartrazines **[3]**

29/00 Monoazo dyes prepared by diazotising and coupling
29/01 . characterised by the diazo component **[3]**
29/02 . . from diazotised o-amino-hydroxy compounds **[3]**
29/03 . . from diazotised o-amino carboxylic acids or o-amino-sulfonic acids **[3]**
29/033 . . from diazotised amines containing a heterocyclic ring **[3]**
29/036 . . . the heterocyclic ring containing only nitrogen as hetero atoms **[3]**
29/039 . . . the heterocyclic ring containing nitrogen and sulfur as hetero atoms **[3]**
29/042 . . . . the hetero ring being a thiazole ring **[3]**
29/045 . . . . . Benzothiazoles **[3]**
29/048 . . . . the hetero ring being a thiadiazole ring **[3]**
29/06 . from coupling components containing amino as the only directing group
29/08 . . Amino benzenes
29/085 . . . coupled with diazotised anilines **[3]**
29/09 . . . coupled with diazotised amines containing heterocyclic rings **[3]**
29/095 . . Amino naphthalenes **[3]**
29/10 . from coupling components containing hydroxy as the only directing group
29/12 . . of the benzene series
29/14 . . . Hydroxy carboxylic acids
29/15 . . of the naphthalene series **[3]**
29/16 . . . Naphthol-sulfonic acids **[3]**
29/18 . . ortho-Hydroxy carbonamides
29/20 . . . of the naphthalene series
29/22 . . . of heterocyclic compounds
29/24 . from coupling components containing both hydroxy and amino directing groups
29/26 . . Amino phenols
29/28 . . Amino naphthols
29/30 . . . Amino naphtholsulfonic acid
29/32 . from coupling components containing a reactive methylene group
29/33 . . Aceto- or benzoyl-acetylarylides **[3]**
29/34 . from other coupling components
29/36 . . from heterocyclic compounds
29/40 . . . containing a five-membered ring with one nitrogen atom as the only ring hetero atom **[3]**
29/42 . . . containing a six-membered ring with one nitrogen atom as the only ring hetero atom **[3]**

29/44 . . . . Quinolines or hydrogenated quinolines **[3]**
29/46 . . . 1,2-Diazoles or hydrogenated 1,2-diazoles **[3]**
29/48 . . . . Amino-1,2-diazoles **[3]**
29/50 . . . . 1,2-Diazolones **[3]**
29/52 . . . Diazines **[3]**

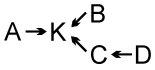
31/00 Disazo or polyazo dyes of the type A→ B→ C, A→ B→ C→ D, or the like, prepared by diazotising and coupling
31/02 . Disazo dyes
31/04 . . from a coupling component "C" containing a directive amino group
31/043 . . . Amino benzenes **[3]**
31/047 . . . . containing acid groups, e.g. $-COOH$, $-SO_3H$, $-PO_3H_2$, $-OSO_3H$, $-OPO_2H_2$; Salts thereof **[3]**
31/053 . . . Amino naphthalenes **[3]**
31/057 . . . . containing acid groups, e.g. $-COOH$, $-SO_3H$, $-PO_3H_2$, $-OSO_3H$, $-OPO_2H_2$; Salts thereof **[3]**
31/06 . . from a coupling component "C" containing a directive hydroxy group
31/062 . . . Phenols **[3]**
31/065 . . . . containing acid groups, e.g. $-COOH$, $-SO_3H$, $-PO_3H_2$, $-OSO_3H$, $-OPO_2H_2$; Salts thereof **[3]**
31/068 . . . Naphthols **[3]**
31/072 . . . . containing acid groups, e.g. $-COOH$, $-SO_3H$, $-PO_3H_2$, $-OSO_3H$, $-OPO_2H_2$; Salts thereof **[3]**
31/075 . . . ortho-Hydroxy carboxylic acid amides **[3]**
31/078 . . . . containing acid groups, e.g. $-COOH$, $-SO_3H$, $-PO_3H_2$, $-OSO_3H$, $-OPO_2H_2$; Salts thereof **[3]**
31/08 . . from a coupling component "C" containing directive hydroxy and amino groups
31/10 . . from a coupling component "C" containing reactive methylene groups
31/11 . . . Aceto- or benzoyl-acetylarylides **[3]**
31/12 . . from other coupling components "C"
31/14 . . . Heterocyclic components
31/143 . . . . 1,2-Diazoles **[3]**
31/147 . . . . . Pyrazoles **[3]**
31/15 . . . . Indoles **[3]**
31/153 . . . . containing a six-membered ring with one nitrogen atom as the only ring hetero atom **[3]**
31/157 . . . . . Quinolines or hydrogenated quinolines **[3]**
31/16 . Trisazo dyes
31/18 . . from a coupling component "D" containing a directive amino group
31/20 . . from a coupling component "D" containing a directive hydroxy group
31/22 . . from a coupling component "D" containing directive hydroxy and amino groups
31/24 . . from a coupling component "D" containing reactive methylene groups
31/26 . . from other coupling components "D"
31/28 . . . Heterocyclic compounds
31/30 . Other polyazo dyes

33/00 Disazo or polyazo dyes of the types A → K ← B, A → B → K ← C, or the like, prepared by diazotising and coupling
33/02 . Disazo dyes
33/04 . . in which the coupling component is a dihydroxy or polyhydroxy compound
33/044 . . . the coupling component being a bis-phenol **[3]**
33/048 . . . the coupling component being a bis-naphthol **[3]**
33/052 . . . the coupling component being a bis-(naphthol-amine) **[3]**
33/056 . . . the coupling component being a bis-(naphthol-urea) **[3]**
33/06 . . in which the coupling component is a diamine or polyamine
33/08 . . in which the coupling component is a hydroxy-amino compound
33/10 . . . in which the coupling component is an amino naphthol
33/12 . . in which the coupling component is a heterocyclic compound
33/13 . . . the coupling component being a bis-pyrazolone **[3]**
33/147 . . in which the coupling component is a bis-(o-hydroxy carboxylic acid amide) **[3]**
33/153 . . in which the coupling component is a bis-(aceto-acetyl amide) or a bis-(benzoyl-acetylamide) **[3]**
33/16 . . from other coupling components
33/18 . Trisazo or higher polyazo dyes
33/22 . . Trisazo dyes of the type A→ B→ K← C **[3]**
33/24 . . Trisazo dyes of the type



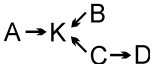
[3]

33/26 . . Tetrazo dyes of the type A→ B→ C→ K← D **[3]**
33/28 . . Tetrazo dyes of the type A→ B→ K← C← D **[3]**
33/30 . . Tetrazo dyes of the type



[3]

33/32 . . Tetrazo dyes of the type



[3]

35/00 Disazo or polyazo dyes of the type A ← D → B prepared by diazotising and coupling
35/02 . Disazo dyes
35/021 . . characterised by two coupling components of the same type **[3]**
35/023 . . . in which the coupling component is a hydroxy or polyhydroxy compound **[3]**
35/025 . . . in which the coupling component is an amine or polyamine **[3]**
35/027 . . . in which the coupling component is a hydroxy-amino compound **[3]**
35/029 . . . . Amino naphthol **[3]**
35/03 . . . in which the coupling component is a heterocyclic compound **[3]**
35/031 . . . . containing a six-membered ring with one nitrogen atom as the only ring hetero atom **[3]**

35/033 . . . in which the coupling component is an arylamide of an o-hydroxy carboxylic acid or of a beta-keto-carboxylic acid **[3]**

35/035 . . . in which the coupling component contains an activated methylene group **[3]**

35/037 . . characterised by two coupling components of different types **[3]**

35/039 . . characterised by the tetrazo component **[3]**

35/04 . . . the tetrazo component being a benzene derivative **[3]**

35/06 . . . the tetrazo component being a naphthalene derivative **[3]**

35/08 . . . the tetrazo component being a derivative of biphenyl **[3]**

35/10 . . . . from two coupling components of the same type **[3]**

35/12 . . . . . from amines **[3]**

35/14 . . . . . from hydroxy compounds **[3]**

35/16 . . . . . from hydroxy amines **[3]**

35/18 . . . . . from heterocyclic compounds **[3]**

35/20 . . . . from two coupling compounds of different types **[3]**

35/205 . . . the tetrazo component being a derivative of a diaryl- or triaryl-alkane or -alkene **[3]**

35/21 . . . . of diarylmethane or triarylmethane **[3]**

35/215 . . . . of diarylethane or diarylethene **[3]**

35/22 . . . the tetrazo component being a derivative of a diaryl ether **[3]**

35/227 . . . the tetrazo component being a derivative of a diaryl sulfide or diaryl polysulfide **[3]**

35/233 . . . the tetrazo component being a derivative of a diaryl ketone or benzil **[3]**

35/24 . . . the tetrazo component being a derivative of a diaryl amine **[3]**

35/26 . . . the tetrazo component being a derivative of a diaryl urea **[3]**

35/28 . . . the tetrazo component containing two aryl nuclei linked by at least one of the groups −CON⟨, $-SO_2N\langle$, $-SO_2-$, or $-SO_2O-$ **[3]**

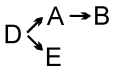
35/30 . . . . from two identical coupling components **[3]**

35/32 . . . . from two different coupling components **[3]**

35/34 . . . the tetrazo component being heterocyclic **[3]**

35/35 . Trisazo dyes in which the tetrazo component is a diamino-azo-aryl compound **[3]**

35/36 . Trisazo dyes of the type



35/362 . . D is benzene **[3]**

35/364 . . D is naphthalene **[3]**

35/366 . . D is diphenyl **[3]**

35/368 . . D is a diarylether, a diarylsulfide or a diarylpolysulfide **[3]**

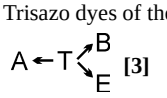
35/37 . . D is a diarylamine **[3]**

35/372 . . D is a diarylurea **[3]**

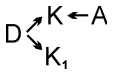
35/374 . . D contains two aryl nuclei linked by at least one of the groups −CON⟨, $-SO_2N\langle$, $-SO_2-$, or $-SO_2O-$ **[3]**

35/376 . . D is a heterocyclic compound **[3]**

35/378 . Trisazo dyes of the type

 **[3]**

35/38 . Trisazo dyes ot the types



35/40 . . the component K being a dihydroxy or polyhydroxy compound

35/42 . . the component K being a diamine or polyamine

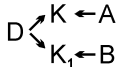
35/44 . . the component K being a hydroxy amine

35/46 . . . the component K being an amino naphthol

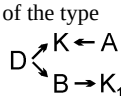
35/48 . . the component K being heterocyclic

35/50 . Tetrazo dyes

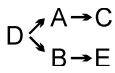
35/52 . . of the type

 **[3]**

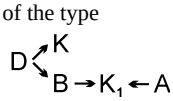
35/54 . . of the type

 **[3]**

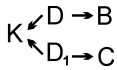
35/56 . . of the type

 **[3]**

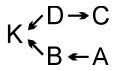
35/58 . . of the type

 **[3]**

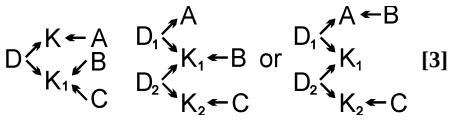
35/60 . . of the type

 **[3]**

35/62 . . of the type

 **[3]**

35/64 . Higher polyazo dyes, e.g. of the types

 **[3]**

37/00 Azo dyes prepared by coupling the diazotised amine with itself

39/00 Other azo dyes prepared by diazotising and coupling

41/00 Special methods of performing the coupling reaction

43/00 Preparation of azo dyes from other azo compounds

43/02 . by sulfonation

43/04 . by nitration

43/06 . by oxidation

43/08 . by reduction (deamination C09B 43/44)

43/10 . . with formation of a new azo or an azoxy bridge

43/11 . by introducing hydrocarbon radicals or substituted hydrocarbon radicals on primary or secondary amino groups (formation of an amino group by reduction, e.g. of a nitro group, C09B 43/08) **[3]**

43/12 . by acylation of amino groups

43/124 . . with monocarboxylic acids, carbamic esters or halides, monoisocyanates, or haloformic acid esters **[3]**

43/128 . . . Aliphatic, cycloaliphatic or araliphatic acids **[3]**

43/132 . . . having the carboxyl group directly attached to an aromatic carbocyclic ring **[3]**

43/136 . . with polyfunctional acylating agents **[3]**

43/14 . . . with phosgene or thiophosgene **[3]**

43/145 . . . with polycarboxylic acids **[3]**
43/15 . . . . with formation of cyclic imides of ortho-or peri-dicarboxylic acids **[3]**
43/155 . . . with di- or poly-isocyanates **[3]**
43/16 . . . linking amino-azo compounds with other amino compounds by cyanuric acid or cyanuric acid residues **[3]**
43/18 . by acylation of hydroxy groups
43/20 . . with monocarboxylic acids, carbamic acid esters or halides, monoisocyanates or haloformic acid esters **[3]**
43/22 . . . having the carboxyl group directly attached to an aromatic carbocyclic ring **[3]**
43/24 . . with formation of $-O-SO_2-R$ or $-O-SO_3H$ radicals **[3]**
43/26 . . with polyfunctional acylating agents **[3]**
43/28 . by etherification of hydroxy groups **[3]**
43/30 . by esterification of $-COOH$ or $-SO_3H$ groups **[3]**
43/32 . by reacting carboxyl or sulfonic groups, or derivatives thereof, with amines; by reacting keto groups with amines **[3]**
43/34 . . by reacting ortho- or peri-dicarboxylic dyes **[3]**
43/36 . . with amino anthracene or amino anthraquinone dyes **[3]**
43/38 . . by reacting two or more ortho-hydroxy naphthoic acid dyes with polyamines **[3]**
43/40 . by substituting hetero atoms by radicals containing other hetero atoms **[3]**
43/42 . . by substituting radicals containing hetero atoms for $-CN$ radicals **[3]**
43/44 . by substituting amine groups for hydroxyl groups or hydroxy groups for amine groups; Desacylation of amino-acyl groups; Deaminating **[3]**

44/00 Azo dyes containing onium groups [3]
44/02 . containing ammonium groups not directly attached to an azo group **[3]**
44/04 . . from coupling components containing amino as the only directing group **[3]**
44/06 . . from coupling components containing hydroxyl as the only directing group **[3]**
44/08 . . from coupling components containing heterocyclic rings **[3]**
44/10 . containing cyclammonium groups attached to an azo group by a carbon atom of the ring system **[3]**
44/12 . . having one nitrogen atom as the only ring hetero atom **[3]**
44/14 . . 1,2-Diazoles or hydrogenated 1,2-diazoles **[3]**
44/16 . . 1,3-Diazoles or hydrogenated 1,3-diazoles **[3]**
44/18 . . having three nitrogen atoms as the only ring hetero atoms **[3]**
44/20 . . Thiazoles or hydrogenated thiazoles **[3]**

45/00 Complex metal compounds of azo dyes
45/01 . characterised by the method of metallisation **[3]**
45/02 . Preparation from dyes containing in o-position a hydroxy group and in o1-position hydroxy, alkoxy, carboxyl, amino, or keto groups **[2]**
45/04 . . Azo compounds in general
45/06 . . . Chromium compounds
45/08 . . . Copper compounds
45/10 . . . Cobalt compounds
45/12 . . . other metal compounds
45/14 . . Monoazo compounds
45/16 . . . containing chromium
45/18 . . . containing copper
45/20 . . . containing cobalt
45/22 . . . containing other metals
45/24 . . Disazo or polyazo compounds
45/26 . . . containing chromium
45/28 . . . containing copper
45/30 . . . containing cobalt
45/32 . . . containing other metals
45/34 . Preparation from o-monohydroxy azo compounds having in the o1-position an atom or functional group other than hydroxy, alkoxy, carboxyl, amino, or keto groups
45/36 . . by oxidation of hydrogen in o1-position
45/38 . Preparation from compounds with $-OH$ and $-COOH$ adjacent in the same ring or in peri position
45/40 . . Chromium compounds
45/42 . . Copper compounds
45/44 . . Cobalt compounds
45/46 . . Other metal compounds
45/48 . Preparation from other complex metal compounds of azo dyes

46/00 Azo dyes not provided for in groups C09B 27/00 to C09B 45/00 [2]

47/00 Porphines; **Azaporphines**
47/04 . Phthalocyanines **[3]**
47/06 . . Preparation from carboxylic acids or derivatives thereof **[3]**
47/067 . . . from phthalodinitriles **[3]**
47/073 . . Preparation from isoindolenines **[3]**
47/08 . . Preparation from other phthalocyanine compounds **[3]**
47/10 . . . Obtaining compounds having halogen atoms directly bound to the phthalocyanine skeleton **[3]**
47/12 . . . Obtaining compounds having alkyl radicals, or alkyl radicals substituted by hetero atoms, bound to the phthalocyanine skeleton **[3]**
47/14 . . . . having alkyl radicals substituted by halogen atoms **[3]**
47/16 . . . . having alkyl radicals substituted by nitrogen atoms **[3]**
47/18 . . . Obtaining compounds having oxygen atoms directly bound to the phthalocyanine skeleton **[3]**
47/20 . . . Obtaining compounds having sulfur atoms directly bound to the phthalocyanine skeleton **[3]**
47/22 . . . Obtaining compounds having nitrogen atoms directly bound to the phthalocyanine skeleton **[3]**
47/24 . . . Obtaining compounds having $-COOH$ or $-SO_3H$ radicals, or derivatives thereof, directly bound to the phthalocyanine radical **[3]**
47/26 . . . . Amide radicals **[3]**
47/28 . . Phthalocyanine dyes containing $-S-SO_3H$ radicals **[3]**
47/30 . . Metal-free phthalocyanines **[3]**
47/32 . . Cationic phthalocyanine dyes **[3]**

48/00 Quinacridones

49/00 Sulfur dyes
49/02 . from nitro compounds of the benzene, naphthalene or anthracene series

49/04 . from amino compounds of the benzene, naphthalene or anthracene series
49/06 . from azines, oxazines, thiazines, or thiazoles
49/08 . from urea derivatives
49/10 . from diphenylamines, indamines, or indophenols
49/12 . from other compounds

50/00 Formazane dyes; Tetrazolium dyes [3]
50/02 . Tetrazolium dyes **[3]**
50/04 . Metal-free formazane dyes **[3]**
50/06 . Bis-formazane dyes **[3]**
50/08 . Meso-acyl formazane dyes **[3]**
50/10 . Cationic formazane dyes **[3]**

51/00 Nitro or nitroso dyes

53/00 Quinone imides
53/02 . Indamines; Indophenols

55/00 Azomethine dyes

56/00 Azo dyes containing other chromophoric systems [3]
56/02 . Azomethine-azo dyes **[3]**
56/04 . Stilbene-azo dyes **[3]**
56/06 . . Bis- or poly-stilbene-azo dyes **[3]**
56/08 . Styryl-azo dyes **[3]**
56/10 . Formazane-azo dyes **[3]**
56/12 . Anthraquinone-azo dyes **[3]**
56/14 . Phthalocyanine-azo dyes **[3]**
56/16 . Methine- or polymethine-azo dyes **[3]**
56/18 . Hydrazone-azo dyes **[3]**
56/20 . Triazene-azo dyes **[3]**

57/00 Other synthetic dyes of known constitution
57/02 . Coumarine dyes **[3]**
57/04 . Isoindoline dyes **[3]**
57/06 . Naphtholactam dyes **[3]**
57/08 . Naphthalimide dyes; Phthalimide dyes **[3]**
57/10 . Metal complexes of organic compounds not being dyes in uncomplexed form **[3]**
57/12 . Perinones, i.e. naphthoylene-aryl-imidazoles **[3]**
57/14 . Benzoxanthene dyes; Benzothioxanthene dyes **[3]**

59/00 Artificial dyes of unknown constitution

61/00 Dyes of natural origin prepared from natural sources

62/00 Reactive dyes, i.e. dyes which form covalent bonds with the substrates or which polymerise with themselves [3]
62/002 . with the linkage of the reactive group being alternatively specified **[3]**
62/004 . . Anthracene dyes **[3]**
62/006 . . Azo dyes **[3]**
62/008 . . . Monoazo dyes **[3]**
62/01 . . . Disazo or polyazo dyes **[3]**
62/012 . . . Metal complex azo dyes **[3]**
62/014 . . Nitro dyes **[3]**
62/016 . . Porphines; Azaporphines **[3]**
62/018 . . Formazane dyes **[3]**
62/02 . with the reactive group directly attached to a heterocyclic ring
62/022 . . the heterocyclic ring being alternatively specified **[3]**
62/024 . . . Anthracene dyes **[3]**
62/026 . . . Azo dyes **[3]**
62/028 . . . . Monoazo dyes **[3]**
62/03 . . . . Disazo or polyazo dyes **[3]**
62/032 . . . . Metal complex azo dyes **[3]**
62/034 . . . Nitro dyes **[3]**
62/036 . . . Porphines; Azaporphines **[3]**
62/038 . . . Formazane dyes **[3]**
62/04 . . to a triazine ring
62/06 . . . Anthracene dyes
62/08 . . . Azo dyes
62/085 . . . . Monoazo dyes **[3]**
62/09 . . . . Disazo or polyazo dyes **[3]**
62/095 . . . . Metal complex azo dyes **[3]**
62/10 . . . Porphines; Azaporphines
62/12 . . to a pyridazine ring
62/14 . . . Anthracene dyes
62/16 . . . Azo dyes
62/165 . . . . Monoazo dyes **[3]**
62/17 . . . . Disazo or polyazo dyes **[3]**
62/175 . . . . Metal complex azo dyes **[3]**
62/18 . . . Porphines; Azaporphines
62/20 . . to a pyrimidine ring
62/22 . . . Anthracene dyes
62/24 . . . Azo dyes
62/245 . . . . Monoazo dyes **[3]**
62/25 . . . . Disazo or polyazo dyes **[3]**
62/255 . . . . Metal complex azo dyes **[3]**
62/26 . . . Porphines; Azaporphines
62/28 . . to a pyrazine ring
62/30 . . . Anthracene dyes
62/32 . . . Azo dyes
62/325 . . . . Monoazo dyes **[3]**
62/33 . . . . Disazo or polyazo dyes **[3]**
62/335 . . . . Metal complex azo dyes **[3]**
62/34 . . . Porphines; Azaporphines
62/343 . . to a five-membered ring **[3]**
62/345 . . . Anthracene dyes **[3]**
62/347 . . . Azo dyes **[3]**
62/35 . . . . Monoazo dyes **[3]**
62/353 . . . . Disazo or polyazo dyes **[3]**
62/355 . . . . Metal complex azo dyes **[3]**
62/357 . . . Porphines; Azaporphines **[3]**
62/36 . . to some other heterocyclic ring
62/38 . . . Anthracene dyes
62/40 . . . Azo dyes
62/405 . . . . Monoazo dyes **[3]**
62/41 . . . . Disazo or polyazo dyes **[3]**
62/415 . . . . Metal complex azo dyes **[3]**
62/42 . . . Porphines; Azaporphines
62/44 . with the reactive group not directly attached to a heterocyclic ring
62/443 . . the reactive group being alternatively specified **[3]**
62/445 . . . Anthracene dyes **[3]**
62/447 . . . Azo dyes **[3]**
62/45 . . . . Monoazo dyes **[3]**
62/453 . . . . Disazo or polyazo dyes **[3]**
62/455 . . . . Metal complex azo dyes **[3]**
62/457 . . . Porphines; Azaporphines **[3]**
62/463 . . . Formazane dyes **[3]**
62/465 . . the reactive group being an acryloyl group, a quaternised or non-quaternised aminoalkyl carbonyl group, or a $(-N)_n-CO-A-O-X$ or $(-N)_n-CO-A-Hal$ group, wherein A is an alkylene or alkylidene group, X is hydrogen or an acyl radical of an organic or inorganic acid, Hal is a halogen atom, and n is 0 or 1 **[3]**

62/467 . . . Anthracene dyes **[3]**
62/47 . . . Azo dyes **[3]**
62/473 . . . . Monoazo dyes **[3]**
62/475 . . . . Disazo or polyazo dyes **[3]**
62/477 . . . . Metal complex azo dyes **[3]**
62/483 . . . Porphines; Azaporphines **[3]**
62/485 . . the reactive group being a halo-cyclobutyl-carbonyl, halo-cyclobutyl-vinyl-carbonyl, or halo-cyclobutenyl-carbonyl group **[3]**
62/487 . . . Anthracene dyes **[3]**
62/489 . . . Azo dyes **[3]**
62/491 . . . . Monoazo dyes **[3]**
62/493 . . . . Disazo or polyazo dyes **[3]**
62/495 . . . . Metal complex azo dyes **[3]**
62/497 . . . Porphines; Azaporphines **[3]**
62/503 . . the reactive group being an esterified or non-esterified hydroxyalkyl sulfonyl or mercaptoalkyl sulfonyl group, a quaternised or non-quaternised aminoalkyl sulfonyl group, a heterylmercapto alkyl sulfonyl group, a vinyl sulfonyl or a substituted vinyl sulfonyl group, or a thiophene-dioxide group **[3]**
62/505 . . . Anthracene dyes **[3]**
62/507 . . . Azo dyes **[3]**
62/51 . . . . Monoazo dyes **[3]**
62/513 . . . . Disazo or polyazo dyes **[3]**
62/515 . . . . Metal complex azo dyes **[3]**
62/517 . . . Porphines; Azaporphines **[3]**
62/523 . . the reactive group being an esterified or non-esterified hydroxyalkyl sulfonyl amido or hydroxyalkyl amino sulfonyl group, a quaternised or non-quaternised amino alkyl sulfonyl amido group, or a substituted alkyl amino sulfonyl group, or a halogen alkyl sulfonyl amido or halogen alkyl amino sulfonyl group or a vinyl sulfonylamido or a substituted vinyl sulfonamido group **[3]**
62/525 . . . Anthracene dyes **[3]**
62/527 . . . Azo dyes **[3]**
62/53 . . . . Monoazo dyes **[3]**
62/533 . . . . Disazo or polyazo dyes **[3]**
62/535 . . . . Metal complex azo dyes **[3]**
62/537 . . . Porphines; Azaporphines **[3]**
62/54 . . the reactive group being an epoxy or halohydrin group **[3]**
62/56 . . . Anthracene dyes
62/58 . . . Azo dyes
62/585 . . . . Monoazo dyes **[3]**
62/59 . . . . Disazo or polyazo dyes **[3]**
62/595 . . . . Metal complex azo dyes **[3]**
62/60 . . . Porphines; Azaporphines
62/62 . . the reactive group being an ethylenimino or N-acylated ethylenimino group or a $-CO-NH-CH_2-CH_2-X$ group, wherein X is a halogen atom, a quaternary ammonium group or O-acyl and acyl is derived from an organic or inorganic acid, or a beta-substituted ethylamine group
62/64 . . . Anthracene dyes
62/66 . . . Azo dyes
62/665 . . . . Monoazo dyes **[3]**
62/67 . . . . Disazo or polyazo dyes **[3]**
62/675 . . . . Metal complex azo dyes **[3]**
62/68 . . . Porphines; Azaporphines
62/763 . . the reactive group being a N-methylol group or an O-derivative thereof **[3]**
62/765 . . . Anthracene dyes **[3]**
62/767 . . . Azo dyes **[3]**
62/77 . . . . Monoazo dyes **[3]**
62/773 . . . . Disazo or polyazo dyes **[3]**
62/775 . . . . Metal complex azo dyes **[3]**
62/777 . . . Porphines; Azaporphines **[3]**
62/78 . . with other reactive groups
62/80 . . . Anthracene dyes
62/82 . . . Azo dyes
62/825 . . . . Monoazo dyes **[3]**
62/83 . . . . Disazo or polyazo dyes **[3]**
62/835 . . . . Metal complex azo dyes **[3]**
62/84 . . . Porphines; Azaporphines

Lakes; **Mordants**; **Dyestuff preparations**

63/00 Lakes

65/00 Compositions containing mordants (preparation of the mordant compounds C01, C07)

67/00 Influencing the physical, e.g. the dyeing or printing, properties of dyestuffs without chemical reaction, e.g. by treating with solvents; **Process features in the making of dyestuff preparations**; **Dyestuff preparations of a special physical nature, e.g. tablets, films**

67/02 . Dyestuff preparations characterised by special physical forms, e.g. tablets, films **[3]**
67/04 . Grinding or milling (C09B 67/14 takes precedence) **[3]**
67/06 . Drying **[3]**
67/08 . Coated particulate pigments or dyes **[3]**
67/10 . Influencing the physical properties by treatment with a liquid, e.g. solvents (C09B 67/14, C09B 67/18, C09B 67/20 take precedence) **[3]**
67/12 . . of phthalocyanines **[3]**
67/14 . Influencing the physical properties by treatment with an acid **[3]**
67/16 . . of phthalocyanines **[3]**
67/18 . Influencing the physical properties by treatment with an amine **[3]**
67/20 . Preparations of organic pigments **[3]**
67/22 . Mixtures of different pigments or dyes or solid solutions of pigments or dyes **[3]**
67/24 . Preparations of acid dyes or reactive dyes **[3]**
67/26 . . in liquid form **[3]**
67/28 . Preparations of vat or sulfur dyes **[3]**
67/30 . . in liquid form **[3]**
67/32 . Preparations of cationic or basic dyes **[3]**
67/34 . . in liquid form **[3]**
67/36 . Azoic dyestuff preparations **[3]**
67/38 . Preparations of disperse dyes **[3]**
67/40 . . in liquid form **[3]**
67/42 . Preparations of dyes not provided for in a single one of groups C09B 67/24 to C09B 67/40 **[3]**
67/44 . . Solutions **[3]**
67/46 . . Dispersions **[3]**
67/48 . Crystalline modifications of pigments or dyestuff (C09B 67/24 takes precedence) **[3]**
67/50 . . of phthalocyanines **[3]**
67/52 . . of quinacridones **[3]**
67/54 . Separation; Purification (C09B 67/06, C09B 67/10 take precedence) **[3]**

69/00 **Dyes not provided for by a single group of this subclass [2]**

69/02 . Dyestuff salts, e.g. salts of acid dyes with basic dyes (for Na, K, or NH_4+ salts of dyes or for chlorides, sulfates or chlorozincates, see the relevant dye groups) **[3]**

69/04 . . of anionic dyes with nitrogen containing compounds **[3]**

69/06 . . of cationic dyes with organic acids **[3]**

69/08 . Dyes containing a splittable water solubilising group **[3]**

69/10 . Polymeric dyes; Reaction products of dyes with monomers or with macromolecular compounds **[3]**

C09C **TREATMENT OF INORGANIC MATERIALS, OTHER THAN FIBROUS FILLERS, TO ENHANCE THEIR PIGMENTING OR FILLING PROPERTIES** (preparation of inorganic compounds or non-metallic elements C01; treatment of materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone C04B 14/00, C04B 18/00, C04B 20/00); **PREPARATION OF CARBON BLACK [4]**

Note

In this subclass, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.

1/00 **Treatment of specific inorganic materials other than fibrous fillers** (luminescent or tenebrescent materials C09K); **Preparation of carbon black**

1/02 . Compounds of alkaline earth metals or magnesium

1/04 . Compounds of zinc

1/06 . . Lithopone

1/08 . . Zinc chromate

1/10 . Compounds of cadmium

1/12 . . Cadmium sulfoselenide

1/14 . Compounds of lead

1/16 . . White lead

1/18 . . Red lead

1/20 . . Lead chromate

1/22 . Compounds of iron

1/24 . . Oxides of iron

1/26 . . Iron blues

1/28 . Compounds of silicon

1/30 . . Silicic acid

1/32 . . Ultramarine

1/34 . Compounds of chromium

1/36 . Compounds of titanium

1/38 . Compounds of mercury

1/40 . Compounds of aluminium

1/42 . . Clays (preparatory treatment for clay-wares C04B 33/04)

1/44 . Carbon

1/46 . . Graphite (preparation of graphite C01B 31/04)

1/48 . . Carbon black

1/50 . . . Furnace black

1/52 . . . Channel black

1/54 . . . Acetylene black; thermal black

1/56 . . . Treatment of carbon black

1/58 . . . . Agglomerating, pelleting, or the like by wet methods

1/60 . . . . Agglomerating, pelleting, or the like by dry methods

1/62 . Metallic pigments or fillers (obtaining metal powder, see the relevant class for the method used, e.g. B22F 9/00, C21B 15/02, C22B 5/20, C25C 5/00)

1/64 . . Aluminium

1/66 . . Copper alloys, e.g. bronze

1/68 . Loose abrasive particles

3/00 **Treatment in general of inorganic materials, other than fibrous fillers, to enhance their pigmenting or filling properties** (dyeing other macromolecular particles C08J 3/20; dyeing macromolecular fibres D06P)

3/04 . Physical treatment, e.g. grinding, treatment with ultrasonic vibrations **[2]**

3/06 . Treatment with inorganic compounds **[2]**

3/08 . Treatment with low-molecular-weight organic compounds **[2]**

3/10 . Treatment with macromolecular organic compounds **[2]**

3/12 . Treatment with organosilicon compounds **[2]**

C09D **COATING COMPOSITIONS, E.G. PAINTS, VARNISHES OR LACQUERS**; **FILLING PASTES**; **CHEMICAL PAINT OR INK REMOVERS**; **INKS**; **CORRECTING FLUIDS**; **WOODSTAINS**; **PASTES OR SOLIDS FOR COLOURING OR PRINTING**; **USE OF MATERIALS THEREFOR** (cosmetics A61K; processes for applying liquids or other fluent materials to surfaces, in general, B05D; staining wood B27K 5/02; glazes or vitreous enamels C03C; organic macromolecular compounds C08; organic dyes or closely-related compounds for producing dyes, mordants or lakes, per se, C09B; treatment of inorganic materials other than fibrous fillers used as pigments or fillers C09C; natural resins, French polish, drying-oils, driers, turpentine, per se, C09F; polishing compositions other than French polish, ski waxes C09G; preparation of glue or gelatine C09H; adhesives or use of materials as adhesives C09J; materials for sealing or packing joints or covers C09K 3/10; materials for stopping leaks C09K 3/12; processes for the electrolytic or electrophoretic production of coatings C25D; textile-treating compositions D06; paper-making D21; conductors, insulators H01B) **[5]**

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
- "use of materials for coating compositions" means the use of known or new polymers or products;
- "rubber" includes:
  (a) natural or conjugated diene rubbers;
  (b) rubber in general (for a specific rubber, other than a natural rubber or a conjugated diene rubber, see the group provided for coating compositions based on such macromolecular compounds);
- "based on" is defined by means of Note (3), below;
- "filling pastes" means materials used to fill up the holes or cavities of a substrate in order to smooth its surface prior to coating. **[5]**

(2) In this subclass, coating compositions, containing specific organic macromolecular substances are classified only according to the macromolecular substance, non-macromolecular substances not being taken into account.
Example: a coating composition containing polyethene and amino-propyltrimethoxysilane is classified in group C09D 123/06.
However, coating compositions containing combinations of organic non-macromolecular compounds having at least one polymerisable carbon-to-carbon unsaturated bond with prepolymers or polymers other than unsaturated polymers of groups C09D 159/00 to C09D 187/00 are classified according to the unsaturated non-macromolecular component in group C09D 4/00.
Example: a coating composition containing polyethene and styrene monomer is classified in group C09D 4/00.
Aspects relating to the physical nature of the coating compositions or to the effects produced, as defined in group C09D 5/00, if clearly and explicitly stated, are also classified in this subclass.
Coating compositions characterised by other features, e.g. additives, are classified in group C09D 7/00, unless the macromolecular constituent is specified. **[5]**

(3) In this subclass, coating compositions comprising two or more macromolecular constituents are classified according to the macromolecular constituent or constituents present in the highest proportion, i.e. the constituent on which the composition is based. If the composition is based on two or more constituents, present in equal proportions, the composition is classified according to each of these constituents.
Example: a coating composition containing 80 parts of polyethene and 20 parts of polyvinylchloride is classified in group C09D 123/06. A coating composition containing 40 parts of polyethene and 40 parts of polyvinylchloride is classified in groups C09D 123/06 and C09D 127/06. **[5]**

Subclass index

1/00 **Coating compositions, e.g. paints, varnishes or lacquers, based on inorganic substances** (C04B takes precedence; glazes or vitreous enamels C03C)

1/02 . alkali metal silicates
1/04 . . with organic additives
1/06 . cement
1/08 . . with organic additives
1/10 . lime
1/12 . . with organic additives

4/00 **Coating compositions, e.g. paints, varnishes or lacquers, based on organic non-macromolecular compounds having at least one polymerisable carbon-to-carbon unsaturated bond [5]**

4/02 . Acrylmonomers **[5]**
4/04 . . Cyanoacrylate monomers **[5]**
4/06 . in combination with a macromolecular compound other than an unsaturated polymer of groups C09D 159/00 to C09D 187/00 **[5]**

5/00 **Coating compositions, e.g. paints, varnishes or lacquers, characterised by their physical nature or the effects produced**; **Filling pastes [5]**

5/02 . Emulsion paints
5/03 . Powdery paints (C09D 5/46 takes precedence) **[4]**
5/04 . Thixotropic paints
5/06 . Artists' paints
5/08 . Anti-corrosive paints
5/10 . . containing metal dust
5/12 . . Wash primers
5/14 . Paints containing biocides, e.g. fungicides, insecticides or pesticides (C09D 5/16 takes precedence) **[6]**
5/16 . Anti-fouling paints; Underwater paints **[6]**
5/18 . Fireproof paints
5/20 . for coatings strippable as coherent films, e.g. temporary coatings strippable as coherent films
5/22 . Luminous paints
5/23 . Magnetisable or magnetic paints or lacquers **[2]**
5/24 . Electrically-conducting paints
5/25 . Electrically-insulating paints or lacquers **[2]**
5/26 . Thermosensitive paints
5/28 . for wrinkle, crackle, orange-peel, or similar decorative effects
5/29 . for multicolour effects **[2]**
5/30 . Camouflage paints
5/32 . Radiation-absorbing paints
5/33 . Radiation-reflecting paints (C09D 5/30 takes precedence) **[4]**
5/34 . Filling pastes (materials for sealing or packing joints or covers C09K 3/10; materials for stopping leaks C09K 3/12)
5/36 . Pearl essence, e.g. coatings containing platelet-like pigments for pearl lustre
5/38 . Paints containing free metal not provided for in groups C09D 5/00 to C09D 5/36 **[2]**
5/44 . for electrophoretic applications (C09D 5/46 takes precedence; processes for coating by electrophoresis C25D 13/00) **[4]**
5/46 . for flame-spraying; for electrostatic or whirl-sintering coating **[4]**

7/00 **Features of coating compositions, not provided for in group C09D 5/00** (driers C09F 9/00)

7/02 . Use of compounds as anti-settling agents
7/04 . Use of compounds as anti-skinning agents
7/06 . Use of compounds as levelling agents
7/12 . Other additives
7/14 . Special processes for incorporating ingredients

9/00 **Chemical paint or ink removers** (fluid media for correction of typographical errors by coating C09D 10/00) **[4]**

9/02 . with abrasives
9/04 . with surface-active agents

10/00 **Correcting fluids, e.g. fluid media for correction of typographical errors by coating [5]**

11/00 **Inks**

11/02 . Printing inks
11/04 . . based on proteins
11/06 . . based on fatty oils
11/08 . . based on natural resins
11/10 . . based on artificial resins
11/12 . . based on waxes or bitumen
11/14 . . based on carbohydrates
11/16 . Writing inks
11/18 . . for use in ball-point writing instruments
11/20 . . indelible

13/00 **Pencil-leads**; **Crayon compositions**; **Chalk compositions**

15/00 **Woodstains [2]**

17/00 **Pigment pastes, e.g. for mixing in paints** (artists' paints C09D 5/06) **[2]**

Coating compositions based on polysaccharides or on their derivatives [5]

(1) In groups C09D 101/00 to C09D 201/00, any macromolecular constituent of a coating composition which is not identified by the classification according to Note (3) after the title of subclass C09D, and the use of which is determined to be novel and non-obvious, must also be classified in a group chosen from groups C09D 101/00 to C09D 201/00. **[8]**

(2) Any macromolecular constituent of a coating composition which is not identified by the classification according to Note (3) after the title of subclass C09D or Note (1) above, and which is considered to represent information of interest for search, may also be classified in a group chosen from groups C09D 101/00 to C09D 201/00. This can for example be the case when it is considered of interest to enable searching of coating compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information." **[8]**

101/00 **Coating compositions based on cellulose, modified cellulose, or cellulose derivatives [5]**

101/02 . Cellulose; Modified cellulose **[5]**
101/04 . . Oxycellulose; Hydrocellulose **[5]**
101/06 . . Cellulose hydrate **[5]**
101/08 . Cellulose derivatives **[5]**
101/10 . . Esters of organic acids (of both organic acids and inorganic acids C09D 101/20) **[5]**
101/12 . . . Cellulose acetate **[5]**
101/14 . . . Mixed esters, e.g. cellulose acetate-butyrate **[5]**
101/16 . . Esters of inorganic acids (of both organic acids and inorganic acids C09D 101/20) **[5]**
101/18 . . . Cellulose nitrate **[5]**
101/20 . . Esters of both organic acids and inorganic acids **[5]**
101/22 . . Cellulose xanthate **[5]**
101/24 . . . Viscose **[5]**
101/26 . . Cellulose ethers **[5]**
101/28 . . . Alkyl ethers **[5]**
101/30 . . . Aryl ethers; Aralkyl ethers **[5]**
101/32 . . Cellulose ether-esters **[5]**

103/00 **Coating compositions based on starch, amylose or amylopectin or on their derivatives or degradation products [5]**

103/02 . Starch; Degradation products thereof, e.g. dextrin **[5]**
103/04 . Starch derivatives **[5]**
103/06 . . Esters **[5]**
103/08 . . Ethers **[5]**
103/10 . . Oxidised starch **[5]**
103/12 . Amylose; Amylopectin; Degradation products thereof **[5]**
103/14 . Amylose derivatives; Amylopectin derivatives **[5]**

103/16 . . Esters **[5]**
103/18 . . Ethers **[5]**
103/20 . . Oxidised amylose; Oxidised amylopectin **[5]**

105/00 Coating compositions based on polysaccharides or on their derivatives, not provided for in groups C09D 101/00 or C09D 103/00 [5]
105/02 . Dextran; Derivatives thereof **[5]**
105/04 . Alginic acid; Derivatives thereof **[5]**
105/06 . Pectin; Derivatives thereof **[5]**
105/08 . Chitin; Chondroitin sulfate; Hyaluronic acid; Derivatives thereof **[5]**
105/10 . Heparin; Derivatives thereof **[5]**
105/12 . Agar-agar; Derivatives thereof **[5]**
105/14 . Hemicellulose; Derivatives thereof **[5]**
105/16 . Cyclodextrin; Derivatives thereof **[5]**

Coating compositions based on rubbers or on their derivatives [5]

107/00 Coating composition based on natural rubber [5]
107/02 . Latex **[5]**

109/00 Coating compositions based on homopolymers or copolymers of conjugated diene hydrocarbons [5]
109/02 . Copolymers with acrylonitrile **[5]**
109/04 . . Latex **[5]**
109/06 . Copolymers with styrene **[5]**
109/08 . . Latex **[5]**
109/10 . Latex (C09D 109/04, C09D 109/08 take precedence) **[5]**

111/00 Coating compositions based on homopolymers or copolymers of chloroprene [5]
111/02 . Latex **[5]**

113/00 Coating compositions based on rubbers containing carboxyl groups [5]
113/02 . Latex **[5]**

115/00 Coating compositions based on rubber derivatives (C09D 111/00, C09D 113/00 take precedence) **[5]**
115/02 . Rubber derivatives containing halogen **[5]**

117/00 Coating compositions based on reclaimed rubber [5]

119/00 Coating compositions based on rubbers, not provided for in groups C09D 107/00 to C09D 117/00 [5]
119/02 . Latex **[5]**

121/00 Coating compositions based on unspecified rubbers [5]
121/02 . Latex **[5]**

Coating compositions based on organic macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds [5]

(1) In groups C09D 123/00 to C09D 149/00, "aliphatic radical" means an acyclic or a non-aromatic carbocyclic carbon skeleton which is considered to be terminated by every bond to: **[8]**
(a) an element other than carbon; **[8]**
(b) a carbon atom having a double bond to one atom other than carbon; **[8]**
(c) an aromatic carbocyclic ring or a heterocyclic ring. **[8]**

(2) In groups C09D 123/00 to C09D 149/00, in the absence of an indication to the contrary, a copolymer is classified according to the major monomeric component. **[8]**

123/00 Coating compositions based on homopolymers or copolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond; **Coating compositions based on derivatives of such polymers [5]**
123/02 . not modified by chemical after-treatment **[5]**
123/04 . . Homopolymers or copolymers of ethene **[5]**
123/06 . . . Polyethene **[5]**
123/08 . . . Copolymers of ethene (C09D 123/16 takes precedence) **[5]**
123/10 . . Homopolymers or copolymers of propene **[5]**
123/12 . . . Polypropene **[5]**
123/14 . . . Copolymers of propene (C09D 123/16 takes precedence) **[5]**
123/16 . . Ethene-propene or ethene-propene-diene copolymers **[5]**
123/18 . . Homopolymers or copolymers of hydrocarbons having four or more carbon atoms **[5]**
123/20 . . . having four to nine carbon atoms **[5]**
123/22 . . . . Copolymers of isobutene; Butyl rubber **[5]**
123/24 . . . having ten or more carbon atoms **[5]**
123/26 . modified by chemical after-treatment **[5]**
123/28 . . by reaction with halogens or halogen-containing compounds (C09D 123/32 takes precedence) **[5]**
123/30 . . by oxidation **[5]**
123/32 . . by reaction with phosphorus- or sulfur- containing compounds **[5]**
123/34 . . . by chlorosulfonation **[5]**
123/36 . . by reaction with nitrogen-containing compounds, e.g. by nitration **[5]**

125/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an aromatic carbocyclic ring; **Coating compositions based on derivatives of such polymers [5]**
125/02 . Homopolymers or copolymers of hydrocarbons **[5]**
125/04 . . Homopolymers or copolymers of styrene **[5]**
125/06 . . . Polystyrene **[5]**
125/08 . . . Copolymers of styrene (C09D 129/08, C09D 135/06, C09D 155/02 take precedence) **[5]**
125/10 . . . . with conjugated dienes **[5]**
125/12 . . . . with unsaturated nitriles **[5]**
125/14 . . . . with unsaturated esters **[5]**
125/16 . . Homopolymers or copolymers of alkyl-substituted styrenes **[5]**
125/18 . Homopolymers or copolymers of aromatic monomers containing elements other than carbon and hydrogen **[5]**

127/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a halogen; **Coating compositions based on derivatives of such polymers [5]**
127/02 . not modified by chemical after-treatment **[5]**
127/04 . . containing chlorine atoms **[5]**
127/06 . . . Homopolymers or copolymers of vinyl chloride **[5]**

127/08 . . . Homopolymers or copolymers of vinylidene chloride **[5]**
127/10 . . containing bromine or iodine atoms **[5]**
127/12 . . containing fluorine atoms **[5]**
127/14 . . . Homopolymers or copolymers of vinyl fluoride **[5]**
127/16 . . . Homopolymers or copolymers of vinylidene fluoride **[5]**
127/18 . . . Homopolymers or copolymers of tetrafluoroethene **[5]**
127/20 . . . Homopolymers or copolymers of hexafluoropropene **[5]**
127/22 . modified by chemical after-treatment **[5]**
127/24 . . halogenated **[5]**

129/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an alcohol, ether, aldehydo, ketonic, acetal, or ketal radical; **Coating compositions based on hydrolysed polymers of esters of unsaturated alcohols with saturated carboxylic acids**; **Coating compositions based on derivatives of such polymers [5]**

129/02 . Homopolymers or copolymers of unsaturated alcohols (C09D 129/14 takes precedence) **[5]**
129/04 . . Polyvinyl alcohol; Partially hydrolysed homopolymers or copolymers of esters of unsaturated alcohols with saturated carboxylic acids **[5]**
129/06 . . Copolymers of allyl alcohol **[5]**
129/08 . . . with vinyl aromatic monomers **[5]**
129/10 . Homopolymers or copolymers of unsaturated ethers (C09D 135/08 takes precedence) **[5]**
129/12 . Homopolymers or copolymers of unsaturated ketones **[5]**
129/14 . Homopolymers or copolymers of acetals or ketals obtained by polymerisation of unsaturated acetals or ketals or by after-treatment of polymers of unsaturated alcohols **[5]**

131/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid, or of a haloformic acid (based on hydrolysed polymers C09D 129/00); **Coating compositions based on derivatives of such polymers [5]**

131/02 . Homopolymers or copolymers of esters of monocarboxylic acids **[5]**
131/04 . . Homopolymers or copolymers of vinyl acetate **[5]**
131/06 . Homopolymers or copolymers of esters of polycarboxylic acids **[5]**
131/08 . . of phthalic acid **[5]**

133/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by only one carboxyl radical, or of salts, anhydrides, esters, amides, imides, or nitriles thereof; **Coating compositions based on derivatives of such polymers [5]**

133/02 . Homopolymers or copolymers of acids; Metal or ammonium salts thereof **[5]**
133/04 . Homopolymers or copolymers of esters **[5]**
133/06 . . of esters containing only carbon, hydrogen and oxygen, the oxygen atom being present only as part of the carboxyl radical **[5]**
133/08 . . . Homopolymers or copolymers of acrylic acid esters **[5]**
133/10 . . . Homopolymers or copolymers of methacrylic acid esters **[5]**
133/12 . . . . Homopolymers or copolymers of methyl methacrylate **[5]**
133/14 . . of esters containing halogen, nitrogen, sulfur or oxygen atoms in addition to the carboxy oxygen **[5]**
133/16 . . . Homopolymers or copolymers of esters containing halogen atoms **[5]**
133/18 . Homopolymers or copolymers of nitriles **[5]**
133/20 . . Homopolymers or copolymers of acrylonitrile (C09D 155/02 takes precedence) **[5]**
133/22 . . Homopolymers or copolymers of nitriles containing four or more carbon atoms **[5]**
133/24 . Homopolymers or copolymers of amides or imides **[5]**
133/26 . . Homopolymers or copolymers of acrylamide or methacrylamide **[5]**

135/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a carboxyl radical, and containing at least another carboxyl radical in the molecule, or of salts, anhydrides, esters, amides, imides or nitriles thereof; **Coating compositions based on derivatives of such polymers [5]**

135/02 . Homopolymers or copolymers of esters (C09D 135/06, C09D 135/08 take precedence) **[5]**
135/04 . Homopolymers or copolymers of nitriles (C09D 135/06, C09D 135/08 take precedence) **[5]**
135/06 . Copolymers with vinyl aromatic monomers **[5]**
135/08 . Copolymers with vinyl ethers **[5]**

137/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a heterocyclic ring containing oxygen (based on polymers of cyclic esters of polyfunctional acids C09D 131/00; based on polymers of cyclic anhydrides of unsaturated acids C09D 135/00); **Coating compositions based on derivatives of such polymers [5]**

139/00 Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a single or double bond to nitrogen or by a heterocyclic ring containing nitrogen; **Coating compositions based on derivatives of such polymers [5]**

139/02 . Homopolymers or copolymers of vinylamine **[5]**
139/04 . Homopolymers or copolymers of monomers containing heterocyclic rings having nitrogen as ring member **[5]**
139/06 . . Homopolymers or copolymers of N-vinyl-pyrrolidones **[5]**
139/08 . . Homopolymers or copolymers of vinyl-pyridine **[5]**

141/00 **Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a bond to sulfur or by a heterocyclic ring containing sulfur**; **Coating compositions based on derivatives of such polymers [5]**

143/00 **Coating compositions based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and containing boron, silicon, phosphorus, selenium, tellurium or a metal**; **Coating compositions based on derivatives of such polymers [5]**

143/02 . Homopolymers or copolymers of monomers containing phosphorus **[5]**

143/04 . Homopolymers or copolymers of monomers containing silicon **[5]**

145/00 **Coating compositions based on homopolymers or copolymers of compounds having no unsaturated aliphatic radicals in a side chain, and having one or more carbon-to-carbon double bonds in a carbocyclic or in a heterocyclic ring system**; **Coating compositions based on derivatives of such polymers** (based on polymers of cyclic esters of polyfunctional acids C09D 131/00; based on polymers of cyclic anhydrides or imides C09D 135/00) **[5]**

145/02 . Coumarone-indene polymers **[5]**

147/00 **Coating compositions based on homolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, at least one having two or more carbon-to-carbon double bonds**; **Coating compositions based on derivatives of such polymers** (C09D 145/00 takes precedence; based on conjugated diene rubbers C09D 109/00 to C09D 121/00) **[5]**

149/00 **Coating compositions based on homopolymers or copolymers of compounds having one or more carbon-to-carbon triple bonds**; **Coating compositions based on derivatives of such polymers [5]**

151/00 **Coating compositions based on graft polymers in which the grafted component is obtained by reactions only involving carbon-to-carbon unsaturated bonds** (based on ABS polymers C09D 155/02); **Coating compositions based on derivatives of such polymers [5]**

151/02 . grafted on to polysaccharides **[5]**

151/04 . grafted on to rubbers **[5]**

151/06 . grafted on to homopolymers or copolymers of aliphatic hydrocarbons containing only one carbon-to-carbon double bond **[5]**

151/08 . grafted on to macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

151/10 . grafted on to inorganic materials **[5]**

153/00 **Coating compositions based on block copolymers containing at least one sequence of a polymer obtained by reactions only involving carbon-to-carbon unsaturated bonds**; **Coating compositions based on derivatives of such polymers [5]**

153/02 . Vinyl aromatic monomers and conjugated dienes **[5]**

155/00 **Coating composition based on homopolymers or copolymers, obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in groups C09D 123/00 to C09D 153/00 [5]**

155/02 . ABS [Acrylonitrile-Butadiene-Styrene] polymers **[5]**

155/04 . Polyadducts obtained by the diene synthesis **[5]**

157/00 **Coating compositions based on unspecified polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds [5]**

157/02 . Copolymers of mineral oil hydrocarbons **[5]**

157/04 . Copolymers in which only the monomer in minority is defined **[5]**

157/06 . Homopolymers or copolymers containing elements other than carbon and hydrogen **[5]**

157/08 . . containing halogen atoms **[5]**

157/10 . . containing oxygen atoms **[5]**

157/12 . . containing nitrogen atoms **[5]**

Coating compositions based on organic macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds [5]

159/00 **Coating compositions based on polyacetals**; **Coating compositions based on derivatives of polyacetals [5]**

159/02 . Polyacetals containing polyoxymethylene sequence only **[5]**

159/04 . Copolyoxymethylenes **[5]**

161/00 **Coating compositions based on condensation polymers of aldehydes or ketones** (with polyalcohols C09D 159/00; with polynitriles C09D 177/00); **Coating compositions based on derivatives of such polymers [5]**

161/02 . Condensation polymers of aldehydes or ketones only **[5]**

161/04 . Condensation polymers of aldehydes or ketones with phenols only **[5]**

161/06 . . of aldehydes with phenols **[5]**

161/08 . . . with monohydric phenols **[5]**

161/10 . . . . Phenol-formaldehyde condensates **[5]**

161/12 . . . with polyhydric phenols **[5]**

161/14 . . . Modified phenol-aldehyde condensates **[5]**

161/16 . . of ketones with phenols **[5]**

161/18 . Condensation polymers of aldehydes or ketones with aromatic hydrocarbons or their halogen derivatives only **[5]**

161/20 . Condensation polymers of aldehydes or ketones with only compounds containing hydrogen attached to nitrogen (with amino phenols C09D 161/04) **[5]**

161/22 . . of aldehydes with acyclic or carbocyclic compounds **[5]**

161/24 . . . with urea or thiourea **[5]**

161/26 . . of aldehydes with heterocyclic compounds **[5]**

161/28 . . . with melamine **[5]**

161/30 . . of aldehydes with heterocyclic and acyclic or carbocyclic compounds **[5]**

161/32 . . Modified amine-aldehyde condensates **[5]**

161/34 . Condensation polymers of aldehydes or ketones with monomers covered by at least two of the groups C09D 161/04, C09D 161/18 and C09D 161/20 **[5]**

163/00 **Coating compositions based on epoxy resins**; **Coating compositions based on derivatives of epoxy resins [5]**

163/02 . Polyglycidyl ethers of bis-phenols **[5]**

163/04 . Epoxynovolacs **[5]**

163/06 . Triglycidylisocyanurates **[5]**

163/08 . Epoxidised polymerised polyenes **[5]**

163/10 . Epoxy resins modified by unsaturated compounds **[5]**

Note

In groups C09D 165/00 to C09D 185/00, in the absence of an indication to the contrary, coating compositions based on macromolecular compounds obtained by reactions forming two different linkages in the main chain are classified only according to the linkage present in excess. **[5]**

165/00 Coating compositions based on macromolecular compounds obtained by reactions forming a carbon-to-carbon link in the main chain (C09D 107/00 to C09D 157/00, C09D 161/00 take precedence); **Coating compositions based on derivatives of such polymers [5]**

165/02 . Polyphenylenes **[5]**

165/04 . Polyxylylenes **[5]**

167/00 Coating compositions based on polyesters obtained by reactions forming a carboxylic ester link in the main chain (based on polyester-amides C09D 177/12; based on polyester-imides C09D 179/08); **Coating compositions based on derivatives of such polymers [5]**

167/02 . Polyesters derived from dicarboxylic acids and dihydroxy compounds (C09D 167/06 takes precedence) **[5]**

167/03 . . the dicarboxylic acids and dihydroxy compounds having the hydroxy and the carboxyl groups directly linked to aromatic rings **[5]**

167/04 . Polyesters derived from hydroxy carboxylic acids, e.g. lactones (C09D 167/06 takes precedence) **[5]**

167/06 . Unsaturated polyesters having carbon-to-carbon unsaturation **[5]**

167/07 . . having terminal carbon-to-carbon unsaturated bonds **[5]**

167/08 . Polyesters modified with higher fatty oils or their acids, or with natural resins or resin acids **[5]**

169/00 Coating compositions based on polycarbonates; **Coating compositions based on derivatives of polycarbonates [5]**

171/00 Coating compositions based on polyethers obtained by reactions forming an ether link in the main chain (based on polyacetals C09D 159/00; based on epoxy resins C09D 163/00; based on polythioether-ethers C09D 181/02; based on polyethersulfones C09D 181/06); **Coating compositions based on derivatives of such polymers [5]**

171/02 . Polyalkylene oxides **[5]**

171/03 . . Polyepihalohydrins **[5]**

171/08 . Polyethers derived from hydroxy compounds or from their metallic derivatives (C09D 171/02 takes precedence) **[5]**

171/10 . . from phenols **[5]**

171/12 . . . Polyphenylene oxides **[5]**

171/14 . . Furfuryl alcohol polymers **[5]**

173/00 Coating compositions based on macromolecular compounds obtained by reactions forming a linkage containing oxygen or oxygen and carbon in the main chain, not provided for in groups C09D 159/00 to C09D 171/00; **Coating compositions based on derivatives of such polymers [5]**

173/02 . Polyanhydrides **[5]**

175/00 Coating compositions based on polyureas or polyurethanes; **Coating compositions based on derivatives of such polymers [5]**

175/02 . Polyureas **[5]**

175/04 . Polyurethanes **[5]**

175/06 . . from polyesters **[5]**

175/08 . . from polyethers **[5]**

175/10 . . from polyacetals **[5]**

175/12 . . from compounds containing nitrogen and active hydrogen, the nitrogen atom not being part of an isocyanate group **[5]**

175/14 . . Polyurethanes having carbon-to-carbon unsaturated bonds **[5]**

175/16 . . . having terminal carbon-to-carbon unsaturated bonds **[5]**

177/00 Coating compositions based on polyamides obtained by reactions forming a carboxylic amide link in the main chain (based on polyhydrazides C09D 179/06; based on polyamide-imides C09D 179/08); **Coating compositions based on derivatives of such polymers [5]**

177/02 . Polyamides derived from omega-amino carboxylic acids or from lactams thereof (C09D 177/10 takes precedence) **[5]**

177/04 . Polyamides derived from alpha-amino carboxylic acids (C09D 177/10 takes precedence) **[5]**

177/06 . Polyamides derived from polyamines and polycarboxylic acids (C09D 177/10 takes precedence) **[5]**

177/08 . . from polyamines and polymerised unsaturated fatty acids **[5]**

177/10 . Polyamides derived from aromatically bound amino and carboxyl groups of amino carboxylic acids or of polyamines and polycarboxylic acids **[5]**

177/12 . Polyester-amides **[5]**

179/00 Coating compositions based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing nitrogen, with or without oxygen, or carbon only, not provided for in groups C09D 161/00 to C09D 177/00 [5]

179/02 . Polyamines **[5]**

179/04 . Polycondensates having nitrogen-containing heterocyclic rings in the main chain; Polyhydrazides; Polyamide acids or similar polyimide precursors **[5]**

179/06 . . Polyhydrazides; Polytriazoles; Polyamino-triazoles; Polyoxadiazoles **[5]**

179/08 . . Polyimides; Polyester-imides; Polyamide-imides; Polyamide acids or similar polyimide precursors **[5]**

181/00 Coating compositions based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing sulfur, with or without nitrogen, oxygen, or carbon only; **Coating compositions based on polysulfones**; **Coating compositions based on derivatives of such polymers [5]**

181/02 . Polythioethers; Polythioether-ethers **[5]**

181/04 . Polysulfides **[5]**

181/06 . Polysulfones; Polyethersulfones **[5]**

181/08 . Polysulfonates **[5]**

181/10 . Polysulfonamides; Polysulfonimides **[5]**

183/00 **Coating compositions based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing silicon, with or without sulfur, nitrogen, oxygen, or carbon only**; **Coating compositions based on derivatives of such polymers [5]**

183/02 . Polysilicates **[5]**

183/04 . Polysiloxanes **[5]**

183/05 . . containing silicon bound to hydrogen **[5]**

183/06 . . containing silicon bound to oxygen-containing groups (C09D 183/12 takes precedence) **[5]**

183/07 . . containing silicon bound to unsaturated aliphatic groups **[5]**

183/08 . . containing silicon bound to organic groups containing atoms other than carbon, hydrogen, and oxygen **[5]**

183/10 . Block or graft copolymers containing polysiloxane sequences (obtained by polymerising a compound having a carbon-to-carbon double bond on to a polysiloxane C09D 151/08, C09D 153/00) **[5]**

183/12 . . containing polyether sequences **[5]**

183/14 . in which at least two but not all the silicon atoms are connected by linkages other than oxygen atoms (C09D 183/10 takes precedence) **[5]**

183/16 . in which all the silicon atoms are connected by linkages other than oxygen atoms **[5]**

185/00 **Coating compositions based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing atoms other than silicon, sulfur, nitrogen, oxygen, and carbon**; **Coating compositions based on derivatives of such polymers [5]**

185/02 . containing phosphorus **[5]**

185/04 . containing boron **[5]**

187/00 **Coating compositions based on unspecified macromolecular compounds, obtained otherwise than by polymerisation reactions only involving unsaturated carbon-to-carbon bonds [5]**

Coating compositions based on natural macromolecular compounds or on derivatives thereof [5]

189/00 **Coating compositions based on proteins**; **Coating compositions based on derivatives thereof** (foodstuff preparations A23J 3/00) **[5]**

189/02 . Casein-aldehyde condensates **[5]**

189/04 . Products derived from waste materials, e.g. horn, hoof or hair **[5]**

189/06 . . derived from leather or skin **[5]**

191/00 **Coating compositions based on oils, fats or waxes**; **Coating compositions based on derivatives thereof** (polishing compositions, ski waxes C09G; soaps, detergent compositions C11D) **[5]**

191/02 . Vulcanised oils, e.g. factice **[5]**

191/04 . Linoxyn **[5]**

191/06 . Waxes **[5]**

191/08 . . Mineral waxes **[5]**

193/00 **Coating compositions based on natural resins**; **Coating compositions based on derivatives thereof** (based on polysaccharides C09D 101/00 to C09D 105/00; based on natural rubber C09D 107/00; polishing compositions C09G) **[5]**

193/02 . Shellac **[5]**

193/04 . Rosin **[5]**

195/00 **Coating compositions based on bituminous materials, e.g. asphalt, tar or pitch [5]**

197/00 **Coating compositions based on lignin-containing materials** (based on polysaccharides C09D 101/00 to C09D 105/00) **[5]**

197/02 . Lignocellulosic material, e.g. wood, straw or bagasse **[5]**

199/00 **Coating compositions based on natural macromolecular compounds or on derivatives thereof, not provided for in groups C09D 101/00 to C09D 107/00 or C09D 189/00 to C09D 197/00 [5]**

201/00 **Coating compositions based on unspecified macromolecular compounds [5]**

201/02 . characterised by the presence of specified groups **[5]**

201/04 . . containing halogen atoms **[5]**

201/06 . . containing oxygen atoms **[5]**

201/08 . . . Carboxyl groups **[5]**

201/10 . . containing hydrolysable silane groups **[5]**

C09F **NATURAL RESINS**; **FRENCH POLISH**; **DRYING-OILS**; **DRIERS (SICCATIVES)**; **TURPENTINE**

1/00 **Obtaining, purification, or chemical modification of natural resins, e.g. oleo-resins**

1/02 . Purification

1/04 . Chemical modification, e.g. esterification

3/00 **Obtaining spirits of turpentine**

3/02 . as a by-product in the paper-pulping process

5/00 **Obtaining drying-oils**

5/02 . from natural sources

5/04 . . from cashew nuts

5/06 . by dehydration of hydroxylated fatty acids or oils

5/08 . by esterification of fatty acids

5/10 . Refining

5/12 . . by distillation

7/00 **Chemical modification of drying-oils** (factice C08H)

7/02 . by oxidising

7/04 . by voltolising

7/06 . by polymerisation

7/08 . by isomerisation

7/10 . by re-esterification

7/12 . Apparatus therefor

9/00 **Compounds to be used as driers (siccatives)**

11/00 **Preparation of French polish**

C09G POLISHING COMPOSITIONS OTHER THAN FRENCH POLISH; SKI WAXES

1/00 **Polishing compositions** (French polish C09F 11/00; detergents C11D)
1/02 . containing abrasives or grinding agents
1/04 . Aqueous dispersions (C09G 1/02 takes precedence)
1/06 . Other polishing compositions
1/08 . . based on wax
1/10 . . . based on mixtures of wax and natural or synthetic resin
1/12 . . . . mixtures of wax and silicon-containing polycondensates
1/14 . . based on non-waxy substances
1/16 . . . on natural or synthetic resins
1/18 . . . on other substances

3/00 **Ski waxes**

C09H PREPARATION OF GLUE OR GELATINE

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

1/00 **Pretreatment of collagen-containing raw materials for the manufacture of glue**
1/02 . of bones (defatting bones C11B)
1/04 . of hides, hoofs, or leather scrap (recovery of tanning agents C14C)

3/00 **Isolation of glue or gelatine from raw materials, e.g. by extracting, by heating** (gelatine for foodstuffs A23J 1/10)
3/02 . Purification of solutions of gelatine

5/00 **Stabilisation of solutions of glue or gelatine**

7/00 **Preparation of water-insoluble gelatine**

9/00 **Drying of glue or gelatine**
9/02 . in the form of foils
9/04 . in the form of granules, e.g. beads

C09J ADHESIVES; NON-MECHANICAL ASPECTS OF ADHESIVE PROCESSES IN GENERAL; ADHESIVE PROCESSES NOT PROVIDED FOR ELSEWHERE; USE OF MATERIALS AS ADHESIVES

(surgical adhesives A61L 24/00; adhesives on the basis of non specified organic macromolecular compounds used as bonding agents in layered products B32B; labelling fabrics or comparable materials or articles with deformable surface using adhesives and thermo-activatable adhesives respectively B65C 5/02, B65C 5/04; preparation of glue or gelatine C09H; adhesive labels, tag tickets or similar identification of indication means G09F 3/10) **[5]**

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
– "use of materials as adhesives" means the use of known or new polymers or products;
– "rubber" includes:
(a) natural or conjugated diene rubbers;
(b) rubber in general (for a specific rubber, other than a natural rubber or a conjugated diene rubber, see the group provided for adhesives based on such macromolecular compounds);
– "based on" is defined by means of Note (3), below. **[5]**

(2) In this subclass, adhesives containing specific organic macromolecular substances are classified only according to the macromolecular substance, non-macromolecular substances not being taken into account.
Example: an adhesive containing polyethene and amino-propyltrimethoxysilane is classified in group C09J 123/06.
However, adhesives containing combinations of organic non-macromolecular compounds having at least one polymerisable carbon-to-carbon unsaturated bond with prepolymers or polymers other than unsaturated polymers of groups C09J 159/00 to C09J 187/00 are classified according to the unsaturated non-macromolecular component in group C09J 4/00.
Example: an adhesive containing polyethene and styrene monomer is classified in group C09J 4/00.
Aspects relating to the physical nature of the adhesives or to the effects produced, as defined in group C09J 9/00, if clearly and explicitly stated, are also classified in this subclass.
Adhesives characterised by other features, e.g. additives, are classified in group C09J 11/00, unless the macromolecular constituent is specified. **[5]**

(3) In this subclass, adhesives comprising two or more macromolecular constituents are classified according to the macromolecular constituent or constituents present in the highest proportion, i.e. the constituent on which the adhesive is based. If the adhesive is based on two or more constituents, present in equal proportions, the adhesive is classified according to each of these constituents.
Example: an adhesive containing 80 parts of polyethene and 20 parts of polyvinylchloride is classified in group C09J 123/06. An adhesive containing 40 parts of polyethene and 40 parts of polyvinylchloride is classified in groups C09J 123/06 and C09J 127/06. **[5]**

Subclass index

1/00 Adhesives based on inorganic constituents

1/02 . containing water-soluble alkali silicates

4/00 Adhesives based on organic non-macromolecular compounds having at least one polymerisable carbon-to-carbon unsaturated bond [5]

4/02 . Acrylmonomers **[5]**

4/04 . . Cyanoacrylate monomers **[5]**

4/06 . in combination with a macromolecular compound other than an unsaturated polymer of groups C09J 159/00 to C09J 187/00 **[5]**

5/00 Adhesive processes in general; Adhesive processes not provided for elsewhere, e.g. relating to primers

5/02 . involving pretreatment of the surfaces to be joined

5/04 . involving separate application of adhesive ingredients to the different surfaces to be joined

5/06 . involving heating of the applied adhesive

5/08 . using foamed adhesives

5/10 . Joining materials by welding overlapping edges with an insertion of plastic material

7/00 Adhesives in the form of films or foils

7/02 . on carriers

7/04 . . on paper or textile fabric (adhesive bandages, dressings or absorbent pads A61L 15/16)

9/00 Adhesives characterised by their physical nature or the effects produced, e.g. glue sticks (C09J 7/00 takes precedence) **[5]**

9/02 . Electrically-conducting adhesives (electrically conductive adhesives specially adapted for use in therapy or testing in vivo A61K 50/00) **[5]**

11/00 Features of adhesives not provided for in group C09J 9/00, e.g. additives [5]

11/02 . Non-macromolecular additives **[5]**

11/04 . . inorganic **[5]**

11/06 . . organic **[5]**

11/08 . Macromolecular additives **[5]**

Adhesives based on polysaccharides or on their derivatives [5]

(1) In groups C09J 101/00 to C09J 201/00, any macromolecular constituent of an adhesive composition which is not identified by the classification according to Note (3) after the title of subclass C09J, and the use of which is determined to be novel and non-obvious, must also be classified in a group chosen from groups C09J 101/00 to C09J 201/00. **[8]**

(2) Any macromolecular constituent of an adhesive composition which is not identified by the classification according to Note (3) after the title of subclass C09J or Note (1) above, and which is considered to represent information of interest for search, may also be classified in a group chosen from groups C09J 101/00 to C09J 201/00. This can, for example, be the case when it is considered of interest to enable searching of adhesive compositions using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. **[8]**

101/00 Adhesives based on cellulose, modified cellulose, or cellulose derivatives [5]

101/02 . Cellulose; Modified cellulose **[5]**

101/04 . . Oxycellulose; Hydrocellulose **[5]**

101/06 . . Cellulose hydrate **[5]**

101/08 . Cellulose derivatives **[5]**

101/10 . . Esters of organic acids (of both organic acids and inorganic acids C09J 101/20) **[5]**

101/12 . . . Cellulose acetate **[5]**

101/14 . . . Mixed esters, e.g. cellulose acetate-butyrate **[5]**

101/16 . . Esters of inorganic acids (of both organic acids and inorganic acids C09J 101/20) **[5]**

101/18 . . . Cellulose nitrate **[5]**

101/20 . . Esters of both organic acids and inorganic acids **[5]**

101/22 . . Cellulose xanthate **[5]**

101/24 . . . Viscose **[5]**

101/26 . . Cellulose ethers **[5]**

101/28 . . . Alkyl ethers **[5]**

101/30 . . . Aryl ethers; Aralkyl ethers **[5]**

101/32 . . Cellulose ether-esters **[5]**

103/00 Adhesives based on starch, amylose or amylopectin or on their derivatives or degradation products [5]

103/02 . Starch; Degradation products thereof, e.g. dextrin **[5]**

103/04 . Starch derivatives **[5]**

103/06 . . Esters **[5]**
103/08 . . Ethers **[5]**
103/10 . . Oxidised starch **[5]**
103/12 . Amylose; Amylopectin; Degradation products thereof **[5]**
103/14 . Amylose derivatives; Amylopectin derivatives **[5]**
103/16 . . Esters **[5]**
103/18 . . Ethers **[5]**
103/20 . . Oxidised amylose; Oxidised amylopectin **[5]**

105/00 Adhesives based on polysaccharides or on their derivatives, not provided for in groups C09J 101/00 or C09J 103/00 [5]
105/02 . Dextran; Derivatives thereof **[5]**
105/04 . Alginic acid; Derivatives thereof **[5]**
105/06 . Pectin; Derivatives thereof **[5]**
105/08 . Chitin; Chondroitin sulfate; Hyaluronic acid; Derivatives thereof **[5]**
105/10 . Heparin; Derivatives thereof **[5]**
105/12 . Agar-agar; Derivatives thereof **[5]**
105/14 . Hemicellulose; Derivatives thereof **[5]**
105/16 . Cyclodextrin; Derivatives thereof **[5]**

Adhesives based on rubbers or on their derivatives [5]

107/00 Adhesives based on natural rubber [5]
107/02 . Latex **[5]**

109/00 Adhesives based on homopolymers or copolymers of conjugated diene hydrocarbons [5]
109/02 . Copolymers with acrylonitrile **[5]**
109/04 . . Latex **[5]**
109/06 . Copolymers with styrene **[5]**
109/08 . . Latex **[5]**
109/10 . Latex (C09J 109/04, C09J 109/08 take precedence) **[5]**

111/00 Adhesives based on homopolymers or copolymers of chloroprene [5]
111/02 . Latex **[5]**

113/00 Adhesives based on rubbers containing carboxyl groups [5]
113/02 . Latex **[5]**

115/00 Adhesives based on rubber derivatives (C09J 111/00, C09J 113/00 take precedence) **[5]**
115/02 . Rubber derivatives containing halogen **[5]**

117/00 Adhesives based on reclaimed rubber [5]

119/00 Adhesives based on rubbers, not provided for in groups C09J 107/00 to C09J 117/00 [5]
119/02 . Latex **[5]**

121/00 Adhesives based on unspecified rubbers [5]
121/02 . Latex **[5]**

Adhesives based on organic macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds [5]

(1) In groups C09J 123/00 to C09J 149/00, "aliphatic radical" means an acyclic or a non-aromatic carbocyclic carbon skeleton which is considered to be terminated by every bond to: **[8]**
(a) an element other than carbon; **[8]**
(b) a carbon atom having a double bond to one atom other than carbon; **[8]**
(c) an aromatic carbocyclic ring or a heterocyclic ring. **[8]**

(2) In groups C09J 123/00 to C09J 149/00, in the absence of an indication to the contrary, a copolymer is classified according to the major monomeric component. **[8]**

123/00 Adhesives based on homopolymers or copolymers of unsaturated aliphatic hydrocarbons having only one carbon-to-carbon double bond; **Adhesives based on derivatives of such polymers [5]**
123/02 . not modified by chemical after-treatment **[5]**
123/04 . . Homopolymers or copolymers of ethene **[5]**
123/06 . . . Polyethene **[5]**
123/08 . . . Copolymers of ethene (C09J 123/16 takes precedence) **[5]**
123/10 . . Homopolymers or copolymers of propene **[5]**
123/12 . . . Polypropene **[5]**
123/14 . . . Copolymers of propene (C09J 123/16 takes precedence) **[5]**
123/16 . . Ethene-propene or ethene-propene-diene copolymers **[5]**
123/18 . . Homopolymers or copolymers of hydrocarbons having four or more carbon atoms **[5]**
123/20 . . . having four to nine carbon atoms **[5]**
123/22 . . . . Copolymers of isobutene; Butyl rubber **[5]**
123/24 . . . having ten or more carbon atoms **[5]**
123/26 . modified by chemical after-treatment **[5]**
123/28 . . by reaction with halogens or halogen-containing compounds (C09J 123/32 takes precedence) **[5]**
123/30 . . by oxidation **[5]**
123/32 . . by reaction with phosphorus- or sulfur-containing compounds **[5]**
123/34 . . . by chlorosulfonation **[5]**
123/36 . . by reaction with nitrogen-containing compounds, e.g. by nitration **[5]**

125/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an aromatic carbocyclic ring; **Adhesives based on derivatives of such polymers [5]**
125/02 . Homopolymers or copolymers of hydrocarbons **[5]**
125/04 . . Homopolymers or copolymers of styrene **[5]**
125/06 . . . Polystyrene **[5]**
125/08 . . . Copolymers of styrene (C09J 129/08, C09J 135/06, C09J 155/02 take precedence) **[5]**
125/10 . . . . with conjugated dienes **[5]**
125/12 . . . . with unsaturated nitriles **[5]**
125/14 . . . . with unsaturated esters **[5]**
125/16 . . Homopolymers or copolymers of alkyl-substituted styrenes **[5]**
125/18 . Homopolymers or copolymers of aromatic monomers containing elements other than carbon and hydrogen **[5]**

127/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a halogen; **Adhesives based on derivatives of such polymers [5]**
127/02 . not modified by chemical after-treatment **[5]**
127/04 . . containing chlorine atoms **[5]**

127/06 . . . Homopolymers or copolymers of vinyl chloride **[5]**
127/08 . . . Homopolymers or copolymers of vinylidene chloride **[5]**
127/10 . . containing bromine or iodine atoms **[5]**
127/12 . . containing fluorine atoms **[5]**
127/14 . . . Homopolymers or copolymers of vinyl fluoride **[5]**
127/16 . . . Homopolymers or copolymers of vinylidene fluoride **[5]**
127/18 . . . Homopolymers or copolymers of tetrafluoroethene **[5]**
127/20 . . . Homopolymers or copolymers of hexafluoropropene **[5]**
127/22 . modified by chemical after-treatment **[5]**
127/24 . . halogenated **[5]**

129/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an alcohol, ether, aldehydo, ketonic, acetal, or ketal radical; **Adhesives based on hydrolysed polymers of esters of unsaturated alcohols with saturated carboxylic acids**; **Adhesives based on derivatives of such polymers [5]**

129/02 . Homopolymers or copolymers of unsaturated alcohols (C09J 129/14 takes precedence) **[5]**
129/04 . . Polyvinyl alcohol; Partially hydrolysed homopolymers or copolymers of esters of unsaturated alcohols with saturated carboxylic acids **[5]**
129/06 . . Copolymers of allyl alcohol **[5]**
129/08 . . . with vinyl aromatic monomers **[5]**
129/10 . Homopolymers or copolymers of unsaturated ethers (C09J 135/08 takes precedence) **[5]**
129/12 . Homopolymers or copolymers of unsaturated ketones **[5]**
129/14 . Homopolymers or copolymers of acetals or ketals obtained by polymerisation of unsaturated acetals or ketals or by after-treatment of polymers of unsaturated alcohols **[5]**

131/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by an acyloxy radical of a saturated carboxylic acid, of carbonic acid, or of a haloformic acid (based on hydrolysed polymers C09J 129/00); **Adhesives based on derivatives of such polymers [5]**

131/02 . Homopolymers or copolymers of esters of monocarboxylic acids **[5]**
131/04 . . Homopolymers or copolymers of vinyl acetate **[5]**
131/06 . Homopolymers or copolymers of esters of polycarboxylic acids **[5]**
131/08 . . of phthalic acid **[5]**

133/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by only one carboxyl radical, or of salts, anhydrides, esters, amides, imides, or nitriles thereof; **Adhesives based on derivatives of such polymers [5]**

133/02 . Homopolymers or copolymers of acids; Metal or ammonium salts thereof **[5]**
133/04 . Homopolymers or copolymers of esters **[5]**
133/06 . . of esters containing only carbon, hydrogen and oxygen, the oxygen atom being present only as part of the carboxyl radical **[5]**
133/08 . . . Homopolymers or copolymers of acrylic acid esters **[5]**
133/10 . . . Homopolymers or copolymers of methacrylic acid esters **[5]**
133/12 . . . . Homopolymers or copolymers of methyl methacrylate **[5]**
133/14 . . of esters containing halogen, nitrogen, sulfur or oxygen atoms in addition to the carboxy oxygen **[5]**
133/16 . . . Homopolymers or copolymers of esters containing halogen atoms **[5]**
133/18 . Homopolymers or copolymers of nitriles **[5]**
133/20 . . Homopolymers or copolymers of acrylonitrile (C09J 155/02 takes precedence) **[5]**
133/22 . . Homopolymers or copolymers of nitriles containing four or more carbon atoms **[5]**
133/24 . Homopolymers or copolymers of amides or imides **[5]**
133/26 . . Homopolymers or copolymers of acrylamide or methacrylamide **[5]**

135/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a carboxyl radical, and containing at least another carboxyl radical in the molecule, or of salts, anhydrides, esters, amides, imides or nitriles thereof; **Adhesives based on derivatives of such polymers [5]**

135/02 . Homopolymers or copolymers of esters (C09J 135/06, C09J 135/08 take precedence) **[5]**
135/04 . Homopolymers or copolymers of nitriles (C09J 135/06, C09J 135/08 take precedence) **[5]**
135/06 . Copolymers with vinyl aromatic monomers **[5]**
135/08 . Copolymers with vinyl ethers **[5]**

137/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a heterocyclic ring containing oxygen (based on polymers of cyclic esters of polyfunctional acids C09J 131/00; based on polymers of cyclic anhydrides of unsaturated acids C09J 135/00); **Adhesives based on derivatives of such polymers [5]**

139/00 Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a single or double bond to nitrogen or by a heterocyclic ring containing nitrogen; **Adhesives based on derivatives of such polymers [5]**

139/02 . Homopolymers or copolymers of vinylamine **[5]**
139/04 . Homopolymers or copolymers of monomers containing heterocyclic rings having nitrogen as ring member **[5]**
139/06 . . Homopolymers or copolymers of N-vinyl-pyrrolidones **[5]**
139/08 . . Homopolymers or copolymers of vinyl-pyridine **[5]**

141/00 **Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and at least one being terminated by a bond to sulfur or by a heterocyclic ring containing sulfur**; **Adhesives based on derivatives of such polymers [5]**

143/00 **Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, each having only one carbon-to-carbon double bond, and containing boron, silicon, phosphorus, selenium, tellurium, or a metal**; **Adhesives based on derivatives of such polymers [5]**

143/02 . Homopolymers or copolymers of monomers containing phosphorus **[5]**

143/04 . Homopolymers or copolymers of monomers containing silicon **[5]**

145/00 **Adhesives based on homopolymers or copolymers of compounds having no unsaturated aliphatic radicals in a side chain, and having one or more carbon-to-carbon double bonds in a carbocyclic or in a heterocyclic ring system**; **Adhesives based on derivatives of such polymers** (based on polymers of cyclic esters of polyfunctional acids C09J 131/00; based on polymers of cyclic anhydrides or imides C09J 135/00) **[5]**

145/02 . Coumarone-indene polymers **[5]**

147/00 **Adhesives based on homopolymers or copolymers of compounds having one or more unsaturated aliphatic radicals, at least one having two or more carbon-to-carbon double bonds**; **Adhesives based on derivatives of such polymers** (C09J 145/00 takes precedence; based on conjugated diene rubbers C09J 109/00 to C09J 121/00) **[5]**

149/00 **Adhesives based on homopolymers or copolymers of compounds having one or more carbon-to-carbon triple bonds**; **Adhesives based on derivatives of such polymers [5]**

151/00 **Adhesives based on graft polymers in which the grafted component is obtained by reactions only involving carbon-to-carbon unsaturated bonds** (based on ABS polymers C09J 155/02); **Adhesives based on derivatives of such polymers [5]**

151/02 . grafted on to polysaccharides **[5]**

151/04 . grafted on to rubbers **[5]**

151/06 . grafted on to homopolymers or copolymers of aliphatic hydrocarbons containing only one carbon-to-carbon double bond **[5]**

151/08 . grafted on to macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

151/10 . grafted on to inorganic materials **[5]**

153/00 **Adhesives based on block copolymers containing at least one sequence of a polymer obtained by reactions only involving carbon-to-carbon unsaturated bonds**; **Adhesives based on derivatives of such polymers [5]**

153/02 . Vinyl aromatic monomers and conjugated dienes **[5]**

155/00 **Adhesives based on homopolymers or copolymers, obtained by polymerisation reactions only involving carbon-to-carbon unsaturated bonds, not provided for in groups C09J 123/00 to C09J 153/00 [5]**

155/02 . ABS [Acrylonitrile-Butadiene-Styrene] polymers **[5]**

155/04 . Polyadducts obtained by the diene synthesis **[5]**

157/00 **Adhesives based on unspecified polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds [5]**

157/02 . Copolymers of mineral oil hydrocarbons **[5]**

157/04 . Copolymers in which only the monomer in minority is defined **[5]**

157/06 . Homopolymers or copolymers containing elements other than carbon and hydrogen **[5]**

157/08 . . containing halogen atoms **[5]**

157/10 . . containing oxygen atoms **[5]**

157/12 . . containing nitrogen atoms **[5]**

Adhesives based on organic macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds [5]

159/00 **Adhesives based on polyacetals**; **Adhesives based on derivatives of polyacetals [5]**

159/02 . Polyacetals containing polyoxymethylene sequences only **[5]**

159/04 . Copolyoxymethylenes **[5]**

161/00 **Adhesives based on condensation polymers of aldehydes or ketones** (with polyalcohols C09J 159/00; with polynitriles C09J 177/00); **Adhesives based on derivatives of such polymers [5]**

161/02 . Condensation polymers of aldehydes or ketones only **[5]**

161/04 . Condensation polymers of aldehydes or ketones with phenols only **[5]**

161/06 . . of aldehydes with phenols **[5]**

161/08 . . . with monohydric phenols **[5]**

161/10 . . . . Phenol-formaldehyde condensates **[5]**

161/12 . . . with polyhydric phenols **[5]**

161/14 . . . Modified phenol-aldehyde condensates **[5]**

161/16 . . of ketones with phenols **[5]**

161/18 . Condensation polymers of aldehydes or ketones with aromatic hydrocarbons or their halogen derivatives only **[5]**

161/20 . Condensation polymers of aldehydes or ketones with only compounds containing hydrogen attached to nitrogen (with amino phenols C09J 161/04) **[5]**

161/22 . . of aldehydes with acyclic or carbocyclic compounds **[5]**

161/24 . . . with urea or thiourea **[5]**

161/26 . . of aldehydes with heterocyclic compounds **[5]**

161/28 . . . with melamine **[5]**

161/30 . . of aldehydes with heterocyclic and acyclic or carbocyclic compounds **[5]**

161/32 . . Modified amine-aldehyde condensates **[5]**

161/34 . Condensation polymers of aldehydes or ketones with monomers covered by at least two of the groups C09J 161/04, C09J 161/18 and C09J 161/20 **[5]**

163/00 **Adhesives based on epoxy resins**; **Adhesives based on derivatives of epoxy resins [5]**

163/02 . Polyglycidyl ethers of bis-phenols **[5]**

163/04 . Epoxynovolacs **[5]**

163/06 . Triglycidylisocyanurates **[5]**

163/08 . Epoxidised polymerised polyenes **[5]**

163/10 . Epoxy resins modified by unsaturated compounds **[5]**

Note

In groups C09J 165/00 to C09J 185/00, in the absence of an indication to the contrary, adhesives based on macromolecular compounds obtained by reactions forming two different linkages in the main chain are classified only according to the linkage present in excess. **[5]**

165/00 **Adhesives based on macromolecular compounds obtained by reactions forming a carbon-to-carbon link in the main chain** (C09J 107/00 to C09J 157/00, C09J 161/00 take precedence); **Adhesives based on derivatives of such polymers [5]**

165/02 . Polyphenylenes **[5]**

165/04 . Polyxylylenes **[5]**

167/00 **Adhesives based on polyesters obtained by reactions forming a carboxylic ester link in the main chain** (based on polyester-amides C09J 177/12; based on polyester-imides C09J 179/08); **Adhesives based on derivatives of such polymers [5]**

167/02 . Polyesters derived from dicarboxylic acids and dihydroxy compounds (C09J 167/06 takes precedence) **[5]**

167/03 . . the dicarboxylic acids and dihydroxy compounds having the hydroxy and the carboxyl groups directly linked to aromatic rings **[5]**

167/04 . Polyesters derived from hydroxy carboxylic acids, e.g. lactones (C09J 167/06 takes precedence) **[5]**

167/06 . Unsaturated polyesters having carbon-to-carbon unsaturation **[5]**

167/07 . . having terminal carbon-to-carbon unsaturated bonds **[5]**

167/08 . Polyesters modified with higher fatty oils or their acids, or with natural resins or resin acids **[5]**

169/00 **Adhesives based on polycarbonates**; **Adhesives based on derivatives of polycarbonates [5]**

171/00 **Adhesives based on polyethers obtained by reactions forming an ether link in the main chain** (based on polyacetals C09J 159/00; based on epoxy resins C09J 163/00; based on polythioether-ethers C09J 181/02; based on polyethersulfones C09J 181/06); **Adhesives based on derivatives of such polymers [5]**

171/02 . Polyalkylene oxides **[5]**

171/03 . . Polyepihalohydrins **[5]**

171/08 . Polyethers derived from hydroxy compounds or from their metallic derivatives (C09J 171/02 takes precedence) **[5]**

171/10 . . from phenols **[5]**

171/12 . . . Polyphenylene oxides **[5]**

171/14 . . Furfuryl alcohol polymers **[5]**

173/00 **Adhesives based on macromolecular compounds obtained by reactions forming a linkage containing oxygen or oxygen and carbon in the main chain, not provided for in groups C09J 159/00 to C09J 171/00**; **Adhesives based on derivatives of such polymers [5]**

173/02 . Polyanhydrides **[5]**

175/00 **Adhesives based on polyureas or polyurethanes**; **Adhesives based on derivatives of such polymers [5]**

175/02 . Polyureas **[5]**

175/04 . Polyurethanes **[5]**

175/06 . . from polyesters **[5]**

175/08 . . from polyethers **[5]**

175/10 . . from polyacetals **[5]**

175/12 . . from compounds containing nitrogen and active hydrogen, the nitrogen atom not being part of an isocyanate group **[5]**

175/14 . . Polyurethanes having carbon-to-carbon unsaturated bonds **[5]**

175/16 . . . having terminal carbon-to-carbon unsaturated bonds **[5]**

177/00 **Adhesives based on polyamides obtained by reactions forming a carboxylic amide link in the main chain** (based on polyhydrazides C09J 179/06; based on polyamide-imides C09J 179/08); **Adhesives based on derivatives of such polymers [5]**

177/02 . Polyamides derived from omega-amino carboxylic acids or from lactams thereof (C09J 177/10 takes precedence) **[5]**

177/04 . Polyamides derived from alpha-amino carboxylic acids (C09J 177/10 takes precedence) **[5]**

177/06 . Polyamides derived from polyamines and polycarboxylic acids (C09J 177/10 takes precedence) **[5]**

177/08 . . from polyamines and polymerised unsaturated fatty acids **[5]**

177/10 . Polyamides derived from aromatically bound amino and carboxyl groups of amino carboxylic acids or of polyamines and polycarboxylic acids **[5]**

177/12 . Polyester-amides **[5]**

179/00 **Adhesives based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing nitrogen, with or without oxygen, or carbon only, not provided for in groups C09J 161/00 to C09J 177/00 [5]**

179/02 . Polyamines **[5]**

179/04 . Polycondensates having nitrogen-containing heterocyclic rings in the main chain; Polyhydrazides; Polyamide acids or similar polyimide precursors **[5]**

179/06 . . Polyhydrazides; Polytriazoles; Polyamino-triazoles; Polyoxadiazoles **[5]**

179/08 . . Polyimides; Polyester-imides; Polyamide-imides; Polyamide acids or similar polyimide precursors **[5]**

181/00 **Adhesives based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing sulfur, with or without nitrogen, oxygen, or carbon only**; **Adhesives based on polysulfones**; **Adhesives based on derivatives of such polymers [5]**

181/02 . Polythioethers; Polythioether-ethers **[5]**

181/04 . Polysulfides **[5]**

181/06 . Polysulfones; Polyethersulfones **[5]**

181/08 . Polysulfonates **[5]**

181/10 . Polysulfonamides; Polysulfonimides **[5]**

183/00 **Adhesives based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing silicon, with or without sulfur, nitrogen, oxygen, or carbon only**; **Adhesives based on derivatives of such polymers [5]**

183/02 . Polysilicates **[5]**

183/04 . Polysiloxanes **[5]**

183/05 . . containing silicon bound to hydrogen **[5]**

183/06 . . containing silicon bound to oxygen-containing groups (C09J 183/12 takes precedence) **[5]**

183/07 . . containing silicon bound to unsaturated aliphatic groups **[5]**

183/08 . . containing silicon bound to organic groups containing atoms other than carbon, hydrogen, and oxygen **[5]**

183/10 . Block or graft copolymers containing polysiloxane sequences (obtained by polymerising a compound having a carbon-to-carbon double bond on to a polysiloxane C09J 151/08, C09J 153/00) **[5]**

183/12 . . containing polyether sequences **[5]**

183/14 . in which at least two but not all the silicon atoms are connected by linkages other than oxygen atoms (C09J 183/10 takes precedence) **[5]**

183/16 . in which all the silicon atoms are connected by linkages other than oxygen atoms **[5]**

185/00 Adhesives based on macromolecular compounds obtained by reactions forming in the main chain of the macromolecule a linkage containing atoms other than silicon, sulfur, nitrogen, oxygen, and carbon; **Adhesives based on derivatives of such polymers [5]**

185/02 . containing phosphorus **[5]**

185/04 . containing boron **[5]**

187/00 Adhesives based on unspecified macromolecular compounds, obtained otherwise than by polymerisation reactions only involving unsaturated carbon-to-carbon-bonds [5]

Adhesives based on natural macromolecular compounds or on derivatives thereof [5]

189/00 Adhesives based on proteins; **Adhesives based on derivatives thereof [5]**

189/02 . Casein-aldehyde condensates **[5]**

189/04 . Products derived from waste materials, e.g. horn, hoof or hair **[5]**

189/06 . . derived from leather or skin **[5]**

191/00 Adhesives based on oils, fats or waxes; **Adhesives based on derivatives thereof [5]**

191/02 . Vulcanised oils, e.g. factice **[5]**

191/04 . Linoxyn **[5]**

191/06 . Waxes **[5]**

191/08 . . Mineral waxes **[5]**

193/00 Adhesives based on natural resins; **Adhesives based on derivatives thereof** (based on polysaccharides C09J 101/00 to C09J 105/00; based on natural rubber C09J 107/00) **[5]**

193/02 . Shellac **[5]**

193/04 . Rosin **[5]**

195/00 Adhesives based on bituminous materials, e.g. asphalt, tar or pitch [5]

197/00 Adhesives based on lignin-containing materials (based on polysaccharides C09J 101/00 to C09J 105/00) **[5]**

197/02 . Lignocellulosic material, e.g. wood, straw or bagasse **[5]**

199/00 Adhesives based on natural macromolecular compounds or on derivatives thereof, not provided for in groups C09J 101/00 to C09J 107/00 or C09J 189/00 to C09J 197/00 [5]

201/00 Adhesives based on unspecified macromolecular compounds [5]

201/02 . characterised by the presence of specified groups **[5]**

201/04 . . containing halogen atoms **[5]**

201/06 . . containing oxygen atoms **[5]**

201/08 . . . Carboxyl groups **[5]**

201/10 . . containing hydrolysable silane groups **[5]**

C09K MATERIALS FOR APPLICATIONS NOT OTHERWISE PROVIDED FOR; **APPLICATIONS OF MATERIALS NOT OTHERWISE PROVIDED FOR**

(1) This subclass covers also the use of specified materials in general or their use for the applications not specifically provided for elsewhere.

(2) In this subclass, the following term is used with the meaning indicated:
– "materials" includes compositions. **[4]**

3/00 Materials not provided for elsewhere [2]

3/10 . for sealing or packing joints or covers

3/12 . for stopping leaks, e.g. in radiators or in tanks

3/14 . Anti-slip materials; Abrasives **[4]**

3/16 . Anti-static materials **[4]**

3/18 . for application to surface to minimize adherence of ice, mist or water thereto; Thawing or antifreeze materials for application to surfaces **[4]**

3/20 . as substitutes for glycerol in its non-chemical uses, e.g. as a base in toilet creams or ointments

3/22 . for dust-laying or dust-absorbing **[4]**

3/24 . for simulating ice or snow **[4]**

3/30 . for aerosols **[4]**

3/32 . for treating liquid pollutants, e.g. oil, gasoline or fat (processes for making harmful chemical substances harmless or less harmful, by effecting a chemical change in the substances A62D 3/00)

5/00 Heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants; **Materials for the production of heat or cold by chemical reactions other than by combustion [2]**

5/02 . Materials undergoing a change of physical state when used (C09K 5/16, C09K 5/20 take precedence) **[2]**

5/04 . . the change of state being from liquid to vapour or vice-versa **[2]**

5/06 . . the change of state being from liquid to solid or vice-versa **[2]**

5/08 . Materials not undergoing a change of physical state when used (C09K 5/16, C09K 5/20 take precedence) **[7]**

5/10 . . Liquid materials **[7]**

5/12 . . . Molten materials, i.e. materials solid at room temperature, e.g. metals or salts **[7]**

5/14 . . Solid materials, e.g. powdery or granular **[7]**

5/16 . Materials undergoing chemical reactions when used **[7]**
5/18 . . Non-reversible chemical reactions **[7]**
5/20 . Antifreeze additives therefor, e.g. for radiator liquids **[7]**

8/00 Compositions for drilling of boreholes or wells; Compositions for treating boreholes or wells, e.g. for completion or for remedial operations [8]
8/02 . Well-drilling compositions **[8]**

Note

In groups C09K 8/03 to C09K 8/38, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[8]**

8/03 . . Specific additives for general use in well-drilling compositions **[8]**
8/035 . . . Organic additives **[8]**
8/04 . . Aqueous well-drilling compositions **[8]**
8/05 . . . containing inorganic compounds only, e.g. mixtures of clay and salt **[8]**
8/06 . . . Clay-free compositions (containing inorganic compounds only C09K 8/05) **[8]**
8/08 . . . . containing natural organic compounds, e.g. polysaccharides, or derivatives thereof **[8]**
8/10 . . . . . Cellulose or derivatives thereof **[8]**
8/12 . . . . containing synthetic organic macromolecular compounds or their precursors **[8]**
8/14 . . . Clay-containing compositions (containing inorganic compounds only C09K 8/05) **[8]**
8/16 . . . . characterised by the inorganic compounds other than clay **[8]**
8/18 . . . . characterised by the organic compounds **[8]**
8/20 . . . . . Natural organic compounds or derivatives thereof, e.g. polysaccharides or lignin derivatives **[8]**
8/22 . . . . . Synthetic organic compounds **[8]**
8/24 . . . . . Polymers **[8]**
8/26 . . . Oil-in-water emulsions **[8]**
8/28 . . . . containing organic additives **[8]**
8/32 . . Non-aqueous well-drilling compositions, e.g. oil-based **[8]**
8/34 . . . Organic liquids **[8]**
8/36 . . . Water-in-oil emulsions **[8]**
8/38 . . Gaseous or foamed well-drilling compositions **[8]**
8/40 . Spacer compositions, e.g. compositions used to separate well-drilling from cementing masses **[8]**
8/42 . Compositions for cementing, e.g. for cementing casings into boreholes; Compositions for plugging, e.g. for killing wells (compositions for plastering borehole walls C09K 8/50) **[8]**
8/44 . . containing organic binders only **[8]**
8/46 . . containing inorganic binders, e.g. Portland cement **[8]**
8/467 . . . containing additives for specific purposes **[8]**
8/473 . . . . Density reducing additives, e.g. for obtaining foamed cement compositions **[8]**
8/48 . . . . Density increasing or weighting additives **[8]**
8/487 . . . . Fluid loss control additives; Additives for reducing or preventing circulation loss **[8]**
8/493 . . . . Additives for reducing or preventing gas migration **[8]**
8/50 . Compositions for plastering borehole walls, i.e. compositions for temporary consolidation of borehole walls **[8]**
8/502 . . Oil-based compositions **[8]**
8/504 . . Compositions based on water or polar solvents (C09K 8/502 takes precedence) **[8]**
8/506 . . . containing organic compounds **[8]**
8/508 . . . . macromolecular compounds **[8]**
8/512 . . . . . containing cross-linking agents **[8]**
8/514 . . . . . of natural origin, e.g. polysaccharides, cellulose (C09K 8/512 takes precedence) **[8]**
8/516 . . characterised by their form or by the form of their components, e.g. encapsulated material **[8]**
8/518 . . . Foams **[8]**
8/52 . Compositions for preventing, limiting or eliminating depositions, e.g. for cleaning **[8]**
8/524 . . organic depositions, e.g. paraffins or asphaltenes **[8]**
8/528 . . inorganic depositions, e.g. sulfates or carbonates **[8]**
8/532 . . . Sulfur **[8]**
8/536 . . characterised by their form or by the form of their components, e.g. encapsulated material **[8]**
8/54 . Compositions for in situ inhibition of corrosion in boreholes or wells **[8]**
8/56 . Compositions for consolidating loose sand or the like around wells without excessively decreasing the permeability thereof **[8]**
8/565 . . Oil-based compositions **[8]**
8/57 . . Compositions based on water or polar solvents (C09K 8/565 takes precedence) **[8]**
8/575 . . . containing organic compounds **[8]**
8/58 . Compositions for enhanced recovery methods for obtaining hydrocarbons, i.e. for improving the mobility of the oil, e.g. displacing fluids **[8]**
8/582 . . characterised by the use of bacteria **[8]**
8/584 . . characterised by the use of specific surfactants **[8]**
8/588 . . characterised by the use of specific polymers **[8]**
8/592 . . Compositions used in combination with generated heat, e.g. by steam injection **[8]**
8/594 . . Compositions used in combination with injected gas (C09K 8/592 takes precedence) **[8]**
8/60 . Compositions for stimulating production by acting on the underground formation **[8]**
8/62 . . Compositions for forming crevices or fractures **[8]**
8/64 . . . Oil-based compositions **[8]**
8/66 . . . Compositions based on water or polar solvents (C09K 8/64 takes precedence) **[8]**
8/68 . . . . containing organic compounds **[8]**
8/70 . . . characterised by their form or by the form of their components, e.g. foams **[8]**
8/72 . . . Eroding chemicals, e.g. acids **[8]**
8/74 . . . . combined with additives added for specific purposes **[8]**
8/76 . . . . . for preventing or reducing fluid loss **[8]**
8/78 . . . . . for preventing sealing **[8]**
8/80 . . Compositions for reinforcing fractures, e.g. compositions of proppants used to keep the fractures open **[8]**
8/82 . . Oil-based compositions (C09K 8/64 takes precedence) **[8]**
8/84 . . Compositions based on water or polar solvents (C09K 8/66, C09K 8/82 take precedence) **[8]**
8/86 . . . containing organic compounds **[8]**
8/88 . . . . macromolecular compounds **[8]**

8/90 . . . . . of natural origin, e.g. polysaccharides, cellulose **[8]**

8/92 . . characterised by their form or by the form of their components, e.g. encapsulated material (C09K 8/70 takes precedence) **[8]**

8/94 . . . Foams **[8]**

9/00 Tenebrescent materials, i.e. materials for which the range of wavelengths for energy adsorption is changed as a result of excitation by some form of energy [2]

9/02 . Organic tenebrescent materials **[2]**

11/00 Luminescent, e.g. electroluminescent, chemiluminescent, materials [2]

11/01 . Recovery of luminescent materials **[3]**

11/02 . Use of particular materials as binders, particle coatings or suspension media therefor **[2]**

11/04 . containing natural or artificial radioactive elements or unspecified radioactive elements **[2]**

11/06 . containing organic luminescent materials **[2]**

11/07 . . having chemically-interreactive components, e.g. reactive chemiluminescent compositions **[3]**

11/08 . containing inorganic luminescent materials **[2]**

Note

In groups C09K 11/54 to C09K 11/89, in the absence of an indication to the contrary, materials are classified in the last appropriate place; however, activating constituents of the luminescent materials are disregarded for classification purposes. **[4]**

11/54 . . containing zinc or cadmium **[4]**

11/55 . . containing beryllium, magnesium, alkali metals or alkaline earth metals **[4]**

11/56 . . containing sulfur **[4]**

11/57 . . containing manganese or rhenium **[4]**

11/58 . . containing copper, silver or gold **[4]**

11/59 . . containing silicon **[4]**

11/60 . . containing iron, cobalt or nickel **[4]**

11/61 . . containing fluorine, chlorine, bromine, iodine or unspecified halogen elements **[4]**

11/62 . . containing gallium, indium or thallium **[4]**

11/63 . . containing boron **[4]**

11/64 . . containing aluminium **[4]**

11/65 . . containing carbon **[4]**

11/66 . . containing germanium, tin or lead **[4]**

11/67 . . containing refractory metals **[4]**

11/68 . . . containing chromium, molybdenum or tungsten **[4]**

11/69 . . . containing vanadium **[4]**

11/70 . . containing phosphorus **[4]**

11/71 . . . also containing alkaline earth metals **[4]**

11/72 . . . also containing halogen, e.g. halophosphates **[4]**

11/73 . . . . also containing alkaline earth metals **[4]**

11/74 . . containing arsenic, antimony or bismuth **[4]**

11/75 . . . containing antimony **[4]**

11/76 . . . . also containing phosphorus and halogen, e.g. halophosphates **[4]**

11/77 . . containing rare earth metals **[4]**

11/78 . . . containing oxygen **[4]**

11/79 . . . containing silicon **[4]**

11/80 . . . containing aluminium or gallium **[4]**

11/81 . . . containing phosphorus **[4]**

11/82 . . . containing vanadium **[4]**

11/83 . . . containing vanadium and phosphorus **[4]**

11/84 . . . containing sulfur, e.g. oxysulfides **[4]**

11/85 . . . containing halogen **[4]**

11/86 . . . containing oxygen and halogen, e.g. oxyhalides **[4]**

11/87 . . containing platinum group metals **[4]**

11/88 . . containing selenium, tellurium or unspecified chalcogen elements **[4]**

11/89 . . containing mercury **[4]**

13/00 Etching, surface-brightening or pickling compositions [2]

Note

In groups C09K 13/02 to C09K 13/12, a composition is classified in the last appropriate place. **[2]**

13/02 . containing an alkali metal hydroxide **[2]**

13/04 . containing an inorganic acid **[2]**

13/06 . . with organic material **[2]**

13/08 . . containing a fluorine compound **[2]**

13/10 . . containing a boron compound **[2]**

13/12 . containing heavy metal salts in an amount of at least 50% of the non-solvent components **[2]**

15/00 Anti-oxidant compositions; **Compositions inhibiting chemical change [4]**

(1) In groups C09K 15/02 to C09K 15/34, in the absence of an indication to the contrary, a composition is classified in the last appropriate place. **[2]**

(2) In groups C09K 15/02 to C09K 15/34, a metal salt of an organic compound is classified as that compound. **[2]**

15/02 . containing inorganic compounds **[2]**

15/04 . containing organic compounds **[2]**

15/06 . . containing oxygen **[2]**

15/08 . . . containing a phenol or quinone moiety **[2]**

15/10 . . containing sulfur **[2]**

15/12 . . containing sulfur and oxygen **[2]**

15/14 . . . containing a phenol or quinone moiety **[2]**

15/16 . . containing nitrogen **[2]**

15/18 . . . containing an amine or imine moiety **[2]**

15/20 . . containing nitrogen and oxygen **[2]**

15/22 . . . containing an amide or imide moiety **[2]**

15/24 . . . containing a phenol or quinone moiety **[2]**

15/26 . . containing nitrogen and sulfur **[2]**

15/28 . . containing nitrogen, oxygen and sulfur **[2]**

15/30 . . containing heterocyclic ring with at least one nitrogen atom as ring member **[2]**

15/32 . . containing boron, silicon, phosphorus, selenium, tellurium or a metal **[2]**

15/34 . containing plant or animal materials of unknown composition **[2]**

17/00 Soil-conditioning materials or soil-stabilising materials [3]

(1) This group covers mixtures of soil-conditioning or soil-stabilising materials with fertilisers characterised by their soil-conditioning or soil-stabilising activity. **[6]**

(2) This group does not cover mixtures of soil-conditioning or soil-stabilising materials with fertilisers characterised by their fertilising activity which are covered by subclass C05G. **[6]**

(3) For the purpose of classification in this group, the presence of fertilisers in the composition is not taken into account. **[6]**

(4) In groups C09K 17/02 to C09K 17/40, in the absence of an indication to the contrary, materials are classified in the last appropriate place.

(5) In this group, it is desirable to add the indexing codes of groups C09K 101/00 to C09K 109/00. **[6]**

17/02 . containing inorganic compounds only **[6]**
17/04 . . applied in a physical form other than a solution or a grout, e.g. as granules or gases **[6]**
17/06 . . Calcium compounds, e.g. lime **[6]**
17/08 . . Aluminium compounds, e.g. aluminium hydroxide **[6]**
17/10 . . Cements, e.g. Portland cement **[6]**
17/12 . . Water-soluble silicates, e.g. waterglass **[6]**
17/14 . containing organic compounds only **[6]**
17/16 . . applied in a physical form other than a solution or a grout, e.g. as platelets or granules **[6]**
17/18 . . Prepolymers; Macromolecular compounds **[6]**
17/20 . . . Vinyl polymers **[6]**
17/22 . . . . Polyacrylates; Polymethacrylates **[6]**
17/24 . . . Condensation polymers of aldehydes or ketones **[6]**
17/26 . . . . Phenol-aldehyde condensation polymers **[6]**
17/28 . . . . Urea-aldehyde condensation polymers **[6]**
17/30 . . . Polyisocyanates; Polyurethanes **[6]**
17/32 . . . of natural origin, e.g. cellulosic materials **[6]**
17/34 . . . Bituminous materials **[6]**
17/36 . . Compounds having one or more carbon-to-silicon linkages **[6]**
17/38 . . . Siloxanes **[6]**
17/40 . containing mixtures of inorganic and organic compounds **[6]**
17/42 . . Inorganic compounds mixed with organic active ingredients, e.g. accelerators **[6]**
17/44 . . . the inorganic compound being cement **[6]**
17/46 . . . the inorganic compound being a water-soluble silicate **[6]**
17/48 . . Organic compounds mixed with inorganic active ingredients, e.g. polymerisation catalysts **[6]**
17/50 . . . the organic compound being of natural origin, e.g. cellulose derivatives **[6]**
17/52 . Mulches **[6]**

19/00 Liquid crystal materials [4]

Note

In groups C09K 19/02 to C09K 19/52 in the absence of an indication to the contrary, materials are classified in the last appropriate place. **[4]**

19/02 . characterised by optical, electrical or physical properties of the components, in general **[4]**
19/04 . characterised by the chemical structure of the liquid crystal components **[4]**
19/06 . . Non-steroidal liquid crystal compounds **[4]**
19/08 . . . containing at least two non-condensed rings **[4]**
19/10 . . . . containing at least two benzene rings **[4]**
19/12 . . . . . at least two benzene rings directly linked, e.g. biphenyls **[4]**
19/14 . . . . . linked by a carbon chain **[4]**
19/16 . . . . . the chain containing carbon-to-carbon double bonds, e.g. stilbenes **[4]**
19/18 . . . . . the chain containing carbon-to-carbon triple bonds, e.g. tolans **[4]**
19/20 . . . . . linked by a chain containing carbon and oxygen atoms as chain links, e.g. esters **[4]**
19/22 . . . . . linked by a chain containing carbon and nitrogen atoms as chain links, e.g. Schiff bases **[4]**
19/24 . . . . . linked by a chain containing nitrogen-to-nitrogen bonds **[4]**
19/26 . . . . . Azoxy compounds **[4]**
19/28 . . . . . linked by a chain containing carbon and sulfur atoms as chain links, e.g. thioesters **[4]**
19/30 . . . . containing saturated or unsaturated non-aromatic rings, e.g. cyclohexane rings **[4]**
19/32 . . . containing condensed ring systems, i.e. fused, bridged or spiro ring systems **[4]**
19/34 . . . containing at least one heterocyclic ring **[4]**
19/36 . . Steroidal liquid crystal compounds **[4]**
19/38 . . Polymers, e.g. polyamides **[4]**
19/40 . . containing elements other than carbon, hydrogen, halogen, oxygen, nitrogen or sulfur, e.g. silicon, metals **[4]**
19/42 . . Mixtures of liquid crystal compounds covered by two or more of the preceding groups C09K 19/06 to C09K 19/40 **[4]**

(1) This group does not cover mixtures containing two or more liquid crystal compounds covered individually by the same one of groups C09K 19/04 to C09K 19/40 which are classified only in that group. **[4]**

(2) If liquid crystal components of the mixtures classified in this group are of interest as such, they are also classified according to the compounds in groups C09K 19/04 to C09K 19/40. **[4]**

19/44 . . . containing compounds with benzene rings directly linked **[4]**
19/46 . . . containing esters **[4]**
19/48 . . . containing Schiff bases **[4]**
19/50 . . . containing steroidal liquid crystal compounds **[4]**
19/52 . characterised by components which are not liquid crystals, e.g. additives **[4]**
19/54 . . Additives having no specific mesophase **[4]**
19/56 . . . Aligning agents **[4]**
19/58 . . Dopants or charge transfer agents **[4]**
19/60 . . Pleochroic dyes **[4]**

21/00 Fireproofing materials [4]

Note

In groups C09K 21/02 to C09K 21/14, in the absence of an indication to the contrary, materials are classified in the last appropriate place. **[4]**

21/02 . Inorganic materials **[4]**
21/04 . . containing phosphorus **[4]**
21/06 . Organic materials **[4]**
21/08 . . containing halogen **[4]**
21/10 . . containing nitrogen **[4]**

21/12 . . containing phosphorus **[4]**
21/14 . Macromolecular materials **[4]**

Indexing scheme associated with group C09K 17/00, relating to the use or the intended effect of the soil-conditioning or soil-stabilising materials. [6]

101/00 Agricultural use [6]

103/00 Civil engineering use [6]

105/00 Erosion prevention [6]

107/00 Impermeabilisation [6]

109/00 pH regulation [6]

C10 PETROLEUM, GAS OR COKE INDUSTRIES; TECHNICAL GASES CONTAINING CARBON MONOXIDE; FUELS; LUBRICANTS; PEAT

C10B DESTRUCTIVE DISTILLATION OF CARBONACEOUS MATERIALS FOR PRODUCTION OF GAS, COKE, TAR, OR SIMILAR MATERIALS (cracking oils C10G; underground gasification of minerals E21B 43/295) **[5]**

Subclass index

Retorts or coke ovens

1/00 Retorts
1/02 . Stationary retorts
1/04 . . Vertical retorts
1/06 . . Horizontal retorts
1/08 . . Inclined retorts
1/10 . Rotary retorts

3/00 Coke ovens with vertical chambers
3/02 . with heat-exchange devices

5/00 Coke ovens with horizontal chambers
5/02 . with vertical heating flues
5/04 . . with cross-over inter-connections
5/06 . with horizontal heating flues
5/08 . with horizontal and vertical heating flues
5/10 . with heat-exchange devices
5/12 . . with regenerators
5/14 . . . situated in the longitudinal direction of the chambers
5/16 . . . . with separated flues
5/18 . . . situated in the longitudinal direction of the oven battery
5/20 . . with recuperators

7/00 Coke ovens with mechanical conveying means for the raw material inside the oven
7/02 . with rotary scraping devices
7/04 . with shaking or vibrating devices
7/06 . with endless conveying devices
7/08 . . in vertical direction
7/10 . with conveyer-screws
7/12 . with tilting or rocking means
7/14 . with trucks, containers, or trays

9/00 Beehive ovens

11/00 Coke ovens with inclined chambers

13/00 Coke ovens with means for bringing and keeping the charge under mechanical pressure

15/00 Other coke ovens
15/02 . with floor heating

Heating of coke ovens

17/00 Preheating of coke ovens

19/00 Heating of coke ovens by electrical means

21/00 Heating of coke ovens with combustible gases
21/02 . with lean gas
21/04 . with rich gas
21/06 . in coke ovens suitable for the use of lean gas or rich gas
21/08 . by applying special heating gases
21/10 . Regulating or controlling the combustion
21/12 . . Burners
21/14 . . Devices for reversing the draught
21/16 . . by controlling or varying the openings between the heating flues and the regenerator flues
21/18 . . Recirculating the flue gases
21/20 . Methods of heating ovens of the chamber oven type
21/22 . . by introducing the heating gas and air at various levels
21/24 . . . at the top and the bottom of the vertical heating flues
21/26 . . by introducing the heating gas and air at the top of the vertical flues only

23/00 Other methods of heating coke ovens

25/00 Doors or closures for coke ovens
25/02 . Doors; Door frames
25/04 . . for ovens with vertical chambers
25/06 . . for ovens with horizontal chambers
25/08 . . Closing or opening the doors
25/10 . . . for ovens with vertical chambers
25/12 . . . for ovens with horizontal chambers
25/14 . . . Devices for lifting doors
25/16 . . Sealing; Means for sealing
25/18 . . Cooling
25/20 . Lids or closures for charging holes
25/22 . . for ovens with vertical chambers
25/24 . . for ovens with horizontal chambers

27/00 Arrangements for withdrawal of the distillation gases
27/02 . with outlets arranged at different levels in the chamber
27/04 . during the charging operation of the oven
27/06 . Conduit details, e.g. valves

29/00 Other details of coke ovens
29/02 . Brickwork, e.g. casings, linings, walls
29/04 . Controlling or preventing expansion or contraction
29/06 . Preventing or repairing leakages of the brickwork
29/08 . Bracing or foundation of the ovens

Devices for charging or discharging coke ovens; **Mechanical treatments of coal charges**

31/00 Charging devices for coke ovens
31/02 . for charging vertically
31/04 . . coke ovens with horizontal chambers
31/06 . for charging horizontally
31/08 . . coke ovens with horizontal chambers
31/10 . . . with one compact charge
31/12 . for liquid materials

33/00 Discharging devices for coke ovens; **Coke guides**
33/02 . Extracting coke with built-in devices, e.g. gears, screws
33/04 . Pulling-out devices
33/06 . . for horizontal chambers
33/08 . Pushers, e.g. rams
33/10 . . for horizontal chambers
33/12 . Discharge valves
33/14 . Coke guides

35/00 Combined charging and discharging devices for coke ovens

37/00 Mechanical treatments of coal charges in the oven
37/02 . Levelling charges, e.g. with bars
37/04 . Compressing charges (during coking C10B 47/12)
37/06 . Forming holes in charges

39/00 Cooling or quenching coke
39/02 . Dry cooling outside the oven
39/04 . Wet quenching
39/06 . . in the oven
39/08 . . Coke-quenching towers
39/10 . combined with agitating means, e.g. rotating tables or drums
39/12 . combined with conveying means
39/14 . Cars
39/16 . combined with sorting
39/18 . Coke ramps

41/00 Safety devices, e.g. signalling or controlling devices for use in the discharge of coke
41/02 . for discharging coke
41/04 . . by electrical means
41/06 . . by pneumatic or hydraulic means
41/08 . for the withdrawal of the distillation gases

43/00 Preventing or removing incrustations
43/02 . Removing incrustations
43/04 . . by mechanical means
43/06 . . . from conduits, valves or the like
43/08 . . with liquids
43/10 . . by burning out
43/12 . . . Burners
43/14 . Preventing incrustations

45/00 Other details
45/02 . Devices for producing compact unified coal charges outside the oven

Carbonising or coking processes

47/00 Destructive distillation of solid carbonaceous materials with indirect heating, e.g. by external combustion
47/02 . with stationary charge
47/04 . . in shaft furnaces
47/06 . . in retorts
47/08 . . in beehive ovens
47/10 . . in coke ovens of the chamber type
47/12 . . in which the charge is subjected to mechanical pressure during coking
47/14 . . with the aid of hot liquids, e.g. molten salts
47/16 . . with indirect heating means both inside and outside the retorts
47/18 . with moving charge
47/20 . . according to the “moving bed” technique (C10B 47/26 takes precedence)
47/22 . . in dispersed form (C10B 47/26 takes precedence)
47/24 . . . according to the “fluidised bed” technique
47/26 . . with the aid of hot liquids, e.g. molten salts
47/28 . Other processes
47/30 . . in rotary ovens or retorts
47/32 . . in ovens with mechanical conveying means
47/34 . . . with rotary scraping devices
47/36 . . . . in multi-stage ovens
47/38 . . . with shaking or vibrating devices
47/40 . . . with endless conveying devices
47/42 . . . . in vertical direction
47/44 . . . with conveyer-screws
47/46 . . . with trucks, containers, or trays
47/48 . . . with tilting or rocking means

49/00 Destructive distillation of solid carbonaceous materials by direct heating with heat-carrying agents including the partial combustion of the solid material to be treated
49/02 . with hot gases or vapours, e.g. hot gases obtained by partial combustion of the charge
49/04 . . while moving the solid material to be treated
49/06 . . . according to the “moving bed” technique
49/08 . . . in dispersed form
49/10 . . . . according to the “fluidised bed” technique
49/12 . . . . by mixing tangentially, e.g. in vortex chambers
49/14 . with hot liquids, e.g. molten metals
49/16 . with moving solid heat-carriers in divided form
49/18 . . according to the “moving bed” technique
49/20 . . in dispersed form
49/22 . . . according to the “fluidised bed” technique

51/00 Destructive distillation of solid carbonaceous materials by combined direct and indirect heating

53/00 Destructive distillation, specially adapted for particular solid raw materials or solid raw materials in special form (wet carbonising of peat C10F)
53/02 . of cellulose-containing material (production of pyroligneous acid C10C 5/00)
53/04 . of powdered coal

53/06 . of oil shale or bituminous rocks
53/07 . of synthetic polymeric materials, e.g. tyres (recovery or working-up of waste materials of organic macromolecular compounds or compositions based thereon by dry-heat treatment for obtaining partially depolymerised materials C08J 11/10; production of liquid hydrocarbon mixtures from rubber or rubber waste C10G 1/10) **[8]**
53/08 . in the form of briquettes, lumps or the like

55/00 Coking mineral oils, bitumen, tar or the like, or mixtures thereof, with solid carbonaceous materials (cracking oils C10G)
55/02 . with solid materials
55/04 . . with moving solid materials
55/06 . . . according to the "moving bed" technique
55/08 . . . in dispersed form
55/10 . . . . according to the "fluidised bed" technique

57/00 Other carbonising or coking processes; **Features of destructive distillation processes in general**
57/02 . Multi-step carbonising or coking processes
57/04 . using charges of special composition
57/06 . . containing additives
57/08 . Non-mechanical pretreatment of the charge
57/10 . . Drying
57/12 . Applying additives during coking
57/14 . Features of low-temperature carbonising processes
57/16 . Features of high-temperature carbonising processes
57/18 . Modifying the properties of the distillation gases in the oven

C10C WORKING-UP TAR, PITCH, ASPHALT, BITUMEN; PYROLIGNEOUS ACID

1/00 Working-up tar (obtaining hydrocarbon oils C10G) **[4]**
1/02 . Removal of water (by distillation C10C 1/06)
1/04 . by distillation
1/06 . . Removal of water
1/08 . . Winning of aromatic fractions
1/10 . . . benzene fraction
1/12 . . . naphthalene fraction
1/14 . . Winning of tar oils from tar
1/16 . . Winning of pitch
1/18 . by extraction with selective solvents
1/19 . by thermal treatment not involving distillation **[4]**
1/20 . Refining by chemical means

3/00 Working-up pitch, asphalt, bitumen
3/02 . by chemical means
3/04 . . by blowing or oxidising
3/06 . by distillation
3/08 . by selective extraction
3/10 . Melting
3/12 . . Devices therefor
3/14 . Solidifying; Disintegrating, e.g. granulating
3/16 . . by direct contact with liquids
3/18 . Removing in solid form from reaction vessels, containers and the like, e.g. by cutting out, by pressing

5/00 Production of pyroligneous acid (carbonisation of wood C10B)

C10F DRYING OR WORKING-UP OF PEAT [5]

5/00 Drying or de-watering peat
5/02 . in the field; Auxiliary means therefor
5/04 . by using presses, bandpresses, rolls, or centrifuges (moulding C10F 7/04)
5/06 . combined with a carbonisation step for producing turfcoal

7/00 Working-up peat (extracting wax from peat C10G)
7/02 . Disintegrating peat (obtaining fibres from peat D01B 1/50)
7/04 . by moulding
7/06 . . Briquetting
7/08 . by extrusion combined with cutting

C10G CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, E.G. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas C01B; cracking or pyrolysis of hydrocarbon gases to individual hydrocarbons or mixtures thereof of definite or specified constitution C07C; cracking to cokes C10B); RECOVERY OF HYDROCARBON OILS FROM OIL-SHALE, OIL-SAND, OR GASES; REFINING MIXTURES MAINLY CONSISTING OF HYDROCARBONS; REFORMING OF NAPHTHA; MINERAL WAXES [6]

(1) In this subclass:
– groups C10G 9/00 to C10G 49/00 are limited to one-step processes; **[3]**
– combined or multi-step processes are covered by groups C10G 51/00 to C10G 69/00; **[3]**
– refining or recovery of mineral waxes is covered by group C10G 73/00. **[3]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "in the presence of hydrogen" or "in the absence of hydrogen" mean treatments in which hydrogen, in free form or as hydrogen generating compounds, is added, or not added, respectively; **[3]**
- "hydrotreatment" is used for conversion processes as defined in group C10G 45/00 or group C10G 47/00; **[3]**
- "hydrocarbon oils" covers mixtures of hydrocarbons such as tar oils or mineral oils. **[3]**

(3) In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[3]**

(4) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 Production of liquid hydrocarbon mixtures from oil shale, oil-sand, or non-melting solid carbonaceous or similar materials, e.g. wood, coal (mechanical winning of oil from oil-shales, oil-sand, or the like B03B)

1/02 . by distillation
1/04 . by extraction
1/06 . by destructive hydrogenation
1/08 . . with moving catalysts
1/10 . from rubber or rubber waste

2/00 Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon [5]

3/00 Production of liquid hydrocarbon mixtures from oxygen-containing organic materials, e.g. fatty oils, fatty acids (production from non-melting solid oxygen-containing carbonaceous materials C10G 1/00)

5/00 Recovery of liquid hydrocarbon mixtures from gases, e.g. natural gas

5/02 . with solid adsorbents
5/04 . with liquid absorbents
5/06 . by cooling or compressing

7/00 Distillation of hydrocarbon oils

7/02 . Stabilising gasoline by removing gases by fractioning
7/04 . De-watering
7/06 . Vacuum distillation **[3]**
7/08 . Azeotropic or extractive distillation (refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents C10G 21/00) **[3]**
7/10 . Inhibiting corrosion during distillation **[3]**
7/12 . Controlling or regulating **[3]**

Cracking in the absence of hydrogen

9/00 Thermal non-catalytic cracking, in the absence of hydrogen, of hydrocarbon oils

9/02 . in retorts
9/04 . . Retorts
9/06 . by pressure distillation
9/08 . . Apparatus therefor
9/12 . . . Removing incrustation
9/14 . in pipes or coils with or without auxiliary means, e.g. digesters, soaking drums, expansion means
9/16 . . Preventing or removing incrustation
9/18 . . Apparatus
9/20 . . . Tube furnaces
9/24 . by heating with electrical means
9/26 . with discontinuously preheated non-moving solid material, e.g. blast and run
9/28 . with preheated moving solid material
9/30 . . according to the "moving bed" technique
9/32 . . according to the "fluidised bed" technique
9/34 . by direct contact with inert preheated fluids, e.g. with molten metals or salts
9/36 . . with heated gases or vapours
9/38 . . . produced by partial combustion of the material to be cracked or by combustion of another hydrocarbon **[2]**
9/40 . by indirect contact with preheated fluid other than hot combustion gases
9/42 . by passing the material to be cracked in thin streams or as spray on or near continuously heated surfaces

11/00 Catalytic cracking, in the absence of hydrogen, of hydrocarbon oils (cracking in direct contact with molten metals or salts C10G 9/34)

11/02 . characterised by the catalyst used
11/04 . . Oxides
11/05 . . . Crystalline alumino-silicates, e.g. molecular sieves **[3]**
11/06 . . Sulfides
11/08 . . Halides
11/10 . with stationary catalyst bed
11/12 . with discontinuously preheated non-moving solid catalysts, e.g. blast and run
11/14 . with preheated moving solid catalysts
11/16 . . according to the "moving bed" technique
11/18 . . according to the "fluidised bed" technique

11/20 . by direct contact with inert heated gases or vapours
11/22 . . produced by partial combustion of the material to be cracked

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15/00 Cracking of hydrocarbon oils by electric means, electromagnetic or mechanical vibrations, by particle radiation or with gases superheated in electric arcs
15/08 . by electric means or by electromagnetic or mechanical vibrations **[3]**
15/10 . by particle radiation **[3]**
15/12 . with gases superheated in an electric arc, e.g. plasma **[3]**

Refining in the absence of hydrogen

17/00 Refining of hydrocarbon oils, in the absence of hydrogen, with acids, acid-forming compounds, or acid-containing liquids, e.g. acid sludge
17/02 . with acids or acid-containing liquids, e.g. acid sludge
17/04 . . Liquid-liquid treatment forming two immiscible phases
17/06 . . . using acids derived from sulfur or acid sludge thereof
17/07 . . . using halogen acids or oxyacids of halogen (acids generating halogen C10G 27/02) **[3]**
17/08 . with acid-forming oxides (refining with CO_2 or SO_2 as a selective solvent C10G 21/06)
17/085 . . with oleum **[3]**
17/09 . with acid salts **[3]**
17/095 . with "solid acids", e.g. phosphoric acid deposited on a carrier **[3]**
17/10 . Recovery of used refining agent

19/00 Refining hydrocarbon oils, in the absence of hydrogen, by alkaline treatment
19/02 . with aqueous alkaline solutions
19/04 . . containing solubilisers, e.g. solutisers
19/06 . . with plumbites or plumbates
19/067 . with molten alkaline material **[3]**
19/073 . with solid alkaline material **[3]**
19/08 . Recovery of used refining agent

21/00 Refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents (C10G 17/00, C10G 19/00 take precedence)
21/02 . with two or more solvents, which are introduced or withdrawn separately
21/04 . . by introducing simultaneously at least two immiscible solvents counter-current to each other
21/06 . characterised by the solvent used
21/08 . . Inorganic compounds only
21/10 . . . Sulfur dioxide
21/12 . . Organic compounds only
21/14 . . . Hydrocarbons
21/16 . . . Oxygen-containing compounds
21/18 . . . Halogen-containing compounds
21/20 . . . Nitrogen-containing compounds
21/22 . . . Compounds containing sulfur, selenium, or tellurium
21/24 . . . Phosphorus-containing compounds
21/26 . . . Silicon-containing compounds
21/27 . . . Organic compounds not provided for in a single one of groups C10G 21/14 to C10G 21/26 **[3]**
21/28 . Recovery of used solvent
21/30 . Controlling or regulating **[3]**

25/00 Refining of hydrocarbon oils, in the absence of hydrogen, with solid sorbents

Note

When classifying in this group, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

25/02 . with ion-exchange material
25/03 . . with crystalline alumino-silicates, e.g. molecular sieves **[3]**
25/05 . . . Removal of non-hydrocarbon compounds, e.g. sulfur compounds **[3]**
25/06 . with moving sorbents or sorbents dispersed in the oil
25/08 . . according to the "moving bed" technique
25/09 . . according to the "fluidised bed" technique **[3]**
25/11 . . Distillation in the presence of moving sorbents **[3]**
25/12 . Recovery of used adsorbent

27/00 Refining of hydrocarbon oils, in the absence of hydrogen, by oxidation
27/02 . with halogen or compounds generating halogen; Hypochlorous acid or salts thereof
27/04 . with oxygen or compounds generating oxygen
27/06 . . in the presence of alkaline solutions
27/08 . . in the presence of copper chloride
27/10 . . in the presence of metal-containing organic complexes, e.g. chelates, or cationic ion-exchange resins **[3]**
27/12 . . with oxygen-generating compounds, e.g. per-compounds, chromic acid, chromates (plumbites or plumbates C10G 19/06) **[3]**
27/14 . . with ozone-containing gases **[3]**

29/00 Refining of hydrocarbon oils, in the absence of hydrogen, with other chemicals
29/02 . Non-metals
29/04 . Metals, or metals deposited on a carrier
29/06 . Metal salts, or metal salts deposited on a carrier
29/08 . . containing the metal in the lower valency
29/10 . . Sulfides
29/12 . . Halides **[3]**
29/16 . Metal oxides
29/20 . Organic compounds not containing metal atoms
29/22 . . containing oxygen as the only hetero atom
29/24 . . . Aldehydes or ketones
29/26 . . Halogenated hydrocarbons
29/28 . . containing sulfur as the only hetero atom, e.g. mercaptans, or sulfur and oxygen as the only hetero atoms

31/00 Refining of hydrocarbon oils, in the absence of hydrogen, by methods not otherwise provided for (by distillation C10G 7/00) **[2]**
31/06 . by heating, cooling, or pressure treatment
31/08 . by treating with water
31/09 . by filtration **[3]**
31/10 . with the aid of centrifugal force
31/11 . by dialysis **[3]**

32/00 Refining of hydrocarbon oils by electric or magnetic means, by irradiation, or by using microorganisms [3]
32/02 . by electric or magnetic means **[3]**
32/04 . by particle radiation **[3]**

33/00 De-watering or demulsification of hydrocarbon oils (by distillation C10G 7/04)

33/02 . with electrical or magnetic means
33/04 . with chemical means
33/06 . with mechanical means, e.g. by filtration
33/08 . Controlling or regulating **[3]**

35/00 Reforming naphtha

Note

In this group, the following term is used with the meaning indicated:
– "reforming" means the treatment of naphtha in order to improve the octane number or its aromatic content. **[3]**

35/02 . Thermal reforming
35/04 . Catalytic reforming
35/06 . . characterised by the catalyst used
35/085 . . . containing platinum group metals or compounds thereof **[3]**
35/09 . . . . Bimetallic catalysts in which at least one of the metals is a platinum-group metal **[3]**
35/095 . . . containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
35/10 . . with moving catalysts
35/12 . . . according to the "moving bed" technique
35/14 . . . according to the "fluidised bed" technique
35/16 . with electric, electromagnetic, or mechanical vibrations; by particle radiation
35/22 . Starting-up reforming operations **[3]**
35/24 . Controlling or regulating of reforming operations **[3]**

Hydrotreatment processes

45/00 Refining of hydrocarbon oils using hydrogen or hydrogen-generating compounds [3]

Note

Treatment of hydrocarbon oils in the presence of hydrogen-generating compounds not provided for in a single one of groups C10G 45/02, C10G 45/32, C10G 45/44, or C10G 45/58 is covered by group C10G 49/00. **[3]**

45/02 . to eliminate hetero atoms without changing the skeleton of the hydrocarbon involved and without cracking into lower boiling hydrocarbons; Hydrofinishing **[3]**
45/04 . . characterised by the catalyst used **[3]**
45/06 . . . containing nickel or cobalt metal, or compounds thereof **[3]**
45/08 . . . . in combination with chromium, molybdenum, or tungsten metals, or compounds thereof **[3]**
45/10 . . . containing platinum group metals or compounds thereof **[3]**
45/12 . . . containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
45/14 . . with moving solid particles **[3]**
45/16 . . . suspended in the oil, e.g. slurries **[3]**
45/18 . . . according to the "moving bed" technique **[3]**
45/20 . . . according to the "fluidised bed" technique **[3]**
45/22 . . with hydrogen dissolved or suspended in the oil **[3]**
45/24 . . with hydrogen-generating compounds **[3]**
45/26 . . . Steam or water **[3]**
45/28 . . . Organic compounds; Autofining **[3]**
45/30 . . . . characterised by the catalyst used **[3]**
45/32 . Selective hydrogenation of the diolefin or acetylene compounds **[3]**
45/34 . . characterised by the catalyst used **[3]**
45/36 . . . containing nickel or cobalt metal, or compounds thereof **[3]**
45/38 . . . . in combination with chromium, molybdenum or tungsten metals, or compounds thereof **[3]**
45/40 . . . containing platinum group metals or compounds thereof **[3]**
45/42 . . with moving solid particles **[3]**
45/44 . Hydrogenation of the aromatic hydrocarbons **[3]**
45/46 . . characterised by the catalyst used **[3]**
45/48 . . . containing nickel or cobalt metal, or compounds thereof **[3]**
45/50 . . . . in combination with chromium, molybdenum or tungsten metal, or compounds thereof **[3]**
45/52 . . . containing platinum group metals or compounds thereof **[3]**
45/54 . . . containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
45/56 . . with moving solid particles **[3]**
45/58 . to change the structural skeleton of some of the hydrocarbon content without cracking the other hydrocarbons present, e.g. lowering pour point; Selective hydrocracking of normal paraffins (C10G 32/00 takes precedence; improving or increasing the octane number or aromatic content of naphtha C10G 35/00) **[3]**
45/60 . . characterised by the catalyst used **[3]**
45/62 . . . containing platinum group metals or compounds thereof **[3]**
45/64 . . . containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
45/66 . . with moving solid particles **[3]**
45/68 . . Aromatisation of hydrocarbon oil fractions **[3]**
45/70 . . . with catalysts containing platinum group metals or compounds thereof **[3]**
45/72 . Controlling or regulating **[3]**

47/00 Cracking of hydrocarbon oils, in the presence of hydrogen or hydrogen-generating compounds, to obtain lower boiling fractions (C10G 15/00 takes precedence; destructive hydrogenation of non-melting solid carbonaceous or similar materials C10G 1/06) **[3]**

47/02 . characterised by the catalyst used **[3]**
47/04 . . Oxides **[3]**
47/06 . . Sulfides **[3]**
47/08 . . Halides **[3]**
47/10 . . with catalysts deposited on a carrier **[3]**
47/12 . . . Inorganic carriers **[3]**
47/14 . . . . the catalyst containing platinum group metals or compounds thereof **[3]**
47/16 . . . . Crystalline alumino-silicate carriers **[3]**
47/18 . . . . . the catalyst containing platinum group metals or compounds thereof **[3]**
47/20 . . . . . the catalyst containing other metals or compounds thereof **[3]**
47/22 . Non-catalytic cracking in the presence of hydrogen **[3]**
47/24 . with moving solid particles **[3]**
47/26 . . suspended in the oil, e.g. slurries **[3]**

47/28 . . according to the "moving bed" technique **[3]**
47/30 . . according to the "fluidised bed" technique **[3]**
47/32 . in the presence of hydrogen-generating compounds **[3]**
47/34 . . Organic compounds, e.g. hydrogenated hydrocarbons **[3]**
47/36 . Controlling or regulating **[3]**

49/00 Treatment of hydrocarbon oils, in the presence of hydrogen or hydrogen-generating compounds, not provided for in a single one of groups C10G 45/02, C10G 45/32, C10G 45/44, C10G 45/58, or C10G 47/00 [3]
49/02 . characterised by the catalyst used **[3]**
49/04 . . containing nickel, cobalt, chromium, molybdenum, or tungsten metals, or compounds thereof **[3]**
49/06 . . containing platinum group metals or compounds thereof **[3]**
49/08 . . containing crystalline alumino-silicates, e.g. molecular sieves **[3]**
49/10 . with moving solid particles **[3]**
49/12 . . suspended in the oil, e.g. slurries **[3]**
49/14 . . according to the "moving bed" technique **[3]**
49/16 . . according to the "fluidised bed" technique **[3]**
49/18 . in the presence of hydrogen-generating compounds, e.g. ammonia, water, hydrogen sulfide **[3]**
49/20 . . Organic compounds **[3]**
49/22 . Separation of effluents **[3]**
49/24 . Starting-up hydrotreatment operations **[3]**
49/26 . Controlling or regulating **[3]**

50/00 Production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation [6]
50/02 . of hydrocarbon oils for lubricating purposes **[6]**

Multi-step processes

Note

Groups C10G 51/00 to C10G 69/00 cover only those combined treating operations where the interest is directed to the relationship between the steps. **[3]**

51/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by two or more cracking processes only [3]
51/02 . plural serial stages only **[3]**
51/04 . . including only thermal and catalytic cracking steps **[3]**
51/06 . plural parallel stages only **[3]**

53/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by two or more refining processes [3]
53/02 . plural serial stages only **[3]**
53/04 . . including at least one extraction step **[3]**
53/06 . . . including only extraction steps, e.g. deasphalting by solvent treatment followed by extraction of aromatics **[3]**
53/08 . . including at least one sorption step **[3]**
53/10 . . including at least one acid-treatment step **[3]**
53/12 . . including at least one alkaline-treatment step **[3]**
53/14 . . including at least one oxidation step **[3]**
53/16 . plural parallel stages only **[3]**

55/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by at least one refining process and at least one cracking process [3]
55/02 . plural serial stages only **[3]**
55/04 . . including at least one thermal cracking step **[3]**
55/06 . . including at least one catalytic cracking step **[3]**
55/08 . plural parallel stages only **[3]**

57/00 Treatment of hydrocarbon oils, in the absence of hydrogen, by at least one cracking process or refining process and at least one other conversion process [3]
57/02 . with polymerisation **[3]**

59/00 Treatment of naphtha by two or more reforming processes only or by at least one reforming process and at least one process which does not substantially change the boiling range of the naphtha [3]
59/02 . plural serial stages only **[3]**
59/04 . . including at least one catalytic and at least one non-catalytic reforming step **[3]**
59/06 . plural parallel stages only **[3]**

61/00 Treatment of naphtha by at least one reforming process and at least one process of refining in the absence of hydrogen [3]
61/02 . plural serial stages only **[3]**
61/04 . . the refining step being an extraction **[3]**
61/06 . . the refining step being a sorption process **[3]**
61/08 . plural parallel stages only **[3]**
61/10 . processes also including other conversion steps **[3]**

63/00 Treatment of naphtha by at least one reforming process and at least one other conversion process (C10G 59/00, C10G 61/00 take precedence) **[3]**
63/02 . plural serial stages only **[3]**
63/04 . . including at least one cracking step **[3]**
63/06 . plural parallel stages only **[3]**
63/08 . . including at least one cracking step **[3]**

65/00 Treatment of hydrocarbon oils by two or more hydrotreatment processes only [3]
65/02 . plural serial stages only **[3]**
65/04 . . including only refining steps **[3]**
65/06 . . . at least one step being a selective hydrogenation of the diolefins **[3]**
65/08 . . . at least one step being a hydrogenation of the aromatic hydrocarbons **[3]**
65/10 . . including only cracking steps **[3]**
65/12 . . including cracking steps and other hydrotreatment steps **[3]**
65/14 . plural parallel stages only **[3]**
65/16 . . including only refining steps **[3]**
65/18 . . including only cracking steps **[3]**

67/00 Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one process for refining in the absence of hydrogen only [3]
67/02 . plural serial stages only **[3]**
67/04 . . including solvent extraction as the refining step in the absence of hydrogen **[3]**
67/06 . . including a sorption process as the refining step in the absence of hydrogen **[3]**
67/08 . . including acid treatment as the refining step in the absence of hydrogen **[3]**
67/10 . . including alkaline treatment as the refining step in the absence of hydrogen **[3]**

67/12 . . including oxidation as the refining step in the absence of hydrogen **[3]**
67/14 . . including at least two different refining steps in the absence of hydrogen **[3]**
67/16 . plural parallel stages only **[3]**

69/00 Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one other conversion process (C10G 67/00 takes precedence) **[3]**
69/02 . plural serial stages only **[3]**
69/04 . . including at least one step of catalytic cracking in the absence of hydrogen **[3]**
69/06 . . including at least one step of thermal cracking in the absence of hydrogen **[3]**
69/08 . . including at least one step of reforming naphtha **[3]**
69/10 . . . hydrocracking of higher boiling fractions into naphtha and reforming the naphtha obtained **[3]**
69/12 . . including at least one polymerisation or alkylation step **[3]**
69/14 . plural parallel stages only **[3]**

70/00 Working-up undefined normally gaseous mixtures obtained by processes covered by groups C10G 9/00, C10G 11/00, C10G 15/00, C10G 47/00, C10G 51/00 [5]
70/02 . by hydrogenation **[5]**
70/04 . by physical processes **[5]**
70/06 . . by gas-liquid contact **[5]**

71/00 Treatment by methods not otherwise provided for of hydrocarbon oils or fatty oils for lubricating purposes [3]
71/02 . Thickening by voltolising (chemical modification of drying-oils by voltolising C09F 7/04) **[3]**

73/00 Recovery or refining of mineral waxes, e.g. montan wax (compositions essentially based on waxes C08L 91/00) **[3]**
73/02 . Recovery of petroleum waxes from hydrocarbon oils; De-waxing of hydrocarbon oils **[3]**
73/04 . . with the use of filter aids **[3]**
73/06 . . with the use of solvents **[3]**
73/08 . . . Organic compounds **[3]**
73/10 . . . . Hydrocarbons **[3]**
73/12 . . . . Oxygen-containing compounds **[3]**
73/14 . . . . Halogen-containing compounds **[3]**
73/16 . . . . Nitrogen-containing compounds **[3]**
73/18 . . . . containing sulfur, selenium or tellurium **[3]**
73/20 . . . . containing phosphorus **[3]**
73/22 . . . . Mixtures of organic compounds **[3]**
73/23 . . . Recovery of used solvents **[6]**
73/24 . . by formation of adducts **[3]**
73/26 . . by flotation **[3]**
73/28 . . by centrifugal force **[3]**
73/30 . . with electric means **[3]**
73/32 . . Methods of cooling during de-waxing **[3]**
73/34 . . Controlling or regulating **[3]**
73/36 . Recovery of petroleum waxes from other compositions containing oil in minor proportions, from concentrates or from residues; De-oiling, sweating **[3]**
73/38 . Chemical modification of petroleum waxes **[3]**
73/40 . Physical treatment of waxes or modified waxes, e.g. granulation, dispersion, emulsion, irradiation **[3]**
73/42 . Refining of petroleum waxes **[3]**
73/44 . . in the presence of hydrogen or hydrogen-generating compounds **[3]**

75/00 Inhibiting corrosion or fouling in apparatus for treatment or conversion of hydrocarbon oils, in general (C10G 7/10, C10G 9/16 take precedence) **[6]**
75/02 . by addition of corrosion inhibitors **[6]**
75/04 . by addition of antifouling agents **[6]**

99/00 Subject matter not provided for in other groups of this subclass [8]

C10H PRODUCTION OF ACETYLENE BY WET METHODS [5]

Subclass index

1/00 Acetylene gas generators with dropwise, gravity, non-automatic water feed
1/02 . Valves
1/04 . . Screw valves
1/06 . . Cocks
1/08 . Other means for controlling the water feed
1/10 . Water feed from above through a central or lateral pipe
1/12 . Water feed from above through porous materials

3/00 Acetylene gas generators with automatic water feed regulation by means independent of the gas-holder
3/02 . with membranes
3/04 . with floats
3/06 . with pistons

5/00 Acetylene gas generators with automatic water feed regulation by the gas-holder
5/02 . with overflow for the water
5/04 . by drop-by-drop water valves connected with the gas-holder
5/06 . . by drop-by-drop water cocks connected with the gas-holder
5/08 . with gas-holder-connected water valves or cocks according to the submersion system

7/00 **Acetylene gas generators with water feed by Kipp's principle**
7/02 . with water feed from below
7/04 . with water feed from above

9/00 **Acetylene gas generators according to Dobereiner's principle with fixed carbide bell**
9/02 . with water feed from below through porous materials (by capillary feed)
9/04 . with gas cock actuated by the gas-holder
9/06 . with the depth of the gas outlet pipe regulated by the gas-holder
9/08 . with movable gas-holder
9/10 . by wetting the carbide only at the bottom

11/00 **Acetylene gas generators with submersion of the carbide in water**
11/02 . inside the gas-holder
11/04 . with sealing and reaction water separated from each other

13/00 **Acetylene gas generators with combined dipping and drop-by-drop system**

15/00 **Acetylene gas generators with carbide feed, with or without regulation by the gas pressure**
15/02 . with non-automatic carbide feed
15/04 . . Closure means at the filling-hopper
15/06 . with automatic carbide feed by valves
15/08 . . by flap or slide valves
15/10 . . by float valves
15/12 . . by measuring valves, including pocket-wheels
15/14 . with feed worm or feed conveyers
15/16 . with feed drums
15/18 . with movable feed disc and fixed carbide-receptacle
15/20 . with carbide feed by cartridges or other packets
15/22 . with carbide feed of pulverous carbide from receptacles or through the gas-holder
15/24 . with carbide feed by pistons

17/00 **High-pressure acetylene gas generators**

19/00 **Other acetylene gas generators**
19/02 . Rotary carbide receptacles

21/00 **Details of acetylene generators**; **Accessory equipment for, or features of, the wet production of acetylene**
21/02 . Packages of carbide for use in generators, e.g. cartridges
21/04 . . Placing packages in the generator
21/06 . . . Opening devices for packages in the generator
21/08 . Safety devices for acetylene generators
21/10 . Carbide compositions
21/12 . Gas-tight sealing means, e.g. liquid seals in generators
21/14 . Ventilation means; Cooling devices
21/16 . Removing sludge from generators

C10J **PRODUCTION OF PRODUCER GAS, WATER-GAS, SYNTHESIS GAS FROM SOLID CARBONACEOUS MATERIAL, OR MIXTURES CONTAINING THESE GASES** (synthesis gas from liquid or gaseous hydrocarbons C01B; underground gasification of minerals E21B 43/295); **CARBURETTING AIR OR OTHER GASES [5]**

1/00 **Production of fuel gases by carburetting air or other gases without pyrolysis** (for internal-combustion engines F02)
1/02 . Carburetting air
1/04 . . Controlling supply of air
1/06 . . with materials which are liquid at ordinary temperatures
1/08 . . . by passage of air through or over the surface of the liquid
1/10 . . . . with the liquid absorbed on carriers
1/12 . . . by atomisation of the liquid
1/14 . . . Controlling the supply of liquid in accordance with the air supply
1/16 . . with solid hydrocarbons
1/18 . . in rotary carburettors
1/20 . Carburetting gases other than air
1/22 . Adding materials to prevent vapour deposition
1/24 . Controlling humidity of the air or gas to be carburetted
1/26 . using raised temperatures or pressures
1/28 . Odorising air gas

3/00 **Production of combustible gases containing carbon monoxide from solid carbonaceous fuels** (destructive distillation processes C10B)
3/02 . Fixed-bed gasification of lump fuel
3/04 . . Cyclic processes, e.g. alternate blast and run
3/06 . . Continuous processes
3/08 . . . with ash-removal in liquid state
3/10 . . . using external heating
3/12 . . . using solid heat-carriers
3/14 . . . using gaseous heat-carriers
3/16 . . . simultaneously reacting oxygen and water with the carbonaceous material
3/18 . . . using electricity
3/20 . . Apparatus; Plants
3/22 . . . Arrangements or dispositions of valves or flues
3/24 . . . . to permit flow of gases or vapours other than upwardly through the fuel bed
3/26 . . . . . downwardly
3/28 . . . . fully automatic
3/30 . . . Fuel charging devices
3/32 . . . Devices for distributing fuel evenly over the bed for stirring-up the fuel bed
3/34 . . . Grates; Mechanical ash-removing devices
3/36 . . . . Fixed grates
3/38 . . . . . with stirring beams
3/40 . . . . Movable grates
3/42 . . . . . Rotary grates
3/44 . . . adapted for use on vehicles
3/46 . Gasification of granular or pulverulent fuels in suspension
3/48 . . Apparatus; Plants
3/50 . . . Fuel charging devices
3/52 . . . Ash-removing devices
3/54 . . Gasification of granular or pulverulent fuels by the Winkler technique, i.e. by fluidisation
3/56 . . . Apparatus; Plants
3/57 . Gasification using molten salts or metals (C10J 3/02, C10J 3/46 take precedence) **[4]**
3/58 . combined with pre-distillation of the fuel

3/60 . . Processes
3/62 . . . with separate withdrawal of the distillation products
3/64 . . . with decomposition of the distillation products
3/66 . . . . by introducing them into the gasification zone
3/68 . Carburetting by pyrolysis of carbonaceous material in the fuel bed (C10J 3/66 takes precedence)
3/70 . Carburetting by pyrolysis of carbonaceous material in a carburettor
3/72 . Other features
3/74 . . Construction of shells or jackets
3/76 . . . Water jackets; Steam boiler jackets
3/78 . . High-pressure apparatus
3/80 . . with arrangements for preheating the blast or the water vapour
3/82 . . Gas withdrawal means
3/84 . . . with means for removing dust or tar from the gas
3/86 . . combined with waste-heat boilers

C10K PURIFYING OR MODIFYING THE CHEMICAL COMPOSITION OF COMBUSTIBLE GASES CONTAINING CARBON MONOXIDE

1/00 Purifying combustible gases containing carbon monoxide (isolation of hydrogen from mixtures containing hydrogen and carbon monoxide C01B 3/50)
1/02 . Dust removal
1/04 . by cooling to condense non-gaseous materials
1/06 . . combined with spraying with water
1/08 . by washing with liquids; Reviving the used wash liquors
1/10 . . with aqueous liquids
1/12 . . . alkaline-reacting
1/14 . . . . organic
1/16 . . with non-aqueous liquids
1/18 . . . hydrocarbon oils
1/20 . by treating with solids; Regenerating spent purifying masses
1/22 . . Apparatus, e.g. dry box purifiers
1/24 . . . Supporting means for the purifying material
1/26 . . Regeneration of the purifying material
1/28 . . Controlling the gas flow through the purifiers
1/30 . . with moving purifying masses
1/32 . with selectively absorptive solids, e.g. active carbon
1/34 . by catalytic conversion of impurities to more readily removable materials

3/00 Modifying the chemical composition of combustible gases containing carbon monoxide to produce an improved fuel, e.g. one of different calorific value, which may be free from carbon monoxide
3/02 . by catalytic treatment
3/04 . . reducing the carbon monoxide content
3/06 . by mixing with gases

C10L FUELS NOT OTHERWISE PROVIDED FOR; NATURAL GAS; SYNTHETIC NATURAL GAS OBTAINED BY PROCESSES NOT COVERED BY SUBCLASSES C10G OR C10K; LIQUEFIED PETROLEUM GAS; USE OF ADDITIVES TO FUELS OR FIRES; FIRE-LIGHTERS [5]

1/00 Liquid carbonaceous fuels
1/02 . essentially based on components consisting of carbon, hydrogen, and oxygen only
1/04 . essentially based on blends of hydrocarbons
1/06 . . for spark ignition
1/08 . . for compression ignition
1/10 . containing additives

(1) In groups C10L 1/12 to C10L 1/14, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.
(2) If an additive is a mixture of compounds, classification is made for each compound of interest. **[8]**
(3) A metal salt or an ammonium salt of a compound is classified as that compound, e.g. a chromium sulfonate is classified as a sulfonate in group C10L 1/24 and <u>not</u> in group C10L 1/30.

1/12 . . Inorganic compounds
1/14 . . Organic compounds
1/16 . . . Hydrocarbons
1/18 . . . containing oxygen
1/182 . . . . containing hydroxy groups; Salts thereof **[8]**
1/183 . . . . . at least one hydroxy group bound to an aromatic carbon atom **[8]**
1/185 . . . . Ethers; Acetals; Ketals; Aldehydes; Ketones **[8]**
1/188 . . . . Carboxylic acids; Salts thereof **[8]**
1/189 . . . . . having at least one carboxyl group bound to an aromatic carbon atom **[8]**
1/19 . . . . Esters **[8]**
1/192 . . . . Macromolecular compounds **[8]**
1/195 . . . . . obtained by reactions involving only carbon-to-carbon unsaturated bonds **[8]**
1/196 . . . . . derived from monomers containing a carbon-to-carbon unsaturated bond and a carboxyl group or salts, anhydrides or esters thereof **[8]**
1/197 . . . . . derived from monomers containing a carbon-to-carbon unsaturated bond and an acyloxy group of a saturated carboxylic or carbonic acid **[8]**
1/198 . . . . . obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds **[8]**
1/20 . . . containing halogen
1/22 . . . containing nitrogen

1/222 . . . . containing at least one carbon-to-nitrogen single bond **[8]**
1/223 . . . . . having at least one amino group bound to an aromatic carbon atom **[8]**
1/224 . . . . . Amides; Imides **[8]**
1/226 . . . . containing at least one nitrogen-to-nitrogen bond, e.g. azo compounds, azides, hydrazines **[8]**
1/228 . . . . containing at least one carbon-to-nitrogen double bond, e.g. guanidines, hydrazones, semicarbazones, imines; containing at least one carbon-to-nitrogen triple bond, e.g. nitriles **[8]**
1/23 . . . . containing at least one nitrogen-to-oxygen bond, e.g. nitro-compounds, nitrates, nitrites **[8]**
1/232 . . . . containing nitrogen in a heterocyclic ring **[8]**
1/233 . . . . . containing nitrogen and oxygen in the ring, e.g. oxazoles **[8]**
1/234 . . . . Macromolecular compounds **[8]**
1/236 . . . . . obtained by reactions involving only carbon-to-carbon unsaturated bonds **[8]**
1/238 . . . . . obtained otherwise than by reactions involving only carbon-to-carbon unsaturated bonds **[8]**
1/2383 . . . . . Polyamines or polyimines, or derivatives thereof **[8]**
1/2387 . . . . . Polyoxyalkyleneamines **[8]**
1/24 . . . containing sulfur, selenium or tellurium
1/26 . . . containing phosphorus
1/28 . . . containing silicon
1/30 . . . containing elements not mentioned in groups C10L 1/16 to C10L 1/28
1/32 . consisting of coal-oil suspensions or aqueous emulsions

3/00 **Gaseous fuels**; **Natural gas**; **Synthetic natural gas obtained by processes not covered by subclasses C10G, C10K**; **Liquefied petroleum gas [5]**
3/02 . Compositions containing acetylene
3/04 . . Absorbing compositions, e.g. solvents
3/06 . Natural gas; Synthetic natural gas obtained by processes not covered by C10G, C10K 3/02 or C10K 3/04 **[5]**
3/08 . . Production of synthetic natural gas **[5]**
3/10 . . Working-up natural gas or synthetic natural gas **[5]**
3/12 . Liquefied petroleum gas **[5]**

5/00 **Solid fuels** (produced by solidifying fluid fuels C10L 7/00; peat briquettes C10F 7/06)
5/02 . Briquettes consisting mainly of carbonaceous materials of mineral origin (peat briquettes C10F)
5/04 . . Raw material to be used; Pretreatment thereof
5/06 . . Briquetting processes
5/08 . . . without the aid of extraneous binders
5/10 . . . with the aid of binders, e.g. pretreated binders
5/12 . . . . with inorganic binders
5/14 . . . . with organic binders
5/16 . . . . . with bituminous binders, e.g. tar, pitch
5/18 . . . . . with naphthalene
5/20 . . . . . with sulfite lye
5/22 . . . . Methods of applying the binder to the other compounding ingredients; Apparatus therefor
5/24 . . Combating dust during briquetting; Safety devices against explosion
5/26 . . After-treatment of the briquettes
5/28 . . . Heating the briquettes; Coking the binders
5/30 . . . Cooling the briquettes
5/32 . . . Coating
5/34 . . Other details of the briquettes
5/36 . . . Shape
5/38 . . . . Briquettes consisting of different layers
5/40 . essentially based on materials of non-mineral origin
5/42 . . on animal substances or products obtained therefrom
5/44 . . on vegetable substances
5/46 . . on sewage, house, or town refuse
5/48 . . on industrial residues or waste materials (C10L 5/42, C10L 5/44 take precedence) **[4]**

7/00 **Fuels produced by solidifying fluid fuels**
7/02 . liquid fuels
7/04 . . alcohol

8/00 **Fuels not provided for in other groups of this subclass [8]**

9/00 **Treating solid fuels to improve their combustion**
9/02 . by chemical means
9/04 . . by hydrogenating
9/06 . . by oxidation
9/08 . by heat treatment, e.g. calcining
9/10 . by using additives
9/12 . . Oxidation means, e.g. oxygen-generating compounds

10/00 **Use of additives to fuels or fires for particular purposes** (using binders for briquetting solid fuels C10L 5/10; using additives to improve the combustion of solid fuels C10L 9/10) **[1,8]**
10/02 . for reducing smoke development
10/04 . for minimising corrosion or incrustation
10/06 . for facilitating soot removal
10/08 . for improving lubricity; for reducing wear **[8]**
10/10 . for improving the octane number **[8]**
10/12 . for improving the cetane number **[8]**
10/14 . for improving low temperature properties **[8]**
10/16 . . Pour-point depressants **[8]**
10/18 . use of detergents or dispersants for purposes not provided for in groups C10L 10/02 to C10L 10/16 **[8]**

11/00 **Fire-lighters**
11/02 . based on refractory porous bodies
11/04 . consisting of combustible material (matches C06F)
11/06 . of a special shape
11/08 . Apparatus for the manufacture thereof

C10M **LUBRICATING COMPOSITIONS** (well drilling compositions C09K 8/02); **USE OF CHEMICAL SUBSTANCES EITHER ALONE OR AS LUBRICATING INGREDIENTS IN A LUBRICATING COMPOSITION** (mould release, i.e. separating, agents for metals B22C 3/00, for plastics or substances in a plastic state, in general B29C 33/56, for glass C03B 40/02; textile lubricating compositions D06M 11/00, D06M 13/00, D06M 15/00; use of particular substances in particular apparatus or conditions, see F16N or the relevant groups for the application, e.g. A21D 8/08, B21C 9/00, H01B 3/18; immersion oils for microscopy G02B 21/33) **[4]**

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
- "lubricant" or "lubricating composition" includes cutting oils, hydraulic fluids, metal drawing compositions, flushing oils, slushing oils, or the like;
- "aliphatic" includes "cycloaliphatic". **[4]**

(2) In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. Thus, a compound having an aromatic ring is classified as aromatic regardless of whether the substituent(s) of interest are on the ring or on an aliphatic part of the molecule. **[4]**

(3) In this subclass:
(a) metal or ammonium salts of a compound are classified as that compound;
(b) salts or adducts formed between two or more organic compounds are classified according to all compounds forming the salt or adduct, if of interest;
(c) a specified compound, e.g. phenols, acids, substituted by a macromolecular hydrocarbon radical is classified as that compound;
(d) base-materials or thickeners or additives consisting of a mixture for which no specific main group is provided are classified in the most indented group covering all essential constituents of the mixture, for example,
- a base-material mixture of ketone and amide group C10M 105/00;
- a base-material mixture of ketone and ether group C10M 105/08;
- an additive mixture of long and short chain esters group C10M 129/00;
- an additive mixture of short chain aliphatic and aromatic carboxylic acids group C10M 129/26;

(e) except for aqueous lubricating compositions containing more than 10% water, which are classified separately, classification is made according to the type of ingredient or mixture of types of ingredient (base-material, thickener or additive) which characterises the composition.

Attention is drawn to the fact that a mixture of essential ingredients characterised by only one of its components, rather than by the mixture as a whole, is not classified as a mixture, e.g., a lubricating composition consisting of:
- a known base-material and a new additive is classified only in the "additive" part of the classification scheme;
- a known base-material with both a thickener and a further additive as essential ingredients, which may be individually known or not, is classified as a mixture of thickener and additive;
- a known base-material with a combination of additives as essential ingredients, which may be individually known or not, is classified in the appropriate place for the additive mixture. **[4]**

(4) Any part of a composition which is not identified by the classification according to Notes (2) or (3) above, and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place. The part can be either a single ingredient or a composition in itself. **[8]**

(5) Any part of a composition which is not identified by the classification according to Notes (2) to (4) above, and which is considered to represent information of interest for search, may also be classified in the last appropriate place. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

(6) In this subclass, it is desirable to add the indexing codes of subclass C10N. **[4]**

Subclass index

Base-materials [4]

101/00 Lubricating compositions characterised by the base-material being a mineral or fatty oil (containing more than 10% water C10M 173/00) **[4]**
101/02 . Petroleum fractions **[4]**
101/04 . Fatty oil fractions **[4]**

103/00 Lubricating compositions characterised by the base-material being an inorganic material (containing more than 10% water C10M 173/00) **[4]**
103/02 . Carbon; Graphite **[4]**
103/04 . Metals; Alloys **[4]**
103/06 . Metal compounds **[4]**

105/00 Lubricating compositions characterised by the base-material being a non-macromolecular organic compound [4]
105/02 . Well-defined hydrocarbons (petroleum fractions C10M 101/02) **[4]**
105/04 . . aliphatic **[4]**
105/06 . . aromatic **[4]**
105/08 . containing oxygen **[4]**
105/10 . . having hydroxy groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
105/12 . . . monohydroxy **[4]**
105/14 . . . polyhydroxy **[4]**
105/16 . . having hydroxy groups bound to a carbon atom of a six-membered aromatic ring **[4]**
105/18 . . Ethers, e.g. epoxides **[4]**
105/20 . . Aldehydes; Ketones **[4]**
105/22 . . Carboxylic acids or their salts **[4]**
105/24 . . . having only one carboxyl group bound to an acyclic carbon atom, cycloaliphatic carbon atom or hydrogen **[4]**
105/26 . . . having more than one carboxyl group bound to an acyclic carbon atom or cycloaliphatic carbon atom **[4]**
105/28 . . . having only one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**
105/30 . . . having more than one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**
105/32 . . Esters **[4]**
105/34 . . . of monocarboxylic acids **[4]**
105/36 . . . of polycarboxylic acids **[4]**
105/38 . . . of polyhydroxy compounds **[4]**
105/40 . . . containing free hydroxy or carboxyl groups **[4]**
105/42 . . . Complex esters, i.e. compounds containing at least three esterified carboxyl groups and derived from the combination of at least three different types of the following five types of compound: monohydroxy compounds, polyhydroxy compounds, monocarboxylic acids, polycarboxylic acids and hydroxy carboxylic acids **[4]**
105/44 . . . . derived from the combination of monocarboxylic acids, dicarboxylic acids and dihydroxy compounds only and having no free hydroxy or carboxyl groups **[4]**
105/46 . . . . derived from the combination of monohydroxy compounds, dihydroxy compounds and dicarboxylic acids only and having no free hydroxy or carboxyl groups **[4]**
105/48 . . . of carbonic acid **[4]**
105/50 . containing halogen **[4]**
105/52 . . containing carbon, hydrogen and halogen only **[4]**
105/54 . . containing carbon, hydrogen, halogen and oxygen **[4]**
105/56 . containing nitrogen **[4]**
105/58 . . Amines, e.g. polyalkylene polyamines, quaternary amines (polyalkylene polyamines with eleven or more monomer units C10M 107/44) **[4]**
105/60 . . . having amino groups bound to an acyclic or cycloaliphatic carbon atom **[4]**
105/62 . . . . containing hydroxy groups **[4]**
105/64 . . . having amino groups bound to a carbon atom of a six-membered aromatic ring **[4]**
105/66 . . . . containing hydroxy groups **[4]**
105/68 . . Amides; Imides **[4]**
105/70 . . as ring hetero atom **[4]**
105/72 . containing sulfur, selenium or tellurium **[4]**
105/74 . containing phosphorus **[4]**
105/76 . containing silicon **[4]**
105/78 . containing boron **[4]**
105/80 . containing atoms of elements not provided for in groups C10M 105/02 to C10M 105/78 **[4]**

107/00 Lubricating compositions characterised by the base-material being a macromolecular compound [4]
107/02 . Hydrocarbon polymers; Hydrocarbon polymers modified by oxidation **[4]**
107/04 . . Polyethene **[4]**
107/06 . . containing propene **[4]**
107/08 . . containing butene **[4]**
107/10 . . containing aliphatic monomer having more than 4 carbon atoms **[4]**
107/12 . . containing aromatic monomer, e.g. styrene **[4]**
107/14 . . containing conjugated diene **[4]**
107/16 . . containing non-conjugated diene **[4]**
107/18 . . Hydrocarbon polymers modified by oxidation **[4]**
107/20 . containing oxygen (C10M 107/18 takes precedence) **[4]**
107/22 . . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/24 . . . containing monomers having an unsaturated radical bound to an alcohol, aldehydo, ketonic, ether, ketal or acetal radical **[4]**
107/26 . . . containing monomers having an unsaturated radical bound to an acyloxy radical of a saturated carboxylic or carbonic acid **[4]**
107/28 . . . containing monomers having an unsaturated radical bound to a carboxyl radical, e.g. acrylate **[4]**
107/30 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/32 . . . Condensation polymers of aldehydes or ketones; Polyesters; Polyethers **[4]**
107/34 . . . . Polyoxyalkylenes **[4]**
107/36 . . Polysaccharides, e.g. cellulose **[4]**
107/38 . containing halogen **[4]**
107/40 . containing nitrogen **[4]**
107/42 . . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/44 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
107/46 . containing sulfur **[4]**
107/48 . containing phosphorus **[4]**

107/50 . containing silicon **[4]**
107/52 . containing boron **[4]**
107/54 . containing atoms of elements not provided for in groups C10M 107/02 to C10M 107/52 **[4]**

109/00 Lubricating compositions characterised by the base-material being a compound of unknown or incompletely defined constitution (C10M 101/00 takes precedence) **[4]**

109/02 . Reaction products **[4]**

Note

When classifying in this group, any reactant of a reaction product which is considered to represent information of interest for search, may also be classified in the last appropriate place in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

111/00 Lubricating compositions characterised by the base-material being a mixture of two or more compounds covered by more than one of the main groups C10M 101/00 to C10M 109/00, each of these compounds being essential [4]

111/02 . at least one of them being a non-macromolecular organic compound **[4]**
111/04 . at least one of them being a macromolecular organic compound **[4]**
111/06 . at least one of them being a compound of the type covered by group C10M 109/00 **[4]**

Thickeners [4]

Note

In groups C10M 113/00 to C10M 123/00, the following term is used with the meaning indicated:
– "thickener" is an agent which solidifies other liquid components to form a grease (solid lubricants consisting of solid components C10M 101/00 to C10M 111/00). **[4]**

113/00 Lubricating compositions characterised by the thickener being an inorganic material [4]

113/02 . Carbon; Graphite **[4]**
113/04 . Sulfur **[4]**
113/06 . Metals; Alloys **[4]**
113/08 . Metal compounds **[4]**
113/10 . Clays; Micas **[4]**
113/12 . Silica **[4]**
113/14 . Glass **[4]**
113/16 . Inorganic material treated with organic compounds, e.g. coated **[4]**

115/00 Lubricating compositions characterised by the thickener being a non-macromolecular organic compound other than a carboxylic acid or salt thereof [4]

115/02 . Hydrocarbons (petroleum fractions C10M 121/02) **[4]**
115/04 . containing oxygen **[4]**
115/06 . containing halogen **[4]**
115/08 . containing nitrogen **[4]**
115/10 . containing sulfur **[4]**
115/12 . containing phosphorus **[4]**

117/00 Lubricating compositions characterised by the thickener being a non-macromolecular carboxylic acid or salt thereof [4]

117/02 . having only one carboxyl group bound to an acyclic carbon atom, cycloaliphatic carbon atom or hydrogen **[4]**
117/04 . . containing hydroxy groups **[4]**
117/06 . having more than one carboxyl group bound to an acyclic carbon atom or cycloaliphatic carbon atom **[4]**
117/08 . having only one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**
117/10 . having more than one carboxyl group bound to a carbon atom of a six-membered aromatic ring **[4]**

119/00 Lubricating compositions characterised by the thickener being a macromolecular compound [4]

119/02 . Hydrocarbons polymers; Hydrocarbon polymers modified by oxidation **[4]**
119/04 . containing oxygen (hydrocarbon polymers modified by oxidation C10M 119/02) **[4]**
119/06 . . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
119/08 . . . containing monomers having an unsaturated radical bound to an alcohol, aldehydo, ketonic, ether, ketal or acetal radical **[4]**
119/10 . . . containing monomers having an unsaturated radical bound to an acyloxy radical of a saturated carboxylic or carbonic acid **[4]**
119/12 . . . containing monomers having an unsaturated radical bound to a carboxyl radical, e.g. acrylate **[4]**
119/14 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
119/16 . . . Condensation polymers of aldehydes or ketones; Polyesters; Polyethers **[4]**
119/18 . . . . Polyoxyalkylenes **[4]**
119/20 . . Polysaccharides, e.g. cellulose **[4]**
119/22 . containing halogen **[4]**
119/24 . containing nitrogen **[4]**
119/26 . containing sulfur **[4]**
119/28 . containing phosphorus **[4]**
119/30 . containing atoms of elements not provided for in groups C10M 119/02 to C10M 119/28 **[4]**

121/00 Lubricating compositions characterised by the thickener being a compound of unknown or incompletely defined constitution [4]

121/02 . Petroleum fractions, e.g. tars **[4]**
121/04 . Reaction products **[4]**

Note

When classifying in this group, any reactant of a reaction product which is considered to represent information of interest for search, may also be classified in the last appropriate place in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

123/00 Lubricating compositions characterised by the thickener being a mixture of two or more compounds covered by more than one of the main groups C10M 113/00 to C10M 121/00, each of these compounds being essential (inorganic materials coated with organic compounds C10M 113/16) **[4]**

123/02 . at least one of them being a non-macromolecular compound **[4]**

123/04 . at least one of them being a macromolecular compound **[4]**

123/06 . at least one of them being a compound of the type covered by group C10M 121/00 **[4]**

Additives [4]

125/00 Lubricating compositions characterised by the additive being an inorganic material [4]

125/02 . Carbon; Graphite **[4]**

125/04 . Metals; Alloys **[4]**

125/06 . Sulfur **[4]**

125/08 . Metal carbides or hydrides **[4]**

125/10 . Metal oxides, hydroxides, carbonates or bicarbonates **[4]**

125/12 . Metal carbonyls **[4]**

125/14 . Water (aqueous lubricating compositions containing more than 10% water C10M 173/00) **[4]**

125/16 . Hydrogen peroxide; Oxygenated water **[4]**

125/18 . Compounds containing halogen **[4]**

125/20 . Compounds containing nitrogen **[4]**

125/22 . Compounds containing sulfur, selenium or tellurium **[4]**

125/24 . Compounds containing phosphorus, arsenic or antimony **[4]**

125/26 . Compounds containing silicon or boron, e.g. silica, sand **[4]**

125/28 . . Glass **[4]**

125/30 . . Clay **[4]**

127/00 Lubricating compositions characterised by the additive being a non-macromolecular hydrocarbon (petroleum fractions C10M 159/04) **[4]**

127/02 . well-defined aliphatic **[4]**

127/04 . well-defined aromatic **[4]**

127/06 . Alkylated aromatic hydrocarbons **[4]**

129/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing oxygen [4]

129/02 . having a carbon chain of less than 30 atoms **[4]**

129/04 . . Hydroxy compounds **[4]**

129/06 . . . having hydroxy groups bound to acyclic or cycloaliphatic carbon atoms **[4]**

129/08 . . . . containing at least 2 hydroxy groups **[4]**

129/10 . . . having hydroxy groups bound to a carbon atom of a six-membered aromatic ring **[4]**

129/12 . . . . with condensed rings **[4]**

129/14 . . . . containing at least 2 hydroxy groups **[4]**

129/16 . . Ethers **[4]**

129/18 . . . Epoxides **[4]**

129/20 . . . Cyclic ethers having 4 or more ring atoms, e.g. furans, dioxolanes **[4]**

129/22 . . Peroxides; Ozonides **[4]**

129/24 . . Aldehydes; Ketones **[4]**

129/26 . . Carboxylic acids; Salts thereof **[4]**

129/28 . . . having carboxyl groups bound to acyclic or cycloaliphatic carbon atoms **[4]**

129/30 . . . . having 7 or less carbon atoms **[4]**

129/32 . . . . . monocarboxylic **[4]**

129/34 . . . . . polycarboxylic **[4]**

129/36 . . . . . containing hydroxy groups **[4]**

129/38 . . . . having 8 or more carbon atoms **[4]**

129/40 . . . . . monocarboxylic **[4]**

129/42 . . . . . polycarboxylic **[4]**

129/44 . . . . . containing hydroxy groups **[4]**

129/46 . . . . cycloaliphatic **[4]**

129/48 . . . having carboxyl groups bound to a carbon atom of a six-membered aromatic ring **[4]**

129/50 . . . . monocarboxylic **[4]**

129/52 . . . . polycarboxylic **[4]**

129/54 . . . . containing hydroxy groups **[4]**

129/56 . . . Acids of unknown or incompletely defined constitution **[4]**

129/58 . . . . Naphthenic acids **[4]**

129/60 . . . . Tall oil acids **[4]**

129/62 . . . . Rosin acids **[4]**

129/64 . . . Acids obtained from polymerised unsaturated acids **[4]**

129/66 . . Epoxidised acids or esters **[4]**

129/68 . . Esters (epoxidised C10M 129/66) **[4]**

129/70 . . . of monocarboxylic acids **[4]**

129/72 . . . of polycarboxylic acids **[4]**

129/74 . . . of polyhydroxy compounds **[4]**

129/76 . . . containing free hydroxy or carboxyl groups **[4]**

129/78 . . . Complex esters, i.e. compounds containing at least three esterified carboxyl groups and derived from the combination of at least three different types of the following five types of compound: monohydroxy compounds, polyhydroxy compounds, monocarboxylic acids, polycarboxylic acids, hydroxy carboxylic acids **[4]**

129/80 . . . . derived from the combination of monocarboxylic acids, dicarboxylic acids and dihydroxy compounds only and having no free hydroxy or carboxyl groups **[4]**

129/82 . . . . derived from the combination of monohydroxy compounds, dihydroxy compounds and dicarboxylic acids only and having no free hydroxy or carboxyl groups **[4]**

129/84 . . . of carbonic acid **[4]**

129/86 . having a carbon chain of 30 or more atoms **[4]**

129/88 . . Hydroxy compounds **[4]**

129/90 . . . having hydroxy groups bound to acyclic or cycloaliphatic carbon atoms **[4]**

129/91 . . . having hydroxy groups bound to a carbon atom of a six-membered aromatic ring **[4]**

129/92 . . Carboxylic acids **[4]**

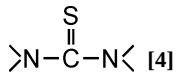
129/93 . . . having carboxyl groups bound to acyclic or cycloaliphatic carbon atoms **[4]**

129/94 . . . having carboxyl groups bound to a carbon atom of a six-membered aromatic ring **[4]**
129/95 . . Esters **[4]**

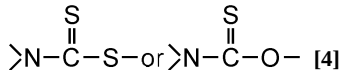
131/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing halogen [4]
131/02 . containing carbon, hydrogen and halogen only **[4]**
131/04 . . aliphatic **[4]**
131/06 . . aromatic **[4]**
131/08 . containing carbon, hydrogen, halogen and oxygen **[4]**
131/10 . . Alcohols; Ethers; Aldehydes; Ketones **[4]**
131/12 . . Acids; Salts or esters thereof **[4]**
131/14 . Halogenated waxes **[4]**

133/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing nitrogen [4]
133/02 . having a carbon chain of less than 30 atoms **[4]**
133/04 . . Amines, e.g. polyalkylene polyamines; Quaternary amines (polyalkylene polyamines with eleven or more monomer units C10M 149/22) **[4]**
133/06 . . . having amino groups bound to acyclic or cycloaliphatic carbon atoms **[4]**
133/08 . . . . containing hydroxy groups **[4]**
133/10 . . . . cycloaliphatic **[4]**
133/12 . . . having amino groups bound to a carbon atom of a six-membered aromatic ring **[4]**
133/14 . . . . containing hydroxy groups **[4]**
133/16 . . Amides; Imides **[4]**
133/18 . . . of carbonic or haloformic acids **[4]**
133/20 . . . . Ureas; Semicarbazides; Allophanates **[4]**
133/22 . . containing a carbon-to-nitrogen double bond, e.g. guanidines, hydrazones, semicarbazones **[4]**
133/24 . . Nitriles **[4]**
133/26 . . containing a nitrogen-to-nitrogen double bond **[4]**
133/28 . . . Azo compounds **[4]**
133/30 . . containing a nitrogen-to-oxygen bond **[4]**
133/32 . . . containing a nitro group **[4]**
133/34 . . . containing a nitroso group **[4]**
133/36 . . . Hydroxylamines **[4]**
133/38 . . Heterocyclic nitrogen compounds **[4]**
133/40 . . . Six-membered ring containing nitrogen and carbon only **[4]**
133/42 . . . . Triazines **[4]**
133/44 . . . Five-membered ring containing nitrogen and carbon only **[4]**
133/46 . . . . Imidazoles **[4]**
133/48 . . . the ring containing both nitrogen and oxygen **[4]**
133/50 . . . . Morpholines **[4]**
133/52 . having a carbon chain of 30 or more atoms **[4]**
133/54 . . Amines **[4]**
133/56 . . Amides; Imides **[4]**
133/58 . . Heterocyclic compounds **[4]**

135/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing sulfur, selenium or tellurium [4]
135/02 . Sulfurised compounds **[4]**
135/04 . . Hydrocarbons **[4]**
135/06 . . Esters, e.g. fats **[4]**
135/08 . containing a sulfur-to-oxygen bond **[4]**
135/10 . . Sulfonic acids or derivatives thereof **[4]**
135/12 . Thio-acids; Thiocyanates; Derivatives thereof **[4]**
135/14 . . having a carbon-to-sulfur double bond **[4]**
135/16 . . . thiourea type, i.e. containing the group


[4]

135/18 . . . thiocarbamic type, e.g. containing the groups


[4]

135/20 . Thiols; Sulfides; Polysulfides **[4]**
135/22 . . containing sulfur atoms bound to acyclic or cycloaliphatic carbon atoms **[4]**
135/24 . . . containing hydroxy groups; Derivatives thereof **[4]**
135/26 . . . containing carboxyl groups; Derivatives thereof **[4]**
135/28 . . containing sulfur atoms bound to a carbon atom of a six-membered aromatic ring **[4]**
135/30 . . . containing hydroxy groups; Derivatives thereof **[4]**
135/32 . Heterocyclic sulfur, selenium or tellurium compounds **[4]**
135/34 . . the ring containing sulfur and carbon only **[4]**
135/36 . . the ring containing sulfur and carbon with nitrogen or oxygen **[4]**

137/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing phosphorus [4]
137/02 . having no phosphorus-to-carbon bond **[4]**
137/04 . . Phosphate esters **[4]**
137/06 . . . Metal salts **[4]**
137/08 . . . Ammonium or amine salts **[4]**
137/10 . . . Thio derivatives **[4]**
137/12 . having a phosphorus-to-carbon bond **[4]**
137/14 . . containing sulfur **[4]**
137/16 . having a phosphorus-to-nitrogen bond **[4]**

139/00 Lubricating compositions characterised by the additive being an organic non-macromolecular compound containing atoms of elements not provided for in groups C10M 127/00 to C10M 137/00 [4]
139/02 . Esters of silicon acids **[4]**
139/04 . having a silicon-to-carbon bond, e.g. silanes **[4]**
139/06 . having a metal-to-carbon bond (metal complexes of unknown constitution C10M 159/18) **[4]**

141/00 Lubricating compositions characterised by the additive being a mixture of two or more compounds covered by more than one of the main groups C10M 125/00 to C10M 139/00, each of these compounds being essential [4]
141/02 . at least one of them being an organic oxygen-containing compound **[4]**
141/04 . at least one of them being an organic halogen-containing compound **[4]**
141/06 . at least one of them being an organic nitrogen-containing compound **[4]**
141/08 . at least one of them being an organic sulfur-, selenium- or tellurium-containing compound **[4]**
141/10 . at least one of them being an organic phosphorus-containing compound **[4]**
141/12 . at least one of them being an organic compound containing atoms of elements not provided for in groups C10M 141/02 to C10M 141/10 **[4]**

143/00 Lubricating composition characterised by the additive being a macromolecular hydrocarbon or such hydrocarbon modified by oxidation [4]

143/02 . Polyethene **[4]**
143/04 . containing propene **[4]**
143/06 . containing butene **[4]**
143/08 . containing aliphatic monomer having more than 4 carbon atoms **[4]**
143/10 . containing aromatic monomer, e.g. styrene **[4]**
143/12 . containing conjugated diene **[4]**
143/14 . containing non-conjugated diene **[4]**
143/16 . containing cycloaliphatic monomer **[4]**
143/18 . Oxidised hydrocarbons, i.e. oxidised subsequent to macromolecular formation **[4]**

145/00 Lubricating compositions characterised by the additive being a macromolecular compound containing oxygen (oxidised hydrocarbons C10M 143/18) **[4]**

145/02 . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
145/04 . . containing monomers having an unsaturated radical bound to an alcohol, aldehydo, ketonic, ether, ketal or acetal radical **[4]**
145/06 . . containing monomers having an unsaturated radical bound to an acyloxy radical of a saturated carboxylic or carbonic acid **[4]**
145/08 . . . Vinyl esters of a saturated carboxylic or carbonic acid **[4]**
145/10 . . containing monomers having an unsaturated radical bound to a carboxyl radical, e.g. acrylate **[4]**
145/12 . . . monocarboxylic **[4]**
145/14 . . . . Acrylate; Methacrylate **[4]**
145/16 . . . polycarboxylic **[4]**
145/18 . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
145/20 . . Condensation polymers of aldehydes or ketones **[4]**
145/22 . . Polyesters **[4]**
145/24 . . Polyethers **[4]**
145/26 . . . Polyoxyalkylenes **[4]**
145/28 . . . . of alkylene oxides containing 2 carbon atoms only **[4]**
145/30 . . . . of alkylene oxides containing 3 carbon atoms only **[4]**
145/32 . . . . of alkylene oxides containing 4 or more carbon atoms **[4]**
145/34 . . . . of two or more specified different types **[4]**
145/36 . . . . etherified **[4]**
145/38 . . . . esterified **[4]**
145/40 . Polysaccharides, e.g. cellulose **[4]**

147/00 Lubricating compositions characterised by the additive being a macromolecular compound containing halogen [4]

147/02 . Monomer containing carbon, hydrogen and halogen only **[4]**
147/04 . Monomer containing carbon, hydrogen, halogen and oxygen **[4]**

149/00 Lubricating compositions characterised by the additive being a macromolecular compound containing nitrogen [4]

149/02 . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
149/04 . . containing monomers having an unsaturated radical bound to an amino group **[4]**
149/06 . . containing monomers having an unsaturated radical bound to an amido or imido group **[4]**
149/08 . . containing monomers having an unsaturated radical bound to a nitrile group **[4]**
149/10 . . containing monomers having an unsaturated radical bound to a nitrogen-containing hetero ring **[4]**
149/12 . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
149/14 . . a condensation reaction being involved **[4]**
149/16 . . . between the nitrogen-containing monomer and an aldehyde or ketone **[4]**
149/18 . . . Polyamides **[4]**
149/20 . . . Polyureas **[4]**
149/22 . . . Polyamines **[4]**

151/00 Lubricating compositions characterised by the additive being a macromolecular compound containing sulfur, selenium or tellurium [4]

151/02 . Macromolecular compounds obtained by reactions involving only carbon-to-carbon unsaturated bonds **[4]**
151/04 . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

153/00 Lubricating compositions characterised by the additive being a macromolecular compound containing phosphorus [4]

153/02 . Macromolecular compounds obtained by reactions involving only carbon-to-carbon unsaturated bonds **[4]**
153/04 . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**

155/00 Lubricating compositions characterised by the additive being a macromolecular compound containing atoms of elements not provided for in groups C10M 143/00 to C10M 153/00 [4]

155/02 . Monomer containing silicon **[4]**
155/04 . Monomer containing boron **[4]**

157/00 Lubricating compositions characterised by the additive being a mixture of two or more macromolecular compounds covered by more than one of the main groups C10M 143/00 to C10M 155/00, each of these compounds being essential [4]

157/02 . at least one of them being a halogen-containing compound **[4]**
157/04 . at least one of them being a nitrogen-containing compound **[4]**
157/06 . at least one of them being a sulfur-, selenium- or tellurium-containing compound **[4]**
157/08 . at least one of them being a phosphorus-containing compound **[4]**
157/10 . at least one of them being a compound containing atoms of elements not provided for in groups C10M 157/02 to C10M 157/08 **[4]**

159/00 Lubricating compositions characterised by the additive being of unknown or incompletely defined constitution (carboxylic acids with less than 30 carbon atoms in the chain, of unknown or incompletely defined constitution C10M 129/56) **[4]**

159/02 . Natural products **[4]**

159/04 . . Petroleum fractions, e.g. tars, solvents **[4]**

159/06 . . Waxes, e.g. ozocerite, ceresine, petrolatum, slack-wax **[4]**

159/08 . . Fatty oils **[4]**

159/10 . . Rubber **[4]**

159/12 . Reaction products **[4]**

Note

When classifying in this group, any reactant of a reaction product which is considered to represent information of interest for search, may also be classified in the last appropriate place in this subclass. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

159/14 . . obtained by Friedel-Crafts condensation **[4]**

159/16 . . obtained by Mannich reactions **[4]**

159/18 . . Complexes with metals **[4]**

159/20 . . Reaction mixtures having an excess of neutralising base, e.g. so-called overbasic or highly basic products **[4]**

159/22 . . . containing phenol radicals **[4]**

159/24 . . . containing sulfonic radicals **[4]**

161/00 Lubricating compositions characterised by the additive being a mixture of a macromolecular compound and a non-macromolecular compound, each of these compounds being essential [4]

163/00 Lubricating compositions characterised by the additive being a mixture of a compound of unknown or incompletely defined constitution and a non-macromolecular compound, each of these compounds being essential [4]

165/00 Lubricating compositions characterised by the additive being a mixture of a macromolecular compound and a compound of unknown or incompletely defined constitution, each of these compounds being essential [4]

167/00 Lubricating compositions characterised by the additive being a mixture of a macromolecular compound, a non-macromolecular compound and a compound of unknown or incompletely defined constitution, each of these compounds being essential [4]

Mixtures of base-materials, thickeners and additives [4]

169/00 Lubricating compositions characterised by containing as components a mixture of at least two types of ingredient selected from base-materials, thickeners or additives, covered by the preceding groups, each of these compounds being essential [4]

169/02 . Mixtures of base-materials and thickeners **[4]**

169/04 . Mixtures of base-materials and additives **[4]**

169/06 . Mixtures of thickeners and additives **[4]**

Compositions characterised by physical properties [4]

171/00 Lubricating compositions characterised by purely physical criteria, e.g. containing as base-material, thickener or additive, ingredients which are characterised exclusively by their numerically specified physical properties, i.e. containing ingredients which are physically well defined but for which the chemical nature is either unspecified or only very vaguely indicated (chemically defined ingredients C10M 101/00 to C10M 169/00; petroleum fractions C10M 101/02, C10M 121/02, C10M 159/04) **[4]**

171/02 . Specified values of viscosity or viscosity index **[4]**

171/04 . Specified molecular weight or molecular weight distribution **[4]**

171/06 . Particles of special shape or size **[4]**

Aqueous lubricating compositions [4]

173/00 Lubricating compositions containing more than 10% water [4]

173/02 . not containing mineral or fatty oils **[4]**

Working-up [4]

175/00 Working-up used lubricants to recover useful products [4]

175/02 . mineral-oil based **[4]**

175/04 . aqueous emulsion based **[4]**

175/06 . by ultrafiltration or osmosis **[4]**

Preparation or after-treatment [4]

177/00 Special methods of preparation of lubricating compositions; **Chemical modification by after-treatment of components or of the whole of a lubricating composition, not covered by other classes [4]**

C10N INDEXING SCHEME ASSOCIATED WITH SUBCLASS C10M [4]

(1) This subclass constitutes an indexing scheme associated with subclass C10M, relating to:
- metals and the metal of a compound (C10N 10/00);
- the properties of the lubricant composition or constituents thereof (C10N 20/00, C10N 30/00);
- the use or application of the lubricant composition (C10N 40/00);
- the form in which the lubricant composition is applied (C10N 50/00);

– chemical modification by after-treatment of lubricant constituents (C10N 60/00);
– special methods of preparation (C10N 70/00);
– special pretreatment of the material to be lubricated (C10N 80/00).

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
– "lubricant" or "lubricating composition" includes cutting oils, hydraulic fluids, metal drawing compositions, flushing oils, slushing oils, or the like;
– "aliphatic" includes "cycloaliphatic". **[4]**

10/00 Metal present as such or in compounds [4]

(1) In this group, metals should be indexed according to their group of the Periodic Table. **[4]**

(2) Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**

10/02 . Group 1 **[4]**
10/04 . Group 2 **[4]**
10/06 . Group 3 **[4]**
10/08 . Group 4 **[4]**
10/10 . Group 5 **[4]**
10/12 . Group 6 **[4]**
10/14 . Group 7 **[4]**
10/16 . Group 8 **[4]**

20/00 Specified physical properties of component of lubricating compositions [4]

20/02 . Viscosity; Viscosity index **[4]**
20/04 . Molecular weight; Molecular weight distribution **[4]**
20/06 . Particles of special shape or size **[4]**

30/00 Specified physical or chemical property which is improved by the additive characterising the lubricating composition, e.g. multifunctional additives [4]

30/02 . Pour-point; Viscosity index **[4]**
30/04 . Detergent or dispersant property **[4]**
30/06 . Oiliness; Film-strength; Anti-wear; Resistance to extreme pressure **[4]**
30/08 . Resistance to extreme temperature **[4]**
30/10 . Inhibition of oxidation, e.g. anti-oxidants **[4]**
30/12 . Inhibition of corrosion, e.g. anti-rust agents, anti-corrosives **[4]**
30/14 . Metal deactivation **[4]**
30/16 . Antiseptic; Biocidal **[4]**
30/18 . Anti-foaming property **[4]**
30/20 . Colour, e.g. dyes **[4]**

40/00 Specified use or application for which the lubricating composition is intended [4]

40/02 . Bearings **[4]**
40/04 . Oil-bath; Gear-boxes; Automatic transmissions; Traction drives **[4]**
40/06 . Instruments or other precision apparatus, e.g. damping fluids **[4]**
40/08 . Hydraulic fluids, e.g. brake-fluids **[4]**
40/10 . Running-in oil **[4]**
40/12 . Gas-turbines **[4]**
40/13 . . Aircraft turbines **[5]**
40/14 . Electric or magnetic purposes **[4]**
40/16 . . dielectric; Insulating oil **[4]**
40/18 . . in connection with recordings on magnetic tape or disc **[4]**
40/20 . Metal working **[4]**
40/22 . . with essential removal of material **[4]**
40/24 . . without essential removal of material; Punching metal **[4]**
40/25 . Internal-combustion engines **[5]**
40/26 . . Two-stroke **[4,5]**
40/28 . . Rotary **[4,5]**
40/30 . Refrigerator lubricant **[5]**
40/32 . Wire, rope or cable lubricants **[5]**
40/34 . Lubricating-sealants **[5]**
40/36 . Release agents **[5]**

50/00 Form in which the lubricant is applied to the material being lubricated [4]

50/02 . dissolved or suspended in a carrier which subsequently evaporates to leave a lubricant coating **[4]**
50/04 . Aerosol **[4]**
50/06 . Gaseous phase, at least during working conditions **[4]**
50/08 . solid **[4]**
50/10 . semi-solid; greasy **[4]**

60/00 Chemical after-treatment of the constituents of the lubricating composition [4]

60/02 . Reduction, e.g. hydrogenation **[4]**
60/04 . Oxidation, e.g. ozonisation **[4]**
60/06 . by epoxides **[4]**
60/08 . Halogenation **[4]**
60/10 . by sulfur or a compound containing sulfur **[4]**
60/12 . by phosphorus or a compound containing phosphorus, e.g. P_xS_y **[4]**
60/14 . by boron or a compound containing boron **[4]**

70/00 Special methods of preparation [4]

80/00 Special pretreatment of the material to be lubricated, e.g. phosphatising or chromatising of a metal [4]

C11 ANIMAL OR VEGETABLE OILS, FATS, FATTY SUBSTANCES OR WAXES; FATTY ACIDS THEREFROM; DETERGENTS; CANDLES

C11B PRODUCING, E.G. BY PRESSING RAW MATERIALS OR BY EXTRACTION FROM WASTE MATERIALS, REFINING OR PRESERVING FATS, FATTY SUBSTANCES, E.G. LANOLIN, FATTY OILS OR WAXES; ESSENTIAL OILS; PERFUMES (drying-oils C09F)

Subclass index

1/00 **Production of fats or fatty oils from raw materials**
1/02 . Pretreatment
1/04 . . of vegetable raw material
1/06 . by pressing
1/08 . . by hot pressing
1/10 . by extracting
1/12 . by melting out
1/14 . . with hot water or aqueous solutions
1/16 . . with steam

3/00 **Refining fats or fatty oils**
3/02 . by chemical reaction
3/04 . . with acids
3/06 . . with bases
3/08 . . with oxidising agents
3/10 . by adsorption

Note

When classifying in this group, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

3/12 . by distillation
3/14 . . with the use of indifferent gases or vapours, e.g. steam
3/16 . by mechanical means

5/00 **Preserving by using additives, e.g. anti-oxidants**

7/00 **Separation of mixtures of fats or fatty oils into their constituents, e.g. saturated oils from unsaturated oils**

9/00 **Essential oils**; **Perfumes** (synthesis of chemical substances C07)
9/02 . Recovery or refining of essential oils from raw materials

11/00 **Recovery or refining of other fatty substances, e.g. lanolin, waxes** (synthetic waxes C07, C08; mineral waxes C10G)

13/00 **Recovery of fats, fatty oils, or fatty acids from waste materials** (mechanical separation from waste water C02F, E03F)
13/02 . from soap stock
13/04 . from spent adsorption materials

15/00 **Solidifying fatty oils, fats, or waxes by physical processes**

C11C FATTY ACIDS FROM FATS, OILS OR WAXES; CANDLES; FATS, OILS OR FATTY ACIDS BY CHEMICAL MODIFICATION OF FATS, OILS, OR FATTY ACIDS OBTAINED THEREFROM

1/00 **Preparation of fatty acids from fats, fatty oils, or waxes**; **Refining the fatty acids** (recovery of fatty acids from waste materials C11B 13/00)
1/02 . from fats or fatty oils
1/04 . . by hydrolysis
1/06 . . . using solid catalysts
1/08 . Refining
1/10 . . by distillation

3/00 **Fats, oils, or fatty acids by chemical modification of fats, oils, or fatty acids obtained therefrom** (sulfonated fats or oils C07C 309/62; factice C08H; drying-oils C09F)
3/02 . by esterification of fatty acids with glycerol
3/04 . by esterification of fats or fatty oils
3/06 . . with glycerol
3/08 . . with fatty acids
3/10 . . Ester interchange
3/12 . by hydrogenation
3/14 . by isomerisation

5/00 **Candles**
5/02 . Apparatus for preparation thereof

C11D **DETERGENT COMPOSITIONS** (preparations specially adapted for washing the hair A61K 8/00, A61Q 5/12; methods or apparatus for disinfection or sterilisation A61L; special washing compositions for cleaning semi-permeable membranes B01D 65/06); **USE OF SINGLE SUBSTANCES AS DETERGENTS**; **SOAP OR SOAP-MAKING**; **RESIN SOAPS**; **RECOVERY OF GLYCEROL**

(1) When classifying in the mixture groups of this subclass, any individual ingredient of a composition which is not identified by such classification, and which itself is determined to be novel and non-obvious, must also be classified in groups C11D 1/00 to C11D 9/00. The individual ingredient can be either a single substance or a composition in itself. **[8]**

(2) Any ingredient of a composition which is not identified by the classification according to Note (1) above, and which is considered to represent information of interest for search, may also be classified in groups C11D 1/00 to C11D 9/00. This can, for example, be the case when it is considered of interest to enable searching of compositions using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

Subclass index

Surface-active non-soap detergents

1/00 Detergent compositions based essentially on surface-active compounds; Use of these compounds as a detergent

Note

In groups C11D 1/02 to C11D 1/88, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.

1/02 . Anionic compounds
1/04 . . Carboxylic acids or salts thereof (soap C11D 9/00)
1/06 . . . Ether- or thioether carboxylic acids
1/08 . . . Polycarboxylic acids containing no nitrogen or sulfur
1/10 . . . Amino carboxylic acids; Imino carboxylic acids; Fatty acid condensates thereof
1/12 . . Sulfonic acids or sulfuric acid esters; Salts thereof (C11D 3/065 takes precedence)
1/14 . . . derived from aliphatic hydrocarbons or mono-alcohols
1/16 . . . derived from divalent or polyvalent alcohols
1/18 . . . derived from amino alcohols
1/20 . . . . Fatty acid condensates
1/22 . . . derived from aromatic compounds
1/24 . . . . containing ester or ether groups directly attached to the nucleus
1/26 . . . derived from heterocyclic compounds
1/28 . . . Sulfonation products derived from fatty acids or their derivatives, e.g. esters, amides
1/29 . . . Sulfates of polyoxyalkylene ethers **[2]**
1/30 . . . Sulfonation products derived from lignin
1/32 . . Protein hydrolysates; Fatty acid condensates thereof
1/34 . . Derivatives of acids of phosphorus
1/36 . . of unknown constitution
1/37 . . Mixtures of compounds all of which are anionic
1/38 . Cationic compounds
1/40 . . Monoamines or polyamines; Salts thereof
1/42 . . Amino alcohols or amino ethers
1/44 . . . Ethers of polyoxyalkylenes with amino alcohols; Condensation products of epoxyalkanes with amines
1/46 . . Esters of carboxylic acids with amino alcohols; Esters of amino carboxylic acids with alcohols
1/48 . . N-containing polycondensation products
1/50 . . Derivatives of urea, thiourea, cyanamide, guanidine or urethanes
1/52 . . Carboxylic amides, alkylolamides or imides (C11D 3/07 takes precedence)
1/54 . . Hydrazides of carboxylic acids
1/56 . . containing nitro or nitroso groups
1/58 . . Heterocyclic compounds
1/60 . . Sulfonium or phosphonium compounds
1/62 . . Quaternary ammonium compounds
1/64 . . of unknown constitution
1/645 . . Mixtures of compounds all of which are cationic
1/65 . . Mixtures of anionic with cationic compounds
1/655 . . . of sulfonated products with alkylolamides of carboxylic acids (C11D 3/066 takes precedence)
1/66 . Non-ionic compounds
1/68 . . Alcohols; Oxidation products of paraffin wax, other than acids
1/70 . . Phenols
1/72 . . Ethers of polyoxyalkylene glycols (C11D 3/075 takes precedence)
1/722 . . Ethers of polyoxyalkylenes having mixed oxyalkylene groups **[2]**
1/74 . . Carboxylates or sulfonates of polyoxyalkylene glycols
1/75 . . Amino oxides **[2]**
1/755 . . Sulfoxides **[2]**
1/76 . . Synthetic resins containing no nitrogen
1/78 . . Neutral esters of acids of phosphorus
1/79 . . Phosphine oxides **[2]**
1/80 . . Derivatives of lignin containing no sulfo- or sulfate groups
1/82 . . Compounds containing silicon
1/825 . . Mixtures of compounds all of which are non-anionic
1/83 . . Mixtures of non-ionic with anionic compounds

1/831 . . . of sulfonates with ethers of polyoxyalkylenes without phosphates
1/835 . . Mixtures of non-ionic with cationic compounds
1/86 . Mixtures of anionic, cationic, and non-ionic compounds
1/88 . Ampholytes; Electroneutral compounds **[2]**
1/90 . . Betaines **[2]**
1/92 . . Sulfobetaines **[2]**
1/94 . . Mixtures with anionic, cationic or non-ionic compounds **[2]**

3/00 Other compounding ingredients of detergent compositions covered in group C11D 1/00

Note

In groups C11D 3/02 to C11D 3/39, in the absence of an indication to the contrary, a compound is classified in the last appropriate place. **[2]**

3/02 . Inorganic compounds
3/04 . . Water-soluble compounds
3/06 . . . Phosphates, including polyphosphates
3/065 . . . . in admixture with sulfonated products
3/066 . . . . . and with alkylolamides of carboxylic acids
3/07 . . . . in a mixture with alkylolamides of carbocyclic acids
3/075 . . . . in admixture with ethers of polyoxyalkylenes
3/08 . . . Silicates
3/10 . . . Carbonates
3/12 . . Water-insoluble compounds
3/14 . . . Pigments; Fillers; Abrasives
3/16 . Organic compounds
3/18 . . Hydrocarbons
3/20 . . containing oxygen
3/22 . . . Carbohydrates or derivatives thereof
3/24 . . containing halogen
3/26 . . containing nitrogen
3/28 . . . Heterocyclic compounds containing nitrogen in the ring
3/30 . . . Amines; Substituted amines
3/32 . . . Amides; Substituted amides
3/33 . . . Amino carboxylic acids **[2]**
3/34 . . containing sulfur
3/36 . . containing phosphorus
3/37 . . Polymers **[2]**
3/38 . . Products with no well-defined composition
3/382 . . . Vegetable products, e.g. soya meal, wood flour, sawdust **[2]**
3/384 . . . Animal products **[2]**
3/386 . . . Preparations containing enzymes **[2]**
3/39 . Organic or inorganic per-compounds **[2]**
3/395 . Bleaching agents **[2]**
3/40 . Dyes **[2]**
3/42 . . Brightening agents **[2]**
3/43 . Solvents **[2]**
3/44 . . Mixed solvents
3/46 . Superfatting agents **[2]**
3/48 . Medicinal or disinfecting agents **[2]**
3/50 . Perfumes **[2]**
3/60 . Mixtures of compounding ingredients **[2]**

7/00 Compositions of detergents based essentially on non-surface-active compounds

Note

In groups C11D 7/02 to C11D 7/22, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.

7/02 . Inorganic compounds
7/04 . . Water-soluble compounds
7/06 . . . Hydroxides
7/08 . . . Acids
7/10 . . . Salts
7/12 . . . . Carbonates
7/14 . . . . Silicates
7/16 . . . . Phosphates including polyphosphates
7/18 . . Peroxides; Persalts
7/20 . . Water-insoluble oxides
7/22 . Organic compounds
7/24 . . Hydrocarbons
7/26 . . containing oxygen
7/28 . . containing halogen
7/30 . . . Halogenated hydrocarbons
7/32 . . containing nitrogen
7/34 . . containing sulfur
7/36 . . containing phosphorus
7/38 . . Per-compounds
7/40 . . Products in which the composition is not well defined
7/42 . . . Preparations containing enzymes
7/44 . . . Vegetable products (C11D 7/42 takes precedence)
7/46 . . . Animal products (C11D 7/42 takes precedence)
7/50 . Solvents **[2]**
7/52 . . combined with promoters **[2]**
7/54 . Bleaching agents **[2]**
7/56 . . combined with phosphates **[2]**
7/60 . Mixtures of non-surface-active compounds **[2]**

Soap Detergents

9/00 Compositions of detergents based essentially on soap (compositions containing resin soap C11D 15/04)
9/02 . on alkali or ammonium soaps
9/04 . containing compounding ingredients other than soaps

Note

In groups C11D 9/06 to C11D 9/42, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.

9/06 . . Inorganic compounds
9/08 . . . Water-soluble compounds
9/10 . . . . Salts
9/12 . . . . . Carbonates
9/14 . . . . . Phosphates; Polyphosphates
9/16 . . . . . Borates
9/18 . . . Water-insoluble compounds
9/20 . . . . Pigments; Fillers; Abrasives
9/22 . . Organic compounds
9/24 . . . Hydrocarbons
9/26 . . . containing oxygen
9/28 . . . containing halogen

9/30 . . . containing nitrogen
9/32 . . . containing sulfur
9/34 . . . containing phosphorus
9/36 . . . containing silicon
9/38 . . . Products in which the composition is not well defined
9/40 . . . Proteins
9/42 . . Per-compounds
9/44 . . Perfumes; Colouring materials; Brightening agents
9/48 . . Superfatting agents
9/50 . . Medicinal or disinfecting agents
9/60 . . Mixtures of compounding ingredients **[2]**

10/00 Compositions of detergents, not provided for by any single one of main groups C11D 1/00 to C11D 9/00 [2]
10/02 . based on mixtures of surface-active non-soap and non-surface-active compounds **[2]**
10/04 . based on mixtures of surface-active non-soap compounds and soap **[2]**
10/06 . based on mixtures of non-surface-active compounds and soap **[2]**

11/00 Special methods for preparing compositions containing mixtures of detergents
11/02 . Preparation in the form of powder by spray-drying
11/04 . by chemical means, e.g. sulfonating in the presence of other compounding ingredients followed by neutralising

Soap or soap-making; **Resin soaps**

13/00 Making of soap or soap solutions in general; **Apparatus therefor** (resin soap C11D 15/00)
13/02 . Boiling soap; Refining
13/04 . . Continuous methods therefor
13/06 . . Bleaching of soap or soap solutions
13/08 . Colouring or perfuming
13/10 . Mixing; Kneading
13/12 . Cooling (C11D 13/14 takes precedence)
13/14 . Shaping
13/16 . . in moulds
13/18 . . by extrusion or by pressing
13/20 . . in the form of small particles, e.g. powder, flakes (by slicing C11D 13/24)
13/22 . Cutting
13/24 . . Slicing soap on the cooling drum
13/26 . Drying (drying ovens F27)
13/28 . Embossing; Polishing
13/30 . Recovery of soap, e.g. from spent solutions

15/00 Manufacture of resin soap or soaps derived from naphthenic acids; **Compositions**
15/02 . Apparatus therefor
15/04 . Compositions containing resin soap or soap derived from naphthenic acids

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17/00 Detergent materials or soaps characterised by their shape or physical properties (shaping soap C11D 13/14)
17/02 . Floating bodies of detergents
17/04 . combined with or containing other objects
17/06 . Powder; Flakes; Free-flowing mixtures; Sheets
17/08 . Liquid soap; capsuled

19/00 Recovery of glycerol from a saponification liquor (refining glycerol C07C 31/22)

C12 BIOCHEMISTRY; BEER; SPIRITS; WINE; VINEGAR; MICROBIOLOGY; ENZYMOLOGY; MUTATION OR GENETIC ENGINEERING

(1) Between subclasses C12M to C12Q, and within each of these subclasses, in the absence of an indication to the contrary, classification is made in the last appropriate place. For example, a fermentation or enzyme-using process involving condition-responsive control is classified in subclass C12Q. **[3]**

(2) In this class, viruses, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae are considered as micro-organisms. **[3,5]**

(3) In this class, unless specifically provided for, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae are classified together with micro-organisms. Sub-cellular parts, unless specifically provided for, are classified with the whole cell. **[5]**

(4) The codes of subclass C12R are only for use as indexing codes associated with subclasses C12C to C12Q or C12S, so as to provide information concerning the micro-organisms used in the processes classified in these subclasses. **[3]**

C12C BREWING OF BEER (cleaning of raw materials A23N; pitching or depitching machines, cellar tools C12L; propagating yeasts C12N 1/14; non-beverage ethanolic fermentation C12P 7/06)

Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

Subclass index

1/00 Preparation of malt

1/02 . Pretreatment of grains, e.g. washing, steeping

1/027 . Germinating **[6]**

1/033 . . in boxes or drums **[6]**

1/047 . . Influencing the germination by chemical or physical means **[6]**

1/053 . . . by irradiation or electric treatment **[6]**

1/067 . Drying **[6]**

1/073 . . Processes or apparatus specially adapted to save or recover energy **[6]**

1/10 . . Drying on fixed supports

1/12 . . Drying on moving supports

1/125 . Continuous or semi-continuous processes for steeping, germinating or drying **[6]**

1/13 . . with vertical transport of the grains **[6]**

1/135 . . with horizontal transport of the grains **[6]**

1/15 . Grain or malt turning, charging or discharging apparatus **[6]**

1/16 . After-treatment of malt, e.g. malt cleaning, detachment of the germ

1/18 . Preparation of malt extract or of special kinds of malt, e.g. caramel, black malt (malt products for use as foodstuffs A23L)

3/00 Treatment of hops

3/02 . Drying

3/04 . Conserving; Storing; Packing

3/06 . . Powder or pellets from hops **[6]**

3/08 . . Solvent extracts from hops **[6]**

3/10 . . . using carbon dioxide **[6]**

3/12 . . Isomerised products from hops **[6]**

5/00 Other raw materials for the preparation of beer

5/02 . Additives for beer

5/04 . . Colouring additives

7/00 Preparation of wort (malt extract C12C 1/18)

7/01 . Pretreatment of malt, e.g. malt grinding **[6]**

7/04 . Preparation or treatment of the mash

7/047 . . part of the mash being unmalted cereal mash **[6]**

7/053 . . part of the mash being non-cereal material **[6]**

7/06 . . Mashing apparatus

7/14 . Clarifying wort (Läuterung)

7/16 . . by straining

7/165 . . . in mash filters **[6]**

7/17 . . . in lautertuns **[6]**

7/175 . . by centrifuging **[6]**

7/20 . . Boiling the beerwort (brew kettles C12C 13/02) **[6]**

7/22 . . . Processes or apparatus specially adapted to save or recover energy **[6]**

7/24 . Clarifying beerwort between hop boiling and cooling **[6]**

7/26 . Cooling beerwort; Clarifying beerwort during or after the cooling **[6]**

7/28 . After-treatment **[6]**

11/00 Fermentation processes for beer

11/02 . Pitching yeast

11/06 . Acidifying the wort

11/07 . Continuous fermentation **[6]**

11/09 . Fermentation with immobilised yeast **[6]**
11/11 . Post fermentation treatments, e.g. carbonation, concentration (C12H takes precedence; containers with means specially adapted for effervescing potable liquids B65D 85/73) **[6]**

12/00 Processes specially adapted for making special kinds of beer [6]
12/02 . Beer with low calorie content (C12C 12/04 takes precedence) **[6]**
12/04 . Beer with low alcohol content (removal of alcohol C12H 3/00) **[6]**

13/00 Brewing devices, not covered by a single group of C12C 1/00 to C12C 12/04 [3,6]
13/02 . Brew kettles **[3]**
13/06 . . heated with fire **[3]**
13/08 . . with internal heating elements **[6]**
13/10 . Home brew equipment **[6]**

C12F RECOVERY OF BY-PRODUCTS OF FERMENTED SOLUTIONS; DENATURING OF, OR DENATURED, ALCOHOL [6]

Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

3/00 Recovery of by-products
3/02 . of carbon dioxide
3/04 . . Recovery of volatile fermentation products from carbon dioxide
3/06 . from beer or wine (C12F 3/02 takes precedence; removal of yeast C12G 1/08)
3/08 . . Recovery of alcohol from press residues or other waste material (from carbon dioxide C12F 3/04)
3/10 . from distillery slops

5/00 Preparation of denatured alcohol

C12G WINE; OTHER ALCOHOLIC BEVERAGES; PREPARATION THEREOF (beer C12C)

Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

1/00 Preparation of wine or sparkling wine
1/02 . Preparation of must from grapes; Must treatment or fermentation
1/022 . . Fermentation; Microbiological or enzymatic treatment **[6]**
1/024 . . . in a horizontally mounted cylindrical vessel (C12G 1/026 takes precedence) **[6]**
1/026 . . . in vessels with movable equipment for mixing the content **[6]**
1/028 . . . with thermal treatment of the grapes or the must **[6]**
1/032 . . . with recirculation of the must for pompage extraction **[6]**
1/036 . . . by use of a home wine making vessel **[6]**
1/04 . . Sulfiting the must; Desulfiting
1/06 . Preparation of sparkling wine, e.g. champagne; Impregnating wine with carbon dioxide
1/067 . . Continuous processes **[6]**
1/073 . . Fermentation with immobilised yeast **[6]**
1/08 . Removal of yeast (“degorgeage”)
1/09 . . Agitation, centrifugation or vibration of bottles **[6]**
1/10 . Deacidifying of wine **[6]**
1/12 . Processes for preventing winestone precipitation **[6]**

3/00 Preparation of other alcoholic beverages
3/02 . by straight fermentation
3/04 . by mixing, e.g. liqueurs
3/06 . . with flavouring ingredients
3/07 . . . Flavouring with wood or wood extract; Pretreatment of the wood used therefor **[6]**
3/08 . by other methods for varying the composition of fermented solutions (removal of alcohol from alcoholic beverages to obtain alcohol-free or low-alcohol beverages C12H 3/00)
3/10 . . Increasing the alcohol content
3/12 . . . by distillation (distillation processes or apparatus, in general B01D 3/00)
3/14 . . . by freezing **[6]**

C12H **PASTEURISATION, STERILISATION, PRESERVATION, PURIFICATION, CLARIFICATION, AGEING OF ALCOHOLIC BEVERAGES OR REMOVAL OF ALCOHOL THEREFROM** (deacidifying wine C12G 1/10; preventing winestone precipitation C12G 1/12; simulation ageing by flavouring C12G 3/06) **[6]**

(1) When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**

(2) In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

1/00 **Pasteurisation, sterilisation, preservation, purification, clarification, or ageing of alcoholic beverages**

1/02 . combined with removal of precipitate or added materials, e.g. adsorption material

1/04 . . with the aid of ion-exchange material or inert clarification material, e.g. adsorption material

1/044 . . . with the aid of inorganic material **[6]**

1/048 . . . . with silicon containing material **[6]**

1/052 . . . with the aid of organic material **[6]**

1/056 . . . . with the aid of polymers **[6]**

1/06 . . Precipitation by physical means, e.g. by irradiation, vibrations

1/065 . . . Separation by centrifugation **[6]**

1/07 . . . Separation by filtration **[6]**

1/075 . . . . by cross-flow filtration **[6]**

1/08 . . . by heating

1/10 . . Precipitation by chemical means

1/12 . without precipitation

1/14 . . with non-precipitating compounds, e.g. sulfiting; Sequestration, e.g. with chelate-producing compounds

1/15 . . . with enzymes **[6]**

1/16 . . by physical means, e.g. irradiation

1/18 . . . by heating

1/20 . . . . in containers allowing for expansion of the contents

1/22 . Ageing or ripening by storing, e.g. lagering of beer

3/00 **Removal of alcohol from alcoholic beverages to obtain alcohol-free or low-alcohol beverages** (recovery of by-products of wine or beer other than low-alcohol beverages C12F 3/06; preparation of alcoholic beverages other than wine or beer by varying the composition of fermented solutions C12G 3/08) **[6]**

3/02 . by evaporating **[6]**

3/04 . using semi-permeable membranes **[6]**

C12J **VINEGAR**; **ITS PREPARATION**

Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

1/00 **Vinegar**; **Preparation**; **Purification**

1/02 . from wine

1/04 . from alcohol

1/06 . from milk

1/08 . Addition of flavouring ingredients

1/10 . Apparatus

C12L **PITCHING OR DEPITCHING MACHINES**; **CELLAR TOOLS** (cleaning of casks B08B 9/00)

Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

3/00 **Pitching or depitching machines**

9/00 **Venting devices for casks, barrels, or the like**

11/00 **Cellar tools**

C12M **APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY** (installations for fermenting manure A01C 3/02; preservation of living parts of humans or animals A01N 1/02; physical or chemical apparatus in general B01; brewing apparatus C12C; fermentation apparatus for wine C12G; apparatus for preparing vinegar C12J 1/10) **[3]**

(1) Attention is drawn to Notes (1) to (3) following the title of class C12. **[4]**
(2) In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

1/00 **Apparatus for enzymology or microbiology [3]**

Note

This group covers:
- apparatus where micro-organisms or enzymes are produced or isolated;
- apparatus where the characteristics of micro-organisms or enzymes are investigated, e.g. which growth factors are necessary;
- apparatus specially adapted to employ micro-organisms or enzymes as "reactants" or biocatalysts;
- apparatus of both the laboratory and industrial scale. **[3]**

1/02 . with agitation means; with heat exchange means **[3]**
1/04 . with gas introduction means **[3]**
1/06 . . with agitator, e.g. impeller **[3]**
1/08 . . with draft tube **[3]**
1/09 . . Flotation apparatus **[5]**
1/10 . rotatably mounted **[3]**
1/107 . with means for collecting fermentation gases, e.g. methane (producing methane by anaerobic treatment of sludge C02F 11/04) **[5]**
1/113 . . with transport of the substrate during the fermentation **[5]**
1/12 . with sterilisation, filtration, or dialysis means **[3]**
1/14 . with means providing thin layers or with multi-level trays **[3]**
1/16 . containing, or adapted to contain, solid media **[3]**
1/18 . . Multiple fields or compartments **[3]**
1/20 . . . Horizontal planar fields **[3]**
1/21 . Froth suppressors **[5]**
1/22 . Petri type dish **[3]**
1/24 . tube or bottle type **[3]**
1/26 . Inoculator or sampler **[3]**
1/28 . . being part of container **[3]**
1/30 . . . Sampler being a swab **[3]**
1/32 . . multiple field or continuous type **[3]**
1/33 . Disintegrators **[5]**
1/34 . Measuring or testing with condition measuring or sensing means, e.g. colony counters **[3]**
1/36 . including condition or time responsive control, e.g. automatically controlled fermentors (controlling or regulating in general G05) **[3]**
1/38 . . Temperature-responsive control **[3]**
1/40 . Apparatus specially designed for the use of free, immobilised, or carrier-bound enzymes, e.g. apparatus containing a fluidised bed of immobilised enzymes **[3]**
1/42 . Apparatus for the treatment of micro-organisms or enzymes with electrical or wave energy, e.g. magnetism, sonic wave **[5]**

3/00 **Tissue, human, animal or plant cell, or virus culture apparatus [3]**

3/02 . with means providing suspensions **[3]**
3/04 . with means providing thin layers **[3]**
3/06 . with filtration, ultrafiltration, inverse osmosis or dialysis means **[5]**
3/08 . Apparatus for tissue disaggregation **[5]**
3/10 . for culture in eggs **[5]**

C12N **MICRO-ORGANISMS OR ENZYMES**; **COMPOSITIONS THEREOF** (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-organisms or animal material A01N 63/00; medicinal preparations A61K; fertilisers C05F); **PROPAGATING, PRESERVING, OR MAINTAINING MICRO-ORGANISMS**; **MUTATION OR GENETIC ENGINEERING**; **CULTURE MEDIA** (microbiological testing media C12Q 1/00) **[3]**

(1) Attention is drawn to Notes (1) to (3) following the title of class C12. **[3,4]**
(2) Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P. **[8]**
(3) Therapeutic activity of single-cell proteins or enzymes is further classified in subclass A61P. **[7]**
(4) When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[8]**
(5) In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

Subclass index

1/00 **Micro-organisms, e.g. protozoa**; **Compositions thereof** (medicinal preparations containing material from protozoa, bacteria or viruses A61K 35/66, from algae A61K 36/02, from fungi A61K 36/06; preparing medicinal bacterial antigen or antibody compositions, e.g. bacterial vaccines, A61K 39/00); **Processes of propagating, maintaining or preserving micro-organisms or compositions thereof**; **Processes of preparing or isolating a composition containing a micro-organism**; **Culture media therefor [3]**

1/02 . Separating micro-organisms from their culture media **[3]**

1/04 . Preserving or maintaining viable micro-organisms (immobilised micro-organisms C12N 11/00) **[3]**

1/06 . Lysis of micro-organisms **[3]**

1/08 . Reducing the nucleic acid content **[3]**

1/10 . Protozoa; Culture media therefor **[3]**

1/11 . . modified by introduction of foreign genetic material **[5]**

1/12 . Unicellular algae; Culture media therefor (as new plants A01H 13/00) **[3]**

1/13 . . modified by introduction of foreign genetic material **[5]**

1/14 . Fungi (culture of mushrooms A01G 1/04; as new plants A01H 15/00); Culture media therefor **[3]**

1/15 . . modified by introduction of foreign genetic material **[5]**

1/16 . . Yeasts; Culture media therefor **[3]**

1/18 . . . Baker's yeast; Brewer's yeast **[3]**

1/19 . . . modified by introduction of foreign genetic material **[5]**

1/20 . Bacteria; Culture media therefor **[3]**

1/21 . . modified by introduction of foreign genetic material **[5]**

1/22 . Processes using, or culture media containing, cellulose or hydrolysates thereof **[3]**

1/24 . Processes using, or culture media containing, waste sulfite liquor **[3]**

1/26 . Processes using, or culture media containing, hydrocarbons (refining of hydrocarbon oils by using micro-organisms C10G 32/00) **[3]**

1/28 . . aliphatic **[3]**

1/30 . . . having five or less carbon atoms **[3]**

1/32 . Processes using, or culture media containing, lower alkanols, i.e. C_1 to C_6 **[3]**

1/34 . Processes using foam culture **[3]**

1/36 . Adaptation or attenuation of cells **[3]**

1/38 . Chemical stimulation of growth or activity by addition of chemical compounds which are not essential growth factors; Stimulation of growth by removal of a chemical compound (C12N 1/34 takes precedence) **[3]**

3/00 **Spore-forming or isolating processes [3]**

5/00 **Undifferentiated human, animal or plant cells, e.g. cell lines**; **Tissues**; **Cultivation or maintenance thereof**; **Culture media therefor** (plant reproduction by tissue culture techniques A01H 4/00) **[3,5]**

5/02 . Propagation of single cells or cells in suspension; Maintenance thereof; Culture media therefor **[3]**

5/04 . Plant cells or tissues **[5]**

5/07 . Animal cells or tissues **[2010.01]**

Note

The last place priority rule does not apply between the subgroups of this group. **[2010.01]**

5/071 . . Vertebrate cells or tissues, e.g. human cells or tissues **[2010.01]**

5/073 . . . Embryonic cells or tissues; Foetal cells or tissues **[2010.01]**

5/0735 . . . . Embryonic stem cells; Embryonic germ cells **[2010.01]**

5/074 . . . Adult stem cells **[2010.01]**

5/075 . . . Oocytes; Oogonia **[2010.01]**

5/076 . . . Sperm cells; Spermatogonia **[2010.01]**

5/077 . . . Mesenchymal cells, e.g. bone cells, cartilage cells, marrow stromal cells, fat cells or muscle cells **[2010.01]**

5/0775 . . . . Mesenchymal stem cells; Adipose-tissue derived stem cells **[2010.01]**

5/078 . . . Cells from blood or from the immune system **[2010.01]**

5/0781 . . . . B cells; Progenitors thereof **[2010.01]**

5/0783 . . . . T cells; NK cells; Progenitors of T or NK cells **[2010.01]**

5/0784 . . . . Dendritic cells; Progenitors thereof **[2010.01]**

5/0786 . . . . Monocytes; Macrophages **[2010.01]**

5/0787 . . . . Granulocytes, e.g. basophils, eosinophils, neutrophils or mast cells **[2010.01]**

5/0789 . . . . Stem cells; Multipotent progenitor cells **[2010.01]**

5/079 . . . Neural cells **[2010.01]**

5/0793 . . . . Neurons **[2010.01]**

5/0797 . . . . Stem cells; Progenitor cells **[2010.01]**

5/09 . Tumour cells **[2010.01]**

5/095 . . Stem cells; Progenitor cells **[2010.01]**

5/10 . Cells modified by introduction of foreign genetic material, e.g. virus-transformed cells **[5]**

5/12 . . Fused cells, e.g. hybridomas **[5]**

5/14 . . . Plant cells **[5]**

5/16 . . . Animal cells **[5]**

5/18 . . . . Murine cells, e.g. mouse cells **[5]**

5/20 . . . . . one of the fusion partners being a B lymphocyte **[5]**

5/22 . . . Human cells **[5]**

5/24 . . . . one of the fusion partners being a B lymphocyte **[5]**

5/26 . . . Cells resulting from interspecies fusion **[5]**

5/28 . . . . one of the fusion partners being a human cell **[5]**

7/00 **Viruses, e.g. bacteriophages**; **Compositions thereof**; **Preparation or purification thereof** (medicinal preparations containing viruses A61K 35/76; preparing medicinal viral antigen or antibody compositions, e.g. virus vaccines, A61K 39/00) **[3]**

7/01 . Viruses, e.g. bacteriophages, modified by introduction of foreign genetic material (vectors C12N 15/00) **[5]**

7/02 . Recovery or purification **[3]**

7/04 . Inactivation or attenuation; Producing viral sub-units **[3]**

7/06 . . by chemical treatment **[3]**

7/08 . . by serial passage of virus **[3]**

9/00 **Enzymes, e.g. ligases (6.)**; **Proenzymes**; **Compositions thereof** (preparations containing enzymes for cleaning teeth A61K 8/66, A61Q 11/00; medicinal preparations containing enzymes or proenzymes A61K 38/43; enzyme containing detergent compositions C11D); **Processes for preparing, activating, inhibiting, separating, or purifying enzymes [3]**

Note

In this group:
- proenzymes are classified with the corresponding enzymes; **[5]**
- enzymes are generally categorised according to the "Nomenclature and Classification of Enzymes" of the International Commission on Enzymes. Where appropriate, this designation appears in the subgroups below in parenthesis. **[3]**

9/02 . Oxidoreductases (1.), e.g. luciferase **[3]**
9/04 . . acting on CHOH groups as donors, e.g. glucose oxidase, lactate dehydrogenase (1.1) **[3]**
9/06 . . acting on nitrogen containing compounds as donors (1.4, 1.5, 1.7) **[3]**
9/08 . . acting on hydrogen peroxide as acceptor (1.11) **[3]**
9/10 . Transferases (2.) (ribonucleases C12N 9/22) **[3]**
9/12 . . transferring phosphorus containing groups, e.g. kinases (2.7) **[3]**
9/14 . Hydrolases (3.) **[3]**
9/16 . . acting on ester bonds (3.1) **[3]**
9/18 . . . Carboxylic ester hydrolases **[3]**
9/20 . . . . Triglyceride splitting, e.g. by means of lipase **[3]**
9/22 . . . Ribonucleases **[3]**
9/24 . . acting on glycosyl compounds (3.2) **[3]**
9/26 . . . acting on alpha-1, 4-glucosidic bonds, e.g. hyaluronidase, invertase, amylase **[3]**
9/28 . . . . Alpha-amylase from microbial source, e.g. bacterial amylase **[3]**
9/30 . . . . . Fungal source **[3]**
9/32 . . . . Alpha-amylase from plant source **[3]**
9/34 . . . . Glucoamylase **[3]**
9/36 . . . acting on beta-1, 4 bonds between N-acetylmuramic acid and 2-acetylamino 2-deoxy-D-glucose, e.g. lysozyme **[3]**
9/38 . . . acting on beta-galactose-glycoside bonds, e.g. beta-galactosidase **[3]**
9/40 . . . acting on alpha-galactose-glycoside bonds, e.g. alpha-galactosidase **[3]**
9/42 . . . acting on beta-1, 4-glucosidic bonds, e.g. cellulase **[3]**
9/44 . . . acting on alpha-1, 6-glucosidic bonds, e.g. isoamylase, pullulanase **[3]**
9/46 . . . . Dextranase **[3]**
9/48 . . acting on peptide bonds, e.g. thromboplastin, leucine aminopeptidase (3.4) **[3]**
9/50 . . . Proteinases **[3]**
9/52 . . . . derived from bacteria **[3]**
9/54 . . . . . bacteria being Bacillus **[3]**
9/56 . . . . . Bacillus subtilis or Bacillus licheniformis **[3]**
9/58 . . . . derived from fungi **[3]**
9/60 . . . . . from yeast **[3]**
9/62 . . . . . from Aspergillus **[3]**
9/64 . . . . derived from animal tissue, e.g. rennin **[3]**
9/66 . . . Elastase **[3]**
9/68 . . . Plasmin, i.e. fibrinolysin **[3]**
9/70 . . . Streptokinase **[3]**
9/72 . . . Urokinase **[3]**
9/74 . . . Thrombin **[3]**
9/76 . . . Trypsin; Chymotrypsin **[3]**
9/78 . . acting on carbon to nitrogen bonds other than peptide bonds (3.5) **[3]**
9/80 . . . acting on amide bonds in linear amides **[3]**
9/82 . . . . Asparaginase **[3]**
9/84 . . . . Penicillin amidase **[3]**
9/86 . . . acting on amide bonds in cyclic amides, e.g. penicillinase **[3]**
9/88 . Lyases (4.) **[3]**
9/90 . Isomerases (5.) **[3]**
9/92 . . Glucose isomerase **[3]**
9/94 . Pancreatin **[3]**
9/96 . Stabilising an enzyme by forming an adduct or a composition; Forming enzyme conjugates **[3]**
9/98 . Preparation of granular or free-flowing enzyme compositions (C12N 9/96 takes precedence) **[3]**
9/99 . Enzyme inactivation by chemical treatment **[3]**

11/00 **Carrier-bound or immobilised enzymes**; **Carrier-bound or immobilised microbial cells**; **Preparation thereof [3]**

11/02 . Enzymes or microbial cells being immobilised on or in an organic carrier **[3]**
11/04 . . entrapped within the carrier, e.g. gel, hollow fibre **[3]**
11/06 . . attached to the carrier via a bridging agent **[3]**
11/08 . . the carrier being a synthetic polymer **[3]**
11/10 . . the carrier being a carbohydrate **[3]**
11/12 . . . Cellulose or derivatives thereof **[3]**
11/14 . Enzymes or microbial cells being immobilised on or in an inorganic carrier **[3]**
11/16 . Enzymes or microbial cells being immobilised on or in a biological cell **[3]**
11/18 . Multi-enzyme systems **[3]**

13/00 **Treatment of micro-organisms or enzymes with electrical or wave energy, e.g. magnetism, sonic waves [3]**

15/00 **Mutation or genetic engineering**; **DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification**; **Use of hosts therefor** (mutants or genetically engineered micro-organisms C12N 1/00, C12N 5/00, C12N 7/00; new plants A01H; plant reproduction by tissue culture techniques A01H 4/00; new animals A01K 67/00; use of medicinal preparations containing genetic material which is inserted into cells of the living body to treat genetic diseases, gene therapy A61K 48/00; peptides in general C07K) **[3,5,6]**

Note

This group covers processes wherein there is a modification of the genetic material which would not normally occur in nature without intervention of man which produce a change in the gene structure which is passed on to succeeding generations. **[3]**

15/01 . Preparation of mutants without inserting foreign genetic material therein; Screening processes therefor **[5]**
15/02 . Preparation of hybrid cells by fusion of two or more cells, e.g. protoplast fusion **[5]**

15/03 . . Bacteria **[5]**
15/04 . . Fungi **[5]**
15/05 . . Plant cells **[5]**
15/06 . . Animal cells **[5]**
15/07 . . Human cells **[5]**
15/08 . . Cells resulting from interspecies fusion **[5]**
15/09 . Recombinant DNA-technology **[5]**
15/10 . . Processes for the isolation, preparation or purification of DNA or RNA (chemical preparation of DNA or RNA C07H 21/00; preparation of non-structural polynucleotides from micro-organisms or with enzymes C12P 19/34) **[5]**
15/11 . . DNA or RNA fragments; Modified forms thereof (DNA or RNA not used in recombinant technology C07H 21/00) **[5]**
15/113 . . . Non-coding nucleic acids modulating the expression of genes, e.g. antisense oligonucleotides **[2010.01]**
15/115 . . . Aptamers, i.e. nucleic acids binding a target molecule specifically and with high affinity without hybridising therewith **[2010.01]**
15/117 . . . Nucleic acids having immunomodulatory properties, e.g. containing CpG-motifs **[2010.01]**
15/12 . . . Genes encoding animal proteins **[5]**
15/13 . . . . Immunoglobulins **[5]**
15/14 . . . . Human serum albumins **[5]**
15/15 . . . . Protease inhibitors, e.g. antithrombin, antitrypsin, hirudin **[5]**
15/16 . . . . Hormones **[5]**
15/17 . . . . . Insulins **[5]**
15/18 . . . . . Growth hormones **[5]**
15/19 . . . . Interferons; Lymphokines; Cytokines **[5]**
15/20 . . . . . Interferons **[5]**
15/21 . . . . . Alpha-interferons **[5]**
15/22 . . . . . Beta-interferons **[5]**
15/23 . . . . . Gamma-interferons **[5]**
15/24 . . . . . Interleukins **[5]**
15/25 . . . . . Interleukin-1 **[5]**
15/26 . . . . . Interleukin-2 **[5]**
15/27 . . . . . Colony stimulating factors **[5]**
15/28 . . . . . Tumor necrosis factors **[5]**
15/29 . . . Genes encoding plant proteins, e.g. thaumatin **[5]**
15/30 . . . Genes encoding protozoal proteins, e.g. from Plasmodium, Trypanosoma, Eimeria **[5]**
15/31 . . . Genes encoding microbial proteins, e.g. enterotoxins **[5]**
15/32 . . . . Bacillus crystal proteins **[5]**
15/33 . . . . Genes encoding viral proteins **[5]**
15/34 . . . . . Proteins from DNA viruses **[5]**
15/35 . . . . . Parvoviridae, e.g. feline panleukopenia virus, human parvovirus **[5]**
15/36 . . . . . Hepadnaviridae **[5]**
15/37 . . . . . Papovaviridae, e.g. papillomaviruses, polyomavirus, SV40 **[5]**
15/38 . . . . . Herpetoviridae, e.g. herpes simplex virus, varicella-zoster virus, Epstein-Barr virus, cytomegalovirus, pseudorabies virus **[5]**
15/39 . . . . . Poxviridae, e.g. vaccinia virus, variola virus **[5]**
15/40 . . . . . Proteins from RNA viruses, e.g. flaviviruses **[5]**
15/41 . . . . . Picornaviridae, e.g. rhinovirus, coxsackie viruses, echoviruses, enteroviruses **[5]**
15/42 . . . . . Foot-and-mouth disease virus **[5]**
15/43 . . . . . Poliovirus **[5]**
15/44 . . . . . Orthomyxoviridae, e.g. influenza virus **[5]**
15/45 . . . . . Paramyxoviridae, e.g. measles virus, mumps virus, Newcastle disease virus, canine distemper virus, rinderpest virus, respiratory syncytial viruses **[5]**
15/46 . . . . . Reoviridae, e.g. rotavirus, bluetongue virus, Colorado tick fever virus **[5]**
15/47 . . . . . Rhabdoviridae, e.g. rabies viruses, vesicular stomatitis virus **[5]**
15/48 . . . . . Retroviridae, e.g. bovine leukaemia virus, feline leukaemia virus **[5]**
15/49 . . . . . Lentiviridae, e.g. immunodeficiency viruses such as HIV, visna-maedi virus, equine infectious anaemia virus **[5]**
15/50 . . . . . Coronaviridae, e.g. infectious bronchitis virus, transmissible gastroenteritis virus **[5]**
15/51 . . . . . Hepatitis viruses **[5]**
15/52 . . . Genes encoding for enzymes or proenzymes **[5]**

Note

In this group:
– genes encoding for proenzymes are classified with the corresponding genes encoding enzymes;
– enzymes are generally categorised according to the "Nomenclature and Classification of Enzymes" of the International Commission on Enzymes. Where appropriate, this designation appears in the groups below in parenthesis. **[5]**

15/53 . . . . Oxidoreductases (1) **[5]**
15/54 . . . . Transferases (2) **[5]**
15/55 . . . . Hydrolases (3) **[5]**
15/56 . . . . . acting on glycosyl compounds (3.2), e.g. amylase, galactosidase, lysozyme **[5]**
15/57 . . . . . acting on peptide bonds (3.4) **[5]**
15/58 . . . . . Plasminogen activators, e.g. urokinase, TPA **[5]**
15/59 . . . . . Chymosin **[5]**
15/60 . . . . Lyases (4) **[5]**
15/61 . . . . Isomerases (5) **[5]**
15/62 . . . DNA sequences coding for fusion proteins **[5]**

Note

In this group, the following term is used with the meaning indicated:
– "fusion" means the fusion of two different proteins. **[5]**

15/63 . . Introduction of foreign genetic material using vectors; Vectors; Use of hosts therefor; Regulation of expression **[5]**
15/64 . . . General methods for preparing the vector, for introducing it into the cell or for selecting the vector-containing host **[5]**
15/65 . . . using markers (enzymes used as markers C12N 15/52) **[5]**

15/66 . . . General methods for inserting a gene into a vector to form a recombinant vector using cleavage and ligation; Use of non-functional linkers or adaptors, e.g. linkers containing the sequence for a restriction endonuclease **[5]**

Note

In this group, the following expression is used with the meaning indicated:
– "non-functional linkers" means DNA sequences which are used to link DNA sequences and which have no known function of structural gene or regulating function. **[5]**

15/67 . . . General methods for enhancing the expression **[5]**
15/68 . . . . Stabilisation of the vector **[5]**
15/69 . . . . Increasing the copy number of the vector **[5]**
15/70 . . . Vectors or expression systems specially adapted for E. coli **[5]**

(1) This group covers the use of E. coli as host. **[5]**
(2) Shuttle vectors also replicating in E. coli are classified according to the other host. **[5]**

15/71 . . . . Expression systems using regulatory sequences derived from the trp-operon **[5]**
15/72 . . . . Expression systems using regulatory sequences derived from the lac-operon **[5]**
15/73 . . . . Expression systems using phage lambda regulatory sequences **[5]**
15/74 . . . Vectors or expression systems specially adapted for prokaryotic hosts other than E. coli, e.g. Lactobacillus, Micromonospora **[5]**

Note

This group covers the use of prokaryotes as hosts. **[5]**

15/75 . . . . for Bacillus **[5]**
15/76 . . . . for Actinomyces; for Streptomyces **[5]**
15/77 . . . . for Corynebacterium; for Brevibacterium **[5]**
15/78 . . . . for Pseudomonas **[5]**
15/79 . . . Vectors or expression systems specially adapted for eukaryotic hosts **[5]**

Note

This group covers the use of eukaryotes as hosts. **[5]**

15/80 . . . . for fungi **[5]**
15/81 . . . . . for yeasts **[5]**
15/82 . . . . for plant cells **[5]**
15/83 . . . . . Viral vectors, e.g. cauliflower mosaic virus **[5]**
15/84 . . . . . Ti-plasmids **[5]**
15/85 . . . . for animal cells **[5]**
15/86 . . . . . Viral vectors **[5]**
15/861 . . . . . Adenoviral vectors **[7]**
15/863 . . . . . Poxviral vectors, e.g. vaccinia virus **[7]**
15/864 . . . . . Parvoviral vectors **[7]**
15/866 . . . . . Baculoviral vectors **[7]**
15/867 . . . . . Retroviral vectors **[7]**
15/869 . . . . . Herpesviral vectors **[7]**
15/87 . . Introduction of foreign genetic material using processes not otherwise provided for, e.g. co-transformation **[5]**
15/873 . . . Techniques for producing new embryos, e.g. nuclear transfer, manipulation of totipotent cells or production of chimeric embryos **[2010.01]**
15/877 . . . . Techniques for producing new mammalian cloned embryos **[2010.01]**
15/88 . . . using micro-encapsulation, e.g. using liposome vesicle **[5]**
15/89 . . . using micro-injection **[5]**
15/90 . . . Stable introduction of foreign DNA into chromosome **[5]**

C12P FERMENTATION OR ENZYME-USING PROCESSES TO SYNTHESISE A DESIRED CHEMICAL COMPOUND OR COMPOSITION OR TO SEPARATE OPTICAL ISOMERS FROM A RACEMIC MIXTURE (fermentation processes to form a food composition A21, A23; compounds in general, see the relevant compound class, e.g. C01, C07; brewing of beer C12C; producing vinegar C12J; processes for producing enzymes C12N 9/00; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification C12N 15/00) **[3]**

(1) This subclass covers both major and minor chemical modifications. **[3]**
(2) Group C12P 1/00 covers processes for producing organic compounds not sufficiently identified to be classified in groups C12P 3/00 to C12P 37/00. Compounds identified only by their empirical formulae are not considered to be sufficiently identified. **[3]**
(3) Attention is drawn to Notes (1) to (3) following the title of class C12. **[4]**
(4) If a particular reaction is considered of interest, it is also classified in the relevant chemical compound class, e.g. C07, C08. **[3]**
(5) In this subclass:
– metal or ammonium salts of a compound are classified as that compound.
– compositions are classified in the relevant compound groups. **[3]**
(6) In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

Subclass index

1/00 Preparation of compounds or compositions, not provided for in groups C12P 3/00 to C12P 39/00, by using micro-organisms or enzymes; General processes for the preparation of compounds or compositions by using micro-organisms or enzymes [3]

1/02 . by using fungi **[3]**

1/04 . by using bacteria **[3]**

1/06 . by using actinomycetales **[3]**

3/00 Preparation of elements or inorganic compounds except carbon dioxide [3]

5/00 Preparation of hydrocarbons [3]

5/02 . acyclic (producing methane by anaerobic treatment of sludge C02F 11/04) **[3]**

7/00 Preparation of oxygen-containing organic compounds [3]

7/02 . containing a hydroxy group **[3]**

7/04 . . acyclic **[3]**

7/06 . . . Ethanol, i.e. non-beverage **[3]**

7/08 . . . . produced as by-product or from waste or cellulosic material substrate **[3]**

7/10 . . . . . substrate containing cellulosic material **[3]**

7/12 . . . . . substrate containing sulfite waste liquor or citrus waste **[3]**

7/14 . . . . Multiple stages of fermentation; Multiple types of micro-organisms or reuse for micro-organisms **[3]**

7/16 . . . Butanols **[3]**

7/18 . . . polyhydric **[3]**

7/20 . . . . Glycerol **[3]**

7/22 . . aromatic **[3]**

7/24 . containing a carbonyl group **[3]**

7/26 . . Ketones **[3]**

7/28 . . . Acetone-containing products **[3]**

7/30 . . . . produced from substrate containing inorganic compounds other than water **[3]**

7/32 . . . . produced from substrate containing inorganic nitrogen source **[3]**

7/34 . . . . produced from substrate containing protein as nitrogen source **[3]**

7/36 . . . . produced from substrate containing grain or cereal material **[3]**

7/38 . . . Cyclopentanone- or cyclopentadione-containing products **[3]**

7/40 . containing a carboxyl group **[3]**

7/42 . . Hydroxy carboxylic acids **[3]**

7/44 . . Polycarboxylic acids **[3]**

7/46 . . . Dicarboxylic acids having four or less carbon atoms, e.g. fumaric acid, maleic acid **[3]**

7/48 . . . Tricarboxylic acids, e.g. citric acid **[3]**

7/50 . . . having keto groups, e.g. 2-ketoglutaric acid **[3]**

7/52 . . Propionic acid; Butyric acids **[3]**

7/54 . . Acetic acid (vinegar C12J) **[3]**

7/56 . . Lactic acid **[3]**

7/58 . . Aldonic, ketoaldonic or saccharic acids (uronic acids C12P 19/00) **[3]**

7/60 . . . 2-Ketogulonic acid **[3]**

7/62 . Carboxylic acid esters **[3]**

7/64 . Fats; Fatty oils; Ester-type waxes; Higher fatty acids, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group; Oxidised oils or fats **[3]**

7/66 . containing the quinoid structure **[3]**

9/00 Preparation of organic compounds containing a metal or atom other than H, N, C, O, S, or halogen [3]

11/00 Preparation of sulfur-containing organic compounds [3]

13/00 Preparation of nitrogen-containing organic compounds [3]

13/02 . Amides, e.g. chloramphenicol **[3]**

13/04 . Alpha- or beta-amino acids **[3]**

13/06 . . Alanine; Leucine; Isoleucine; Serine; Homoserine **[3]**

13/08 . . Lysine; Diaminopimelic acid; Threonine; Valine **[3]**

13/10 . . Citrulline; Arginine; Ornithine **[3]**

13/12 . . Methionine; Cysteine; Cystine **[3]**

13/14 . . Glutamic acid; Glutamine **[3]**

13/16 . . . using surfactants, fatty acids or fatty acid esters, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group or a carboxyl ester group **[3]**

13/18 . . . using biotin or its derivatives **[3]**

13/20 . . Aspartic acid; Asparagine **[3]**

13/22 . . Tryptophan; Tyrosine; Phenylalanine; 3,4-Dihydroxyphenylalanine **[3]**

13/24 . . Proline; Hydroxyproline; Histidine **[3]**

15/00 Preparation of compounds containing at least three condensed carbocyclic rings [3]

17/00 Preparation of heterocyclic carbon compounds with only O, N, S, Se, or Te as ring hetero atoms (C12P 13/04 to C12P 13/24 take precedence) **[3]**

17/02 . Oxygen as only ring hetero atoms **[3]**

17/04 . . containing a five-membered hetero ring, e.g. griseofulvin **[3]**

17/06 . . containing a six-membered hetero ring, e.g. fluorescein **[3]**

17/08 . . containing a hetero ring of at least seven ring members, e.g. zearalenone, macrolide aglycons **[3]**

17/10 . Nitrogen as only ring hetero atom **[3]**

17/12 . . containing a six-membered hetero ring **[3]**

17/14 . Nitrogen or oxygen as hetero atom and at least one other diverse hetero ring atom in the same ring **[3]**

17/16 . containing two or more hetero rings **[3]**

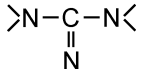
17/18 . containing at least two hetero rings condensed among themselves or condensed with a common carbocyclic ring system, e.g. rifamycin **[3]**

19/00 **Preparation of compounds containing saccharide radicals** (ketoaldonic acids C12P 7/58) **[3]**

Note

Attention is drawn to Note (3) following the title of subclass C07H, which defines the expression "saccharide radical". **[3]**

19/02 . Monosaccharides (2-ketogulonic acid C12P 7/60) **[3]**
19/04 . Polysaccharides, i.e. compounds containing more than five saccharide radicals attached to each other by glycosidic bonds **[3]**
19/06 . . Xanthan, i.e. Xanthomonas-type heteropolysaccharides **[3]**
19/08 . . Dextran **[3]**
19/10 . . Pullulan **[3]**
19/12 . Disaccharides **[3]**
19/14 . produced by the action of a carbohydrase, e.g. by alpha-amylase **[3]**
19/16 . produced by the action of an alpha-1, 6-glucosidase, e.g. amylose, debranched amylopectin (non-biological hydrolysis of starch C08B 30/00) **[3]**
19/18 . produced by the action of a glycosyl transferase, e.g. alpha-, beta- or gamma-cyclodextrins **[3]**
19/20 . produced by the action of an exo-1, 4 alpha-glucosidase, e.g. dextrose **[3]**
19/22 . produced by the action of a beta-amylase, e.g. maltose **[3]**
19/24 . produced by the action of an isomerase, e.g. fructose **[3]**
19/26 . Preparation of nitrogen-containing carbohydrates **[3]**
19/28 . . N-glycosides **[3]**
19/30 . . . Nucleotides **[3]**
19/32 . . . . having a condensed ring system containing a six-membered ring having two nitrogen atoms in the same-ring, e.g. purine nucleotides, nicotineamide-adenine dinucleotide **[3]**
19/34 . . . . Polynucleotides, e.g. nucleic acids, oligoribonucleotides **[3]**
19/36 . . . . Dinucleotides, e.g. nicotineamide-adenine dinucleotide phosphate **[3]**
19/38 . . . Nucleosides **[3]**
19/40 . . . . having a condensed ring system containing a six-membered ring having two nitrogen atoms in the same ring, e.g. purine nucleosides **[3]**
19/42 . . . Cobalamins, i.e. vitamin B_{12}, LLD factor **[3]**
19/44 . Preparation of O-glycosides, e.g. glucosides **[3]**
19/46 . . having an oxygen atom of the saccharide radical bound to a cyclohexyl radical, e.g. kasugamycin **[3]**
19/48 . . . the cyclohexyl radical being substituted by two or more nitrogen atoms, e.g. destomycin, neamin **[3]**
19/50 . . . . having two saccharide radicals bound through only oxygen to adjacent ring carbon atoms of the cyclohexyl radical, e.g. ambutyrosin, ribostamycin **[3]**
19/52 . . . . . containing three or more saccharide radicals, e.g. neomycin, lividomycin **[3]**
19/54 . . . the cyclohexyl radical being bound directly to a nitrogen atom of two or more



radicals, e.g. streptomycin **[3]**

19/56 . . having an oxygen atom of the saccharide radical directly bound to a condensed ring system having three or more carbocyclic rings, e.g. daunomycin, adriamycin **[3]**
19/58 . . having an oxygen atom of the saccharide radical directly bound through only acyclic carbon atoms to a non-saccharide heterocyclic ring, e.g. bleomycin, phleomycin **[3]**
19/60 . . having an oxygen of the saccharide radical directly bound to a non-saccharide heterocyclic ring or a condensed ring system containing a non-saccharide heterocyclic ring, e.g. coumermycin, novobiocin **[3]**
19/62 . . . the hetero ring having eight or more ring members and only oxygen as ring hetero atoms, e.g. erythromycin, spiramycin, nystatin **[3]**
19/64 . Preparation of S-glycosides, e.g. lincomycin **[3]**

21/00 **Preparation of peptides or proteins** (single-cell protein C12N 1/00) **[3]**
21/02 . having a known sequence of two or more amino acids, e.g. glutathione **[3]**
21/04 . . Cyclic or bridged peptides or polypeptides, e.g. bacitracin (cyclised by −S−S− bonds only C12P 21/02) **[3]**
21/06 . produced by the hydrolysis of a peptide bond, e.g. hydrolysate products (preparing foodstuffs by protein hydrolysis A23J 3/00) **[3]**
21/08 . Monoclonal antibodies **[5]**

23/00 **Preparation of compounds containing a cyclohexene ring having an unsaturated side chain containing at least ten carbon atoms bound by conjugated double bonds, e.g. carotenes** (containing hetero-rings C12P 17/00) **[3]**

25/00 **Preparation of compounds containing alloxazine or isoalloxazine nucleus, e.g. riboflavin [3]**

27/00 **Preparation of compounds containing a gibbane ring system, e.g. gibberellin [3]**

29/00 **Preparation of compounds containing a naphthacene ring system, e.g. tetracycline** (C12P 19/00 takes precedence) **[3]**

31/00 **Preparation of compounds containing a five-membered ring having two side-chains in ortho position to each other, and having at least one oxygen atom directly bound to the ring in ortho position to one of the side-chains, one side-chain containing, not directly bound to the ring, a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, and the other side-chain having at least one oxygen atom bound in gamma-position to the ring, e.g. prostaglandins [3]**

33/00 **Preparation of steroids [3]**

Note

Attention is drawn to Note (1) following the title of subclass C07J, which explains what is covered by the term "steroids". **[3]**

Note

In groups C12P 33/02 to C12P 33/20, the following terms are used with the meaning indicated:
– "acting", "forming", "hydroxylating", "dehydroxylating" or "dehydrogenating" means the action of a micro-organism or enzyme rather than other chemical action. **[3]**

33/02 . Dehydrogenating; Dehydroxylating **[3]**
33/04 . . Forming an aryl ring from A ring **[3]**
33/06 . Hydroxylating **[3]**
33/08 . . at 11 position **[3]**
33/10 . . . at 11alpha-position **[3]**
33/12 . Acting on D ring **[3]**
33/14 . . Hydroxylating at 16 position **[3]**
33/16 . . Acting at 17 position **[3]**
33/18 . . . Hydroxylating at 17 position **[3]**
33/20 . containing heterocyclic rings **[3]**

35/00 Preparation of compounds having a 5-thia-1-azabicyclo [4.2.0] octane ring system, e.g. cephalosporin [3]
35/02 . by desacylation of the substituent in the 7 position **[3]**
35/04 . by acylation of the substituent in the 7 position **[3]**
35/06 . Cephalosporin C; Derivatives thereof **[3]**
35/08 . disubstituted in the 7 position **[3]**

37/00 Preparation of compounds having a 4-thia-1-azabicyclo [3.2.0] heptane ring system, e.g. penicillin [3]
37/02 . in presence of phenylacetic acid or phenylacetamide or their derivatives **[3]**
37/04 . by acylation of the substituent in the 6 position **[3]**
37/06 . by desacylation of the substituent in the 6 position **[3]**

39/00 Processes involving micro-organisms of different genera in the same process, simultaneously [3]

41/00 Processes using enzymes or micro-organisms to separate optical isomers from a racemic mixture [4]

C12Q MEASURING OR TESTING PROCESSES INVOLVING ENZYMES OR MICRO-ORGANISMS (immunoassay G01N 33/53); **COMPOSITIONS OR TEST PAPERS THEREFOR**; **PROCESSES OF PREPARING SUCH COMPOSITIONS**; **CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES [3]**

(1) This subclass does not cover the observation of the progress or of the result of processes specified in this subclass by any of the methods specified in groups G01N 3/00 to G01N 29/00, which is covered by subclass G01N. **[3]**
(2) In this subclass, the following expression is used with the meaning indicated:
– "involving", when used in relation to a substance, includes the testing for the substance as well as employing the substance as a determinant or reactant in a test for a different substance. **[3]**
(3) Attention is drawn to Notes (1) to (3) following the title of class C12. **[4]**
(4) In this subclass, test media are classified in the appropriate group for the relevant test process. **[3]**
(5) In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

1/00 Measuring or testing processes involving enzymes or micro-organisms (measuring or testing apparatus with condition measuring or sensing means, e.g. colony counters, C12M 1/34); **Compositions therefor**; **Processes of preparing such compositions [3]**
1/02 . involving viable micro-organisms **[3]**
1/04 . . Determining presence or kind of micro-organism; Use of selective media for testing antibiotics or bacteriocides; Compositions containing a chemical indicator therefor **[3]**
1/06 . . . Quantitative determination **[3]**
1/08 . . . . using multifield media **[3]**
1/10 . . . Enterobacteria **[3]**
1/12 . . . Nitrate to nitrite reducing bacteria **[3]**
1/14 . . . Streptococcus; Staphylococcus **[3]**
1/16 . . . using radioactive material **[3]**
1/18 . . Testing for antimicrobial activity of a material **[3]**
1/20 . . . using multifield media **[3]**
1/22 . . Testing for sterility conditions **[3]**
1/24 . . Methods of sampling, or inoculating or spreading a sample; Methods of physically isolating an intact micro-organism **[3]**
1/25 . involving enzymes not classifiable in groups C12Q 1/26 to C12Q 1/70 **[5]**
1/26 . involving oxidoreductase **[3]**
1/28 . . involving peroxidase **[3]**
1/30 . . involving catalase **[3]**
1/32 . . involving dehydrogenase **[3]**
1/34 . involving hydrolase **[3]**
1/37 . . involving peptidase or proteinase **[5]**
1/40 . . involving amylase **[3]**
1/42 . . involving phosphatase **[3]**
1/44 . . involving esterase **[3]**
1/46 . . . involving cholinesterase **[3]**
1/48 . involving transferase **[3]**
1/50 . . involving creatine phosphokinase **[3]**
1/52 . . involving transaminase **[3]**
1/527 . involving lyase **[5]**
1/533 . involving isomerase **[5]**
1/54 . involving glucose or galactose **[3]**
1/56 . involving blood clotting factors, e.g. involving thrombin, thromboplastin, fibrinogen **[3]**
1/58 . involving urea or urease **[3]**
1/60 . involving cholesterol **[3]**
1/61 . involving triglycerides **[5]**
1/62 . involving uric acid **[3]**
1/64 . Geomicrobiological testing, e.g. for petroleum **[3]**
1/66 . involving luciferase **[3]**
1/68 . involving nucleic acids **[3]**
1/70 . involving virus or bacteriophage **[3]**

3/00 Condition-responsive control processes (apparatus therefor C12M 1/36; controlling or regulating in general G05) **[3]**

C12R INDEXING SCHEME ASSOCIATED WITH SUBCLASSES C12C TO C12Q OR C12S, RELATING TO MICRO-ORGANISMS [3]

(1) This subclass constitutes an indexing scheme associated with the other subclasses of class C12, relating to micro-organisms used in the processes classified in subclasses C12C to C12Q or C12S. **[3]**

(2) The bacteria terminology is based on “Bergey’s Manual of Determinative Bacteriology”, Eighth Edition, 1975. **[3]**

1/00 Micro-organisms [3]
1/01 . Bacteria or actinomycetales **[3]**
1/02 . . Acetobacter **[3]**
1/025 . . Achromobacter **[3]**
1/03 . . Actinomadura **[3]**
1/04 . . Actinomyces **[3]**
1/045 . . Actinoplanes **[3]**
1/05 . . Alcaligenes **[3]**
1/06 . . Arthrobacter **[3]**
1/065 . . Azotobacter **[3]**
1/07 . . Bacillus **[3]**
1/08 . . . Bacillus brevis **[3]**
1/085 . . . Bacillus cereus **[3]**
1/09 . . . Bacillus circulans **[3]**
1/10 . . . Bacillus licheniformis **[3]**
1/11 . . . Bacillus megaterium **[3]**
1/12 . . . Bacillus polymyxa **[3]**
1/125 . . . Bacillus subtilis **[3]**
1/13 . . Brevibacterium **[3]**
1/14 . . Chainia **[3]**
1/145 . . Clostridium **[3]**
1/15 . . Corynebacterium **[3]**
1/16 . . . Corynebacterium diphtheriae **[3]**
1/165 . . . Corynebacterium poinsettiae **[3]**
1/17 . . . Corynebacterium pyogenes **[3]**
1/18 . . Erwinia **[3]**
1/185 . . Escherichia **[3]**
1/19 . . . Escherichia coli **[3]**
1/20 . . Flavobacterium **[3]**
1/21 . . Haemophilus **[3]**
1/22 . . Klebsiella **[3]**
1/225 . . Lactobacillus **[3]**
1/23 . . . Lactobacillus acidophilus **[3]**
1/24 . . . Lactobacillus brevis **[3]**
1/245 . . . Lactobacillus casei **[3]**
1/25 . . . Lactobacillus plantarum **[3]**
1/26 . . Methylomonas **[3]**
1/265 . . Micrococcus **[3]**
1/27 . . . Micrococcus flavus **[3]**
1/28 . . . Micrococcus glutamicus **[3]**
1/285 . . . Micrococcus lysodeikticus **[3]**
1/29 . . Micromonospora **[3]**
1/30 . . . Micromonospora chalcea **[3]**
1/31 . . . Micromonospora purpurea **[3]**
1/32 . . Mycobacterium **[3]**
1/325 . . . Mycobacterium avium **[3]**
1/33 . . . Mycobacterium fortuitum **[3]**
1/34 . . . Mycobacterium smegmatis **[3]**
1/35 . . Mycoplasma **[3]**
1/36 . . Neisseria **[3]**
1/365 . . Nocardia **[3]**
1/37 . . Proteus **[3]**
1/38 . . Pseudomonas **[3]**
1/385 . . . Pseudomonas aeruginosa **[3]**
1/39 . . . Pseudomonas fluorescens **[3]**
1/40 . . . Pseudomonas putida **[3]**
1/41 . . Rhizobium **[3]**
1/42 . . Salmonella **[3]**
1/425 . . Serratia **[3]**
1/43 . . . Serratia marcescens **[3]**
1/44 . . Staphylococcus **[3]**
1/445 . . . Staphylococcus aureus **[3]**
1/45 . . . Staphylococcus epidermidis **[3]**
1/46 . . Streptococcus **[3]**
1/465 . . Streptomyces **[3]**
1/47 . . . Streptomyces albus **[3]**
1/48 . . . Streptomyces antibioticus **[3]**
1/485 . . . Streptomyces aureofaciens **[3]**
1/49 . . . Streptomyces aureus **[3]**
1/50 . . . Streptomyces bikiniensis **[3]**
1/51 . . . Streptomyces candidus **[3]**
1/52 . . . Streptomyces chartreusis **[3]**
1/525 . . . Streptomyces diastatochromogenes **[3]**
1/53 . . . Streptomyces filipinensis **[3]**
1/54 . . . Streptomyces fradiae **[3]**
1/545 . . . Streptomyces griseus **[3]**
1/55 . . . Streptomyces hygroscopicus **[3]**
1/56 . . . Streptomyces lavendulae **[3]**
1/565 . . . Streptomyces lincolnensis **[3]**
1/57 . . . Streptomyces noursei **[3]**
1/58 . . . Streptomyces olivaceus **[3]**
1/585 . . . Streptomyces platensis **[3]**
1/59 . . . Streptomyces rimosus **[3]**
1/60 . . . Streptomyces sparsogenes **[3]**
1/61 . . . Streptomyces venezuelae **[3]**
1/62 . . Streptosporangium **[3]**
1/625 . . Streptoverticillium **[3]**
1/63 . . Vibrio **[3]**
1/64 . . Xanthomonas **[3]**
1/645 . Fungi **[3]**
1/65 . . Absidia **[3]**
1/66 . . Aspergillus **[3]**
1/665 . . . Aspergillus awamori **[3]**
1/67 . . . Aspergillus flavus **[3]**
1/68 . . . Aspergillus fumigatus **[3]**
1/685 . . . Aspergillus niger **[3]**
1/69 . . . Aspergillus oryzae **[3]**
1/70 . . . Aspergillus ustus **[3]**
1/71 . . . Aspergillus wentii **[3]**
1/72 . . Candida **[3]**
1/725 . . . Candida albicans **[3]**
1/73 . . . Candida lipolytica **[3]**
1/74 . . . Candida tropicalis **[3]**
1/745 . . Cephalosporium **[3]**

1/75 . . . Cephalosporium acremonium **[3]**
1/76 . . . Cephalosporium coerulescens **[3]**
1/765 . . . Cephalosporium crotocinigenum **[3]**
1/77 . . Fusarium **[3]**
1/78 . . Hansenula **[3]**
1/785 . . Mucor **[3]**
1/79 . . Paecilomyces **[3]**
1/80 . . Penicillium **[3]**
1/81 . . . Penicillium brevi **[3]**
1/82 . . . Penicillium chrysogenum **[3]**
1/825 . . . Penicillium notatum **[3]**
1/83 . . . Penicillium patulum **[3]**
1/84 . . Pichia **[3]**
1/845 . . Rhizopus **[3]**
1/85 . . Saccharomyces **[3]**
1/86 . . . Saccharomyces carlsbergensis **[3]**
1/865 . . . Saccharomyces cerevisiae **[3]**
1/87 . . . Saccharomyces lactis **[3]**
1/88 . . Torulopsis **[3]**
1/885 . . Trichoderma **[3]**
1/89 . Algae **[3]**
1/90 . Protozoa **[3]**
1/91 . Cell lines **[3,7]**
1/92 . Viruses **[5,7]**
1/93 . . Animal viruses **[7]**
1/94 . . Plant viruses **[7]**

C12S **PROCESSES USING ENZYMES OR MICRO-ORGANISMS TO LIBERATE, SEPARATE OR PURIFY A PRE-EXISTING COMPOUND OR COMPOSITION** (biological treatment of water, waste water, or sewage C02F 3/00, of sludge C02F 11/02; processes using enzymes or micro-organisms to separate optical isomers from a racemic mixture C12P 41/00); **PROCESSES USING ENZYMES OR MICRO-ORGANISMS TO TREAT TEXTILES OR TO CLEAN SOLID SURFACES OF MATERIALS [5]**

(1) This subclass covers processes already provided for in:
– Section A: A21, A23, A61L, A62D;
– Section B: B01D, B08B, B09C;
– Section C: C01, C05F, C08, C09B, C09H, C10G, C13, C14C, C21B, C22B, C23F, C23G;
– Section D: D01C, D01F, D06L, D06M, D06P, D21C, D21H;
– Section E: E21B;
– Section F: F24F, F24J, F26B;
– Section H: H01M.
This subclass is intended to provide a basis for a complete search to be made with respect to the subject matter defined by the subclass title and, therefore, all relevant information is classified in this subclass, even if classified elsewhere.
(2) Attention is drawn to Notes (2) and (3) following the title of class C12. **[5]**
(3) In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2009.01]**
(4) The classification symbols of this subclass are not listed first when printed on patent documents. **[5]**
(5) In this subclass, it is desirable to add the indexing codes of subclass C12R. **[6]**

1/00 **Treatment of petroleum oils, shale oils or sand oils [5]**
1/02 . Desulfurising **[5]**

3/00 **Treatment of animal or plant materials or micro-organisms [5]**
3/02 . Recovery or purification of carbohydrate material **[5]**
3/04 . . Cellulose, e.g. plant fibres **[5]**
3/06 . . . Treatment of hemp or flax **[5]**
3/08 . . . in the production of paper pulp **[5]**
3/10 . . Treatment of sugar or molasses **[5]**
3/12 . . Treatment of pectin or starch **[5]**
3/14 . Recovery or purification of proteinaceous material **[5]**
3/16 . . Collagen or gelatin **[5]**
3/18 . Recovery or purification of glyceridic oils, fats, ester-type waxes or fatty acids **[5]**
3/20 . Removal of nucleic acids from intact or disrupted cells **[5]**
3/22 . Treatment of blood fractions **[5]**
3/24 . Treatment of animal secretions or organs **[5]**

5/00 **Treatment of emulsions, gases or foams [5]**

7/00 **Treatment of hides, e.g. depilating, bating [5]**

9/00 **Cleaning solid surfaces of materials [5]**

11/00 **Treatment of textiles, e.g. cleaning [5]**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

C13 SUGAR INDUSTRY [4]

(1) In class C13, the following terms or expressions are used with the meanings indicated:
– *"sugars" are a class of edible, water-soluble crystalline carbohydrates, having a characteristic sweet taste, including mono-, di- and oligosaccharides, e.g. sucrose, lactose and fructose. A more specific meaning of the term "sugar" is defined in the note of subclass C13B.* **[2011.01]**

(2) Processes using enzymes or micro-organisms in order:
(i) to liberate, separate or purify a pre-existing compound or composition, or
(ii) to treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

C13B ***PRODUCTION OF SUCROSE; APPARATUS SPECIALLY ADAPTED THEREFOR*** *(chemically synthesised sugars or sugar derivatives C07H; fermentation or enzyme-using processes for preparing compounds containing saccharide radicals C12P 19/00)* **[2011.01]**

Note

In subclass C13B, the following terms or expressions are used with the meanings indicated:
– *"sugar" is used in its non-scientific meaning and refers to sucrose, also called "table sugar" or "saccharose", a white crystalline disaccharide;* **[2011.01]**
– *"sugar juices" are solutions of sugar, essentially comprising sucrose, which are derived from different plants, e.g. beet, cane or maple;* **[2011.01]**
– *"syrups" are highly concentrated sugar juices.* **[2011.01]**

5/00 ***Reducing the size of material from which sugar is to be extracted*** *(for extraction of starch C08B 30/02)* **[2011.01]**
5/02 . *Cutting sugar cane* **[2011.01]**
5/04 . . *Shredding sugar cane* **[2011.01]**
5/06 . *Slicing sugar beet* **[2011.01]**
5/08 . *Knives; Adjustment or maintenance thereof* **[2011.01]**

10/00 ***Production of sugar juices*** *(tapping of tree-juices A01G 23/10; tapping-spouts, receptacles for juices A01G 23/14)* **[2011.01]**
10/02 . *Expressing juice from sugar cane or similar material, e.g. sorghum saccharatum* **[2011.01]**
10/04 . . *combined with imbibition* **[2011.01]**
10/06 . . *Sugar-cane crushers* **[2011.01]**
10/08 . *Extraction of sugar from sugar beet with water* **[2011.01]**
10/10 . . *Continuous processes* **[2011.01]**
10/12 . . *Details of extraction apparatus, e.g. arrangements of pipes or valves* **[2011.01]**
10/14 . *using extracting agents other than water, e.g. alcohol or salt solutions* **[2011.01]**

15/00 ***Expressing water from material from which sugar has been extracted*** *(from starch-extracted material C08B 30/10)* **[2011.01]**
15/02 . *between perforated moving belts* **[2011.01]**

20/00 ***Purification of sugar juices*** **[2011.01]**

Note

When classifying in this group, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned. **[2011.01]**

20/02 . *using alkaline earth metal compounds* **[2011.01]**
20/04 . . *followed by saturation* **[2011.01]**
20/06 . . . *with carbon dioxide or sulfur dioxide* **[2011.01]**
20/08 . *by oxidation or reduction* **[2011.01]**
20/10 . . *using sulfur dioxide or sulfites* **[2011.01]**
20/12 . *using adsorption agents, e.g. active carbon* **[2011.01]**
20/14 . *using ion-exchange materials* **[2011.01]**
20/16 . *by physical means, e.g. osmosis or filtration* **[2011.01]**
20/18 . *by electrical means* **[2011.01]**

25/00 ***Evaporators or boiling pans specially adapted for sugar juices; Evaporating or boiling sugar juices*** **[2011.01]**
25/02 . *Details, e.g. for preventing foaming or for catching juice* **[2011.01]**
25/04 . . *Heating equipment* **[2011.01]**
25/06 . *combined with measuring instruments for effecting control of the process* **[2011.01]**

30/00 ***Crystallisation; Crystallising apparatus; Separating crystals from mother liquors*** **[2011.01]**
30/02 . *Crystallisation; Crystallising apparatus* **[2011.01]**
30/04 . *Separating crystals from mother liquor* **[2011.01]**
30/06 . . *by centrifugal force* **[2011.01]**
30/08 . . *Washing residual mother liquor from crystals* **[2011.01]**
30/10 . . . *in centrifuges* **[2011.01]**
30/12 . . *Recycling mother liquor or wash liquors* **[2011.01]**
30/14 . . *Dissolving or refining raw sugar* **[2011.01]**

35/00 ***Extraction of sucrose from molasses*** **[2011.01]**
35/02 . *by chemical means* **[2011.01]**
35/04 . . *by precipitation as alkaline earth metal saccharates* **[2011.01]**
35/06 . . *using ion exchange* **[2011.01]**
35/08 . *by physical means, e.g. osmosis* **[2011.01]**

40/00 ***Drying sugar*** **[2011.01]**

45/00 ***Cutting machines specially adapted for sugar*** **[2011.01]**
45/02 . *in combination with sorting and packing machines* **[2011.01]**

50/00 ***Sugar products, e.g. powdered, lump or liquid sugar****; **Working-up of sugar** (C13B 40/00, C13B 45/00 take precedence; confectionery A23G 3/00)* **[2011.01]**

50/02 **.** *formed by moulding sugar* **[2011.01]**

99/00 ***Subject matter not provided for in other groups of this subclass*** **[2011.01]**

C13K **SACCHARIDES, OTHER THAN SUCROSE, OBTAINED FROM NATURAL SOURCES OR BY HYDROLYSIS OF NATURALLY OCCURRING DI-, OLIGO- OR POLYSACCHARIDES** (chemically synthesised sugars or sugar derivatives C07H; polysaccharides, e.g. starch, derivatives thereof C08B; malt C12C; fermentation or enzyme-using processes for preparing compounds containing saccharide radicals C12P 19/00)

1/00 **Glucose** (separation from invert sugar C13K 3/00); **Glucose-containing syrups [2]**

1/02 **.** obtained by saccharification of cellulosic materials (manufacture of fodder A23K 1/12)

1/04 **. .** Purifying

1/06 **.** obtained by saccharification of starch or raw materials containing starch

1/08 **. .** Purifying

1/10 **.** Crystallisation

3/00 **Invert sugar**; **Separation of glucose or fructose from invert sugar**

5/00 **Lactose**

7/00 **Maltose**

11/00 **Fructose** (separation from invert sugar C13K 3/00) **[2]**

13/00 **Sugars not otherwise provided for in this class [2]**

C14 SKINS; HIDES; PELTS; LEATHER

C14B MECHANICAL TREATMENT OR PROCESSING OF SKINS, HIDES, OR LEATHER IN GENERAL; PELT-SHEARING MACHINES; INTESTINE-SPLITTING MACHINES (mechanical cleaning of hides or the like D06G)

Subclass index

1/00 Manufacture of leather; Machines or devices therefor

1/02 . Fleshing, unhairing, samming, stretching-out, setting-out, shaving, splitting, or skiving skins, hides, or leather

1/04 . . using slicking, scraping, or smoothing-out cylinders or blades fixed on supports, e.g. cylinders, in a plane substantially at right angles to the working surface

1/06 . . . in machines in which the working piece is maintained in contact with the working tools solely by means of rolls

1/08 . . . in machines with flexible bands as bed supporting or counter-pressure elements

1/10 . . . in machines with drums with cylindrical, conical, or similar surfaces for supporting the whole working piece

1/12 . . . in machines with plane supporting bed-plates

1/14 . . using tools cutting the skin in a plane substantially parallel to its surface

1/16 . . . using fixed or reciprocating or oscillating knives

1/18 . . . using band knives

1/20 . . . using circular dished or coned knives

1/22 . . . using cylindrical knives

1/24 . . Cutting or shearing hairs without cutting the skin (shearing furs or plucking hairs for fur manufacturing purposes C14B 15/02)

1/26 . Leather tensioning or stretching frames; Stretching-machines; Setting-out boards; Pasting boards (fastening devices C14B 17/08)

1/28 . Machines for treating leather combined with devices for measuring and printing

1/30 . Pressing or rolling leather

1/32 . . by linear movement of the pressing elements

1/34 . . by rotating movement of the pressing or rolling elements

1/36 . . . Bridge leather-rolling machines

1/38 . Hammering leather

1/40 . Softening or making skins or leather supple, e.g. by staking, boarding, or crippling machines, by dry mills

1/42 . . by means of a rotatable drum with radial blades

1/44 . Mechanical treatment of leather surfaces

1/46 . . Fluffing, buffing or sanding

1/48 . . Roughening (by sanding C14B 1/46)

1/50 . . Glazing

1/52 . . Brushing or plush-wheeling

1/54 . . Ironing (pressing or rolling C14B 1/30)

1/56 . . Ornamenting, producing designs, embossing

1/58 . Drying

1/60 . . Pasting processes (chemical aspects C14C 7/00)

1/62 . Winding or stacking hides or leather

3/00 Milling leather

5/00 Clicking, perforating, or cutting leather (for shoe parts, e.g. soles, A43D)

5/02 . Stamps or dies for leather articles

5/04 . for making leather belts or strips

5/06 . . Machines for cutting strips spirally from discs of leather

7/00 Special leathers or their manufacture

7/02 . Composite leathers (with one or more laminae of plastics material B32B 9/02)

7/04 . . by cementing or pressing together leather pieces, strips, or layers; Reinforcing or stiffening leather by means of reinforcing layers

7/06 . Leather webs built up of interengaged strips or pieces, e.g. by braiding

9/00 Making driving belts or other leather belts or strips

11/00 Finishing the edges of leather pieces, e.g. by folding, by burning

13/00 Shredding hides or leather

15/00 Mechanical treatment of furs

15/02 . Shearing; Removing dead or coarse hairs or bristles by shearing or plucking

15/04 . Fur dressing

15/06 . . Fur-stretching devices

15/08 . Application of reinforcing or stiffening layers to fur skins

15/10 . Cutting furs; Making fur plates or strips

15/12 . Finishing, e.g. pointing furs; Producing designs or patterns

17/00 Details of apparatus or machines for manufacturing or treating skins, hides, leather, or furs

17/02 . Blading cylinders or other working cylinders, e.g. slicking or scraping cylinders

17/04 . Work-supports or other counter-pressing elements; Bed rolls or counter-pressing rolls

17/06 . Work feeding or clamping devices

17/08 . . Fastening devices, e.g. clips for leather-stretching

17/10 . Arrangements for driving parts of leather-working machines

17/12 . Safety devices specially adapted for leather-working machines

17/14 . Auxiliary devices for leather-working machines, e.g. grinding devices for blading cylinders or dust-removal devices combined with the working machines

19/00 Hand tools specially adapted for the treatment of hides, skins, or leather in the manufacture of leather or furs (equipment or tools for saddlery B68C)

21/00 Splitting intestines; **Cutting intestines longitudinally** (cleaning or cutting intestines during processing of meat A22C 17/00)

99/00 Subject matter not provided for in other groups of this subclass [8]

C14C CHEMICAL TREATMENT OF SKINS, HIDES OR LEATHER, E.G. TANNING, IMPREGNATING, FINISHING; **APPARATUS THEREFOR**; **COMPOSITIONS FOR TANNING** (bleaching of leather or furs D06L; dyeing of leather or furs D06P)

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 Chemical treatment prior to tanning

1/02 . Curing raw hides

1/04 . Soaking

1/06 . Facilitating unhairing, e.g. by painting, by liming

1/08 . Deliming; Bating; Pickling; Degreasing

3/00 Tanning; **Compositions for tanning**

3/02 . Chemical tanning

3/04 . . Mineral tanning

3/06 . . . using chromium compounds

3/08 . . by organic agents

3/10 . . . Vegetable tanning

3/12 . . . . using purified or modified vegetable tanning agents

3/14 . . . Fat tanning; Oil tanning

3/16 . . . using aliphatic aldehydes

3/18 . . . using polycondensation products or precursors thereof

3/20 . . . . sulfonated

3/22 . . . using polymerisation products

3/24 . . . using lignin derivatives, e.g. sulfate liquor

3/26 . . . using other organic substances, containing halogen

3/28 . . Multi-step processes

3/30 . . using physical means combined with chemical means

3/32 . Recovering tanning agents from leather

5/00 Degreasing leather

7/00 Chemical aspects of pasting processes

9/00 Impregnating leather for preserving, waterproofing, making resistant to heat or similar purposes

9/02 . using fatty or oily materials, e.g. fat liquoring

9/04 . Fixing tanning agents in the leather

11/00 Surface finishing of leather

13/00 Manufacture of special kinds of leather, e.g. vellum

13/02 . Manufacture of technical leather

15/00 Apparatus for chemical treatment or washing of hides, skins, or leather

99/00 Subject matter not provided for in other groups of this subclass [8]

METALLURGY

C21 METALLURGY OF IRON

C21B MANUFACTURE OF IRON OR STEEL (preliminary treatment of ferrous ores or scrap C22B 1/00; electric heating H05B)

(1) This subclass covers:
- the production of iron or steel from source materials, e.g. the production of pig-iron;
- apparatus specially adapted therefor, e.g. blast furnaces, air heaters (furnaces in general F27).

(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

3/00 General features in the manufacture of pig-iron (mixers for pig-iron C21C 1/06)
- 3/02 . by applying additives, e.g. fluxing agents
- 3/04 . Recovery of by-products, e.g. slag
- 3/06 . . Treatment of liquid slag (slag wool C03B; slag stones C04B)
- 3/08 . . . Cooling slag
- 3/10 . . . Slag pots; Slag cars

5/00 Making pig-iron in the blast furnace
- 5/02 . Making special pig-iron, e.g. by applying additives, e.g. oxides of other metals
- 5/04 . Making slag of special composition
- 5/06 . using top gas in the blast furnace process (in coke ovens C10B)

7/00 Blast furnaces (lifts associated with blast furnaces B66B 9/06)
- 7/02 . Internal forms
- 7/04 . with special refractories (refractory materials C04B)
- 7/06 . . Linings for furnaces
- 7/08 . Top armourings
- 7/10 . Cooling; Devices therefor
- 7/12 . Opening or sealing the tap holes
- 7/14 . Discharging devices, e.g. for slag
- 7/16 . Tuyères
- 7/18 . Bell-and-hopper arrangements
- 7/20 . . with appliances for distributing the burden
- 7/22 . Dust arresters
- 7/24 . Test rods or other checking devices

9/00 Stoves for heating the blast in blast furnaces
- 9/02 . Brick hot-blast stoves
- 9/04 . . with combustion shaft
- 9/06 . . Linings
- 9/08 . Iron hot-blast stoves
- 9/10 . Other details, e.g. blast mains
- 9/12 . . Hot-blast valves or slides for blast furnaces (valves in general F16K)
- 9/14 . Preheating the combustion air
- 9/16 . Cooling or drying the hot-blast

11/00 Making pig-iron other than in blast furnaces
- 11/02 . in low shaft furnaces
- 11/06 . in rotary kilns
- 11/08 . in hearth-type furnaces
- 11/10 . in electric furnaces

13/00 Making spongy iron or liquid steel, by direct processes
- 13/02 . in shaft furnaces
- 13/04 . in retorts
- 13/06 . in multi-storied furnaces
- 13/08 . in rotary furnaces
- 13/10 . in hearth-type furnaces
- 13/12 . in electric furnaces
- 13/14 . Multi-stage processes

15/00 Other processes for the manufacture of iron from iron compounds (general methods of reducing to metal C22B 5/00; by electrolysis C25C 1/06)
- 15/02 . Metallothermic processes, e.g. thermit reduction
- 15/04 . from iron carbonyl

C21C PROCESSING OF PIG-IRON, E.G. REFINING, MANUFACTURE OF WROUGHT-IRON OR STEEL (refining or remelting metals in general C22B 9/00); **TREATMENT IN MOLTEN STATE OF FERROUS ALLOYS**

1/00 Refining of pig-iron; Cast iron
1/02 . Dephosphorising or desulfurising
1/04 . Removing impurities other than carbon, phosphorus, or sulfur
1/06 . Constructional features of mixers for pig-iron
1/08 . Manufacture of cast-iron
1/10 . Making spheroidal graphite cast-iron

3/00 Manufacture of wrought-iron or wrought-steel

5/00 Manufacture of carbon steel, e.g. plain mild steel, medium carbon steel, or cast-steel
5/02 . Crucible furnace processes
5/04 . Manufacture of hearth-furnace steel, e.g. Siemens-Martin steel
5/06 . . Processes yielding slags of special composition
5/28 . Manufacture of steel in the converter
5/30 . . Regulating or controlling the blowing
5/32 . . . Blowing from above (C21C 5/35 takes precedence) **[5]**
5/34 . . . Blowing through the bath (C21C 5/35 takes precedence) **[5]**
5/35 . . . Blowing from above and through the bath **[5]**
5/36 . . Processes yielding slags of special composition
5/38 . . Removal of waste gases or dust
5/40 . . . Offtakes or separating apparatus for converter waste gases or dust
5/42 . . Constructional features of converters
5/44 . . . Refractory linings
5/46 . . . Details or accessories
5/48 . . . . Bottoms or tuyères of converters
5/50 . . . . Tilting mechanisms for converters
5/52 . Manufacture of steel in electric furnaces (electric heating per se H05B)
5/54 . . Processes yielding slags of special composition
5/56 . Manufacture of steel by other methods (making liquid steel by direct processes C21B 13/00)

7/00 Treating molten ferrous alloys, e.g. steel, not covered by groups C21C 1/00 to C21C 5/00 (treating molten metals during moulding B22D 1/00, B22D 27/00; remelting ferrous metals C22B)
7/04 . Removing impurities by adding a treating agent
7/06 . . Deoxidising, e.g. killing **[2]**
7/064 . . Dephosphorising; Desulfurising **[3]**
7/068 . . Decarburising **[3]**
7/072 . . Treatment with gases (C21C 7/06, C21C 7/064, C21C 7/068 take precedence) **[3]**
7/076 . . Use of slags or fluxes as treating agents (C21C 7/06, C21C 7/064, C21C 7/068 take precedence) **[3]**
7/10 . Handling in vacuum

C21D MODIFYING THE PHYSICAL STRUCTURE OF FERROUS METALS; GENERAL DEVICES FOR HEAT TREATMENT OF FERROUS OR NON-FERROUS METALS OR ALLOYS; MAKING METAL MALLEABLE BY DECARBURISATION, TEMPERING, OR OTHER TREATMENTS (cementation by diffusion processes C23C; surface treatment of metallic material involving at least one process provided for in class C23 and at least one process covered by this subclass C23F 17/00; unidirectional solidification of eutectic materials or unidirectional demixing of eutectoid materials C30B)

Subclass index

1/00 General methods or devices for heat treatment, e.g. annealing, hardening, quenching, tempering (furnaces in general F27; electric heating H05B)
1/02 . Hardening articles or materials formed by forging or rolling, with no further heating beyond that required for the formation
1/04 . with simultaneous application of supersonic waves, magnetic or electric fields
1/06 . Surface hardening
1/08 . . with flames
1/09 . . by direct application of electrical or wave energy; by particle radiation **[3]**
1/10 . . . by electric induction **[3]**
1/18 . Hardening (C21D 1/02 takes precedence); Quenching with or without subsequent tempering (quenching devices C21D 1/62) **[3]**
1/19 . . by interrupted quenching **[3]**
1/20 . . . Isothermal quenching, e.g. bainitic hardening **[3]**
1/22 . . . Martempering **[3]**
1/25 . . Hardening, combined with annealing between 300 °C and 600 °C, i.e. heat refining ("Vergüten") **[3]**
1/26 . Methods of annealing
1/28 . . Normalising
1/30 . . Stress-relieving
1/32 . . Soft annealing, e.g. spheroidising
1/34 . Methods of heating (C21D 1/06 takes precedence)
1/38 . . Heating by cathodic discharges
1/40 . . Direct resistance heating
1/42 . . Induction heating
1/44 . . in heat-treatment baths
1/46 . . . Salt baths

1/48 . . . Metal baths
1/50 . . . Oil baths
1/52 . . with flames
1/53 . . Heating in fluidised beds **[3]**
1/54 . Determining when the hardening temperature has been reached by measurement of magnetic or electrical properties
1/55 . Hardenability tests, e.g. end-quench tests (investigating or analysing materials by determining their chemical or physical properties, in general G01N) **[3]**
1/56 . characterised by the quenching agents
1/58 . . Oils
1/60 . . Aqueous agents
1/607 . . Molten salts **[3]**
1/613 . . Gases; Liquefied or solidified normally gaseous material **[3]**
1/62 . Quenching devices
1/63 . . for bath quenching **[3]**
1/64 . . . with circulating liquids (in general F28D) **[3]**
1/667 . . for spray quenching **[3]**
1/673 . . for die quenching **[3]**
1/68 . Temporary coatings or embedding materials applied before or during heat treatment
1/70 . . while heating or quenching
1/72 . . during chemical change of surfaces
1/74 . Methods of treatment in inert gas, controlled atmosphere, vacuum, or pulverulent material (production of gases C01, C10)
1/76 . . Adjusting the composition of the atmosphere
1/767 . . with forced gas circulation; Reheating thereof **[3]**
1/773 . . under reduced pressure or vacuum **[3]**
1/78 . Combined heat-treatments not provided for above
1/82 . Descaling by thermal stresses (mechanically B21, B23; chemically C23; electrolytically C25F)
1/84 . Controlled slow cooling (cooling-beds for metal rolling B21B 43/00) **[3]**

3/00 Diffusion processes for extraction of non-metals; **Furnaces therefor** (local protective coatings C21D 1/72; furnaces in general F27)
3/02 . Extraction of non-metals
3/04 . . Decarburising
3/06 . . Extraction of hydrogen
3/08 . . Extraction of nitrogen
3/10 . Furnaces therefor

5/00 Heat treatment of cast-iron
5/02 . improving the malleability of grey cast-iron
5/04 . of white cast-iron
5/06 . . Malleabilising
5/08 . . . with oxidation of carbon
5/10 . . . . in gaseous agents
5/12 . . . . in solid agents
5/14 . . . Graphitising
5/16 . . . . Packing agents

6/00 Heat treatment of ferrous alloys [2]

(1) When classifying in group C21D 6/00, any aspect of the method for the heat treatment of ferrous alloys which is considered to represent information of interest for search may also be classified in groups C21D 1/02 to C21D 1/84. This can, for example, be the case when it is considered of interest to enable searching of heat treatment methods of ferrous alloys using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. **[8]**

(2) When classifying in group C21D 6/00, any alloying constituent which is considered to represent information of interest for search may also be classified in groups C22C 38/02 to C22C 38/60. This can, for example, be the case when it is considered of interest to enable searching of heat treatment of specific ferrous alloys using a combination of classification symbols. Such non-obligatory classification should be given as “additional information”. **[8]**

6/02 . Hardening by precipitation **[2]**
6/04 . Hardening by cooling below 0° C **[2]**

7/00 Modifying the physical properties of iron or steel by deformation (apparatus for mechanical working of metal B21, B23, B24)
7/02 . by cold working
7/04 . . of the surface
7/06 . . . by shot-peening or the like
7/08 . . . by burnishing or the like
7/10 . . of the whole cross-section, e.g. of concrete reinforcing bars
7/12 . . . by expanding tubular bodies
7/13 . by hot working

8/00 Modifying the physical properties by deformation combined with, or followed by, heat treatment (hardening articles or materials formed by forging or rolling with no further heating beyond that required for the formation C21D 1/02) **[3]**
8/02 . during manufacturing of plates or strips (C21D 8/12 takes precedence) **[3]**
8/04 . . to produce plates or strips for deep-drawing **[3]**
8/06 . during manufacturing of rods or wires **[3]**
8/08 . . for concrete reinforcement **[3]**
8/10 . during manufacturing of tubular bodies **[3]**
8/12 . during manufacturing of articles with special electromagnetic properties **[3]**

9/00 Heat treatment, e.g. annealing, hardening, quenching, tempering, adapted for particular articles; **Furnaces therefor** (furnaces in general F27)
9/02 . for springs
9/04 . for rails (apparatus for heat treatment of railway rails on the spot E01B 31/18)
9/06 . . with diminished tendency to become wavy
9/08 . for tubular bodies or pipes
9/10 . . shotgun barrels
9/12 . . barrels for ordnance
9/14 . . wear- or pressure-resistant pipes
9/16 . for explosive shells
9/18 . for knives, scythes, scissors, or like hand cutting tools
9/20 . for blades for skates
9/22 . for drills; for milling cutters; for machine cutting tools
9/24 . for saw blades

9/26 . for needles; for teeth for card-clothing
9/28 . for plain shafts
9/30 . for crankshafts; for camshafts
9/32 . for gear wheels, worm wheels, or the like
9/34 . for tyres; for rims
9/36 . for balls; for rollers
9/38 . for roll bodies
9/40 . for rings; for bearing races
9/42 . for armour plate
9/44 . for equipment for lining mine shafts, e.g. segments, rings, props
9/46 . for sheet metals
9/48 . . deep-drawing sheets
9/50 . for welded joints
9/52 . for wires; for strips
9/54 . . Furnaces for treating strips or wire
9/56 . . . Continuous furnaces for strip or wire
9/567 . . . . with heating in fluidised beds **[3]**
9/573 . . . . with cooling **[3]**
9/58 . . . . with heating by baths
9/60 . . . . with induction heating
9/62 . . . . with direct resistance heating
9/63 . . . . the strip being supported by a cushion of gas **[3]**
9/64 . . . Patenting furnaces
9/66 . . . Tower-type furnaces
9/663 . . . Bell-type furnaces **[3]**
9/665 . . . . inverted or side-facing **[3]**
9/667 . . . . Multi-station furnaces **[3]**
9/67 . . . . . adapted for treating the charge in vacuum or special atmosphere **[3]**
9/673 . . . . Details, accessories, or equipment peculiar to bell-type furnaces **[3]**
9/675 . . . . Arrangements of charging or discharging devices **[3]**
9/677 . . . . Arrangements of heating devices **[3]**
9/68 . . . Furnace coilers; Hot coilers (cold coilers B21C)
9/70 . Furnaces for ingots, i.e. soaking pits

10/00 Modifying the physical properties by methods other than heat treatment or deformation [3]

11/00 Process control or regulation for heat treatments (controlling or regulating in general G05) **[2]**

C22 METALLURGY; FERROUS OR NON-FERROUS ALLOYS; TREATMENT OF ALLOYS OR NON-FERROUS METALS

C22B PRODUCTION OR REFINING OF METALS (making metallic powder or suspensions thereof B22F 9/00; production of metals by electrolysis or electrophoresis C25); PRETREATMENT OF RAW MATERIALS

(1) In this subclass, groups for obtaining metals include obtaining the metals by non-metallurgical processes, and obtaining metal compounds by metallurgical processes. Thus, for example, group C22B 11/00 covers the production of silver by reduction of ammoniacal silver oxide in solution, and group C22B 17/00 covers the production of cadmium oxide by a metallurgical process. Furthermore, although compounds of arsenic and antimony are classified in C01G, production of the elements themselves is covered by C22B, as well as the production of their compounds by metallurgical processes.

(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 Preliminary treatment of ores or scrap

1/02 . Roasting processes (C22B 1/16 takes precedence)
1/04 . . Blast roasting
1/06 . . Sulfating roasting
1/08 . . Chloridising roasting
1/10 . . in fluidised form
1/11 . Removing sulfur, phosphorus or arsenic, other than by roasting **[2]**
1/14 . Agglomerating; Briquetting; Binding; Granulating
1/16 . . Sintering; Agglomerating
1/18 . . . in sinter pots
1/20 . . . in sintering machines with movable grates
1/212 . . . in tunnel furnaces **[2]**
1/214 . . . in shaft furnaces **[2]**
1/216 . . . in rotary furnaces **[2]**
1/22 . . . in other sintering apparatus
1/24 . . Binding; Briquetting
1/242 . . . with binders **[2]**
1/243 . . . . inorganic **[2]**
1/244 . . . . organic **[2]**
1/245 . . . . . with carbonaceous material for the production of coked agglomerates **[2]**
1/248 . . . of metal scrap or alloys **[2]**
1/26 . Cooling of roasted, sintered, or agglomerated ores

3/00 Extraction of metal compounds from ores or concentrates by wet processes [5]

Note

When classifying in this group, the nature of any metal which is considered to represent information of interest for search may also be classified in the main groups only of C22B 11/00 to C22B 25/00, in group C22B 19/34 or in any of groups C22B 26/00 to C22B 61/00. This can, for example, be the case when it is considered of interest to enable searching for extraction of specific metals or their compounds. Such non-obligatory classification should be given as "additional information". **[8]**

3/02 . Apparatus therefor
3/04 . by leaching (C22B 3/18 takes precedence) **[5]**
3/06 . . in inorganic acid solutions **[5]**
3/08 . . . Sulfuric acid **[5]**
3/10 . . . Hydrochloric acid **[5]**
3/12 . . in inorganic alkaline solutions **[5]**
3/14 . . . containing ammonia or ammonium salts **[5]**
3/16 . . in organic solutions **[5]**
3/18 . with the aid of micro-organisms or enzymes, e.g. bacteria or algae **[5]**
3/20 . Treatment or purification of solutions, e.g. obtained by leaching (C22B 3/18 takes precedence) **[5]**
3/22 . . by physical processes, e.g. by filtration, by magnetic means (C22B 3/26 takes precedence) **[5]**
3/24 . . . by adsorption on solid substances, e.g. by extraction with solid resins **[5]**
3/26 . . by liquid-liquid extraction using organic compounds **[5]**

Note

In groups C22B 3/28 to C22B 3/40:
(a) in the absence of an indication to the contrary, compounds are classified in the last appropriate place;

(b) when two or more compounds are used successively, each compound is classified as such;
(c) mixtures containing two or more compounds covered individually by the same one of groups C22B 3/28 to C22B 3/38, are classified only in that group. **[5]**

3/28 . . . Amines **[5]**
3/30 . . . Oximes **[5]**
3/32 . . . Carboxylic acids **[5]**
3/34 . . . containing sulfur **[5]**
3/36 . . . Heterocyclic compounds (C22B 3/34 takes precedence) **[5]**
3/38 . . . containing phosphorus **[5]**
3/40 . . . Mixtures **[5]**
3/42 . . by ion-exchange extraction **[5]**
3/44 . . by chemical processes (C22B 3/26, C22B 3/42 take precedence) **[5]**
3/46 . . . by substitution, e.g. by cementation **[5]**

4/00 Electrothermal treatment of ores or metallurgical products for obtaining metals or alloys (general methods of refining or remelting metals C22B 9/00; obtaining iron or steel C21B, C21C) **[2]**
4/02 . Light metals **[2]**
4/04 . Heavy metals **[2]**
4/06 . Alloys **[2]**
4/08 . Apparatus **[2]**

5/00 General processes of reducing to metals
5/02 . Dry processes
5/04 . . by aluminium, other metals, or silicon
5/06 . . by carbides or the like
5/08 . . by sulfides; Roasting reaction processes
5/10 . . by solid carbonaceous reducing agents
5/12 . . by gases
5/14 . . . fluidised material
5/16 . . with volatilisation or condensation of the metal being produced
5/18 . . Reducing step-by-step
5/20 . . from metal carbonyls

7/00 Working-up raw materials other than ores, e.g. scrap, to produce non-ferrous metals or compounds thereof
7/02 . Working-up flue dust
7/04 . Working-up slag

9/00 General processes of refining or remelting of metals; **Apparatus for electroslag or arc remelting of metals**
9/02 . Refining by liquating, filtering, centrifuging, distilling or supersonic wave action
9/04 . Refining by applying a vacuum **[3]**
9/05 . Refining by treating with gases, e.g. gas flushing **[3]**
9/10 . with refining or fluxing agents; Use of materials therefor (C22B 9/18 takes precedence) **[3]**
9/14 . Refining in the solid state
9/16 . Remelting metals (liquating C22B 9/02) **[3]**
9/18 . . Electroslag remelting **[3]**
9/187 . . . Apparatus therefor, e.g. furnaces **[5]**
9/193 . . . . Moulds, bottom plates or starter plates **[5]**
9/20 . . Arc remelting **[3]**
9/21 . . . Apparatus therefor **[5]**
9/22 . . with heating by wave energy or particle radiation **[3]**

11/00 Obtaining noble metals
11/02 . by dry processes
11/06 . Chloridising
11/08 . by cyaniding
11/10 . by amalgamating
11/12 . . Apparatus therefor

13/00 Obtaining lead
13/02 . by dry processes
13/06 . Refining
13/08 . . Separating metals from lead by precipitating, e.g. by Parkes process
13/10 . . Separating metals from lead by crystallising, e.g. by Pattison process

15/00 Obtaining copper
15/02 . in blast furnaces
15/04 . in reverberatory furnaces
15/06 . in converters
15/14 . Refining

17/00 Obtaining cadmium
17/02 . by dry processes
17/06 . Refining

19/00 Obtaining zinc or zinc oxide
19/02 . Preliminary treatment of ores; Preliminary refining of zinc oxide
19/04 . Obtaining zinc by distilling
19/06 . . in muffle furnaces
19/08 . . in blast furnaces
19/10 . . in reverberatory furnaces
19/12 . . in crucible furnaces
19/14 . . in vertical retorts
19/16 . . Distilling vessels
19/18 . . . Condensers; Receiving vessels
19/20 . Obtaining zinc otherwise than by distilling
19/28 . from muffle furnace residues
19/30 . from metallic residues or scraps
19/32 . Refining zinc
19/34 . Obtaining zinc oxide (purifying zinc oxide C01G 9/02)
19/36 . . in blast or reverberatory furnaces
19/38 . . in rotary furnaces

21/00 Obtaining aluminium
21/02 . with reducing
21/04 . with alkali metals
21/06 . Refining

23/00 Obtaining nickel or cobalt
23/02 . by dry processes
23/06 . Refining

25/00 Obtaining tin
25/02 . by dry processes
25/06 . from scrap, especially tin scrap (by electrolytic process C25C 1/14)
25/08 . Refining

26/00 Obtaining alkali, alkaline earth metals or magnesium [2]
26/10 . Obtaining alkali metals **[2]**
26/12 . . Obtaining lithium **[2]**
26/20 . Obtaining alkaline earth metals or magnesium **[2]**
26/22 . . Obtaining magnesium **[2]**

30/00 Obtaining antimony, arsenic or bismuth [2]
30/02 . Obtaining antimony **[2]**
30/04 . Obtaining arsenic **[2]**
30/06 . Obtaining bismuth **[2]**

34/00 Obtaining refractory metals [2]
34/10 . Obtaining titanium, zirconium or hafnium **[2]**
34/12 . . Obtaining titanium **[2]**
34/14 . . Obtaining zirconium or hafnium **[2]**
34/20 . Obtaining niobium, tantalum or vanadium **[2]**
34/22 . . Obtaining vanadium **[2]**
34/24 . . Obtaining niobium or tantalum **[2]**
34/30 . Obtaining chromium, molybdenum or tungsten **[2]**
34/32 . . Obtaining chromium **[2]**
34/34 . . Obtaining molybdenum **[2]**
34/36 . . Obtaining tungsten **[2]**

35/00 Obtaining beryllium

41/00 Obtaining germanium

43/00 Obtaining mercury

47/00 Obtaining manganese

58/00 Obtaining gallium or indium [2]

59/00 Obtaining rare earth metals

60/00 Obtaining metals of atomic number 87 or higher, i.e. radioactive metals [2]
60/02 . Obtaining thorium, uranium or other actinides **[2]**
60/04 . . Obtaining plutonium **[2]**

61/00 Obtaining metals not elsewhere provided for in this subclass (iron C21) **[2]**

C22C ALLOYS (treatment of alloys C21D, C22F)

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "alloys" includes also:
(a) metallic composite materials containing a substantial proportion of fibres or other somewhat larger particles;
(b) ceramic compositions containing free metal bonded to carbides, diamond, oxides, borides, nitrides or silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides, other than as macroscopic reinforcing agents. **[4]**
– "based on" requires at least 50% by weight of the specified constituent or of the specified group of constituents. **[2]**

Subclass index

Non-ferrous alloys, i.e. alloys based essentially on metals other than iron [2,5]

Note

Groups C22C 43/00 to C22C 49/00 take precedence over groups C22C 1/00 to C22C 38/00. **[2009.01]**

1/00 Making non-ferrous alloys (by electrothermic methods C22B 4/00; by electrolysis C25C)
1/02 . by melting
1/03 . . using master alloys **[2]**
1/04 . by powder metallurgy (C22C 1/08 takes precedence) **[2]**
1/05 . . Mixtures of metal powder with non-metallic powder (C22C 1/08 takes precedence) **[2]**
1/06 . with the use of special agents for refining or deoxidising
1/08 . Alloys with open or closed pores
1/10 . Alloys containing non-metals (C22C 1/08 takes precedence) **[2]**

3/00 Removing material from non-ferrous alloys to produce alloys of different constitution

5/00 Alloys based on noble metals
5/02 . Alloys based on gold **[2]**
5/04 . Alloys based on a platinum group metal **[2]**
5/06 . Alloys based on silver **[2]**
5/08 . . with copper as the next major constituent **[2]**
5/10 . . with cadmium as the next major constituent **[2]**

7/00 Alloys based on mercury

9/00 Alloys based on copper
9/01 . with aluminium as the next major constituent **[2]**
9/02 . with tin as the next major constituent **[2]**
9/04 . with zinc as the next major constituent **[2]**
9/05 . with manganese as the next major constituent **[2]**
9/06 . with nickel or cobalt as the next major constituent **[2]**
9/08 . with lead as the next major constituent **[2]**
9/10 . with silicon as the next major constituent

11/00 Alloys based on lead
11/02 . with an alkali or an alkaline earth metal as the next major constituent **[2]**
11/04 . with copper as the next major constituent **[2]**
11/06 . with tin as the next major constituent **[2]**

11/08 . with antimony or bismuth as the next major constituent **[2]**
11/10 . . with tin **[2]**

12/00 Alloys based on antimony or bismuth [2]

13/00 Alloys based on tin
13/02 . with antimony or bismuth as the next major constituent **[2]**

14/00 Alloys based on titanium [2]

16/00 Alloys based on zirconium [2]

18/00 Alloys based on zinc [2]
18/02 . with copper as the next major constituent **[2]**
18/04 . with aluminium as the next major constituent **[2]**

19/00 Alloys based on nickel or cobalt
19/03 . based on nickel **[2]**
19/05 . . with chromium **[2]**
19/07 . based on cobalt **[2]**

20/00 Alloys based on cadmium [2]

21/00 Alloys based on aluminium
21/02 . with silicon as the next major constituent **[2]**
21/04 . . Modified aluminium-silicon alloys
21/06 . with magnesium as the next major constituent **[2]**
21/08 . . with silicon **[2]**
21/10 . with zinc as the next major constituent **[2]**
21/12 . with copper as the next major constituent **[2]**

Note

In groups C22C 21/14 to C22C 21/18, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place. **[4]**

21/14 . . with silicon **[2]**
21/16 . . with magnesium **[2]**
21/18 . . with zinc **[2]**

22/00 Alloys based on manganese [2]

23/00 Alloys based on magnesium
23/02 . with aluminium as the next major constituent **[2]**
23/04 . with zinc or cadmium as the next major constituent **[2]**
23/06 . with a rare earth metal as the next major constituent **[2]**

24/00 Alloys based on an alkali or an alkaline earth metal [2]

25/00 Alloys based on beryllium

26/00 Alloys containing diamond [4]

27/00 Alloys based on rhenium or a refractory metal not mentioned in groups C22C 14/00 or C22C 16/00 [2]
27/02 . Alloys based on vanadium, niobium or tantalum **[2]**
27/04 . Alloys based on tungsten or molybdenum **[2]**
27/06 . Alloys based on chromium **[2]**

28/00 Alloys based on a metal not provided for in groups C22C 5/00 to C22C 27/00 [2]

29/00 Alloys based on carbides, oxides, borides, nitrides or silicides, e.g. cermets, or other metal compounds, e. g. oxynitrides, sulfides [4]
29/02 . based on carbides or carbonitrides **[4]**
29/04 . . based on carbonitrides **[4]**
29/06 . . based on carbides, but not containing other metal compounds **[4]**
29/08 . . . based on tungsten carbide **[4]**
29/10 . . . based on titanium carbide **[4]**
29/12 . based on oxides **[4]**
29/14 . based on borides **[4]**
29/16 . based on nitrides **[4]**
29/18 . based on silicides **[4]**

30/00 Alloys containing less than 50% by weight of each constituent [2]

Note

In groups C22C 30/02 to C22C 30/06, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place. **[4]**

30/02 . containing copper **[2]**
30/04 . containing tin or lead **[2]**
30/06 . containing zinc **[2]**

32/00 Non-ferrous alloys containing at least 5% by weight but less than 50% by weight of oxides, carbides, borides, nitrides, silicides or other metal compounds, e.g. oxynitrides, sulfides, whether added as such or formed in situ [2]

Ferrous alloys, i.e. alloys based on iron [2,5]

33/00 Making ferrous alloys (heat treatment thereof C21D 5/00, C21D 6/00)
33/02 . by powder metallurgy
33/04 . by melting **[2]**
33/06 . . using master alloys **[2]**
33/08 . Making cast-iron alloys **[2]**
33/10 . . including procedures for adding magnesium **[2]**
33/12 . . . by fluidised injection **[2]**

35/00 Master alloys for iron or steel

Note

In groups C22C 37/00 and C22C 38/00, in the absence of an indication to the contrary, an alloy is classified in the last appropriate place that provides for one of the alloying components. **[2]**

37/00 Cast-iron alloys [2]
37/04 . containing spheroidal graphite
37/06 . containing chromium **[2]**
37/08 . . with nickel
37/10 . containing aluminium or silicon

38/00 Ferrous alloys, e.g. steel alloys (cast-iron alloys C22C 37/00) **[2]**
38/02 . containing silicon **[2]**
38/04 . containing manganese **[2]**
38/06 . containing aluminium **[2]**
38/08 . containing nickel **[2]**
38/10 . containing cobalt **[2]**
38/12 . containing tungsten, tantalum, molybdenum, vanadium or niobium **[2]**
38/14 . containing titanium or zirconium **[2]**
38/16 . containing copper **[2]**
38/18 . containing chromium **[2]**

38/20 . . with copper **[2]**
38/22 . . with molybdenum or tungsten **[2]**
38/24 . . with vanadium **[2]**
38/26 . . with niobium or tantalum **[2]**
38/28 . . with titanium or zirconium **[2]**
38/30 . . with cobalt **[2]**
38/32 . . with boron **[2]**
38/34 . . with more than 1.5% by weight of silicon **[2]**
38/36 . . with more than 1.7% by weight of carbon **[2]**
38/38 . . with more than 1.5% by weight of manganese **[2]**
38/40 . . with nickel **[2]**
38/42 . . . with copper **[2]**
38/44 . . . with molybdenum or tungsten **[2]**
38/46 . . . with vanadium **[2]**
38/48 . . . with niobium or tantalum **[2]**
38/50 . . . with titanium or zirconium **[2]**
38/52 . . . with cobalt **[2]**
38/54 . . . with boron **[2]**
38/56 . . . with more than 1.7% by weight of carbon **[2]**
38/58 . . . with more than 1.5% by weight of manganese **[2]**
38/60 . containing lead, selenium, tellurium or antimony, or more than 0.04% by weight of sulfur **[2]**

43/00 Alloys containing radioactive materials [2]

45/00 Amorphous alloys [5]
45/02 . with iron as the major constituent **[5]**
45/04 . with nickel or cobalt as the major constituent **[5]**
45/06 . with beryllium as the major constituent **[5]**
45/08 . with aluminium as the major constituent **[5]**
45/10 . with molybdenum, tungsten, niobium, tantalum, titanium, or zirconium as the major constituent **[5]**

Alloys containing fibres or filaments [7]

Note

In groups C22C 47/00 and C22C 49/00, it is desirable to add the indexing codes of groups C22C 101/00, C22C 111/00 and C22C 121/00. **[7]**

47/00 Making alloys containing metallic or non-metallic fibres or filaments [7]
47/02 . Pretreatment of the fibres or filaments **[7]**
47/04 . . by coating, e.g. with a protective or activated covering **[7]**
47/06 . . by forming the fibres or filaments into a preformed structure, e.g. using a temporary binder to form a mat-like element **[7]**
47/08 . by contacting the fibres or filaments with molten metal, e.g. by infiltrating the fibres or filaments placed in a mould **[7]**
47/10 . . Infiltration in the presence of a reactive atmosphere; Reactive infiltration **[7]**
47/12 . . Infiltration or casting under mechanical pressure **[7]**
47/14 . by powder metallurgy, i.e. by processing mixtures of metal powder and fibres or filaments **[7]**
47/16 . by thermal spraying of the metal, e.g. plasma spraying **[7]**
47/18 . . using a preformed structure of fibres or filaments **[7]**
47/20 . by subjecting to pressure and heat an assembly comprising at least one metal layer or sheet and one layer of fibres or filaments **[7]**

49/00 Alloys containing metallic or non-metallic fibres or filaments [7]
49/02 . characterised by the matrix material **[7]**
49/04 . . Light metals **[7]**
49/06 . . . Aluminium **[7]**
49/08 . . Iron group metals **[7]**
49/10 . . Refractory metals **[7]**
49/11 . . . Titanium **[7]**
49/12 . . Intermetallic matrix material **[7]**
49/14 . characterised by the fibres or filaments **[7]**

Indexing scheme associated with groups C22C 47/00 and C22C 49/00, relating to the nature of the fibrous materials contained in metal-fibrous composites. [7]

101/00 Non-metallic fibres or filaments [7]
101/02 . based on oxides, e.g. oxide ceramic fibres **[7]**
101/04 . . Aluminium oxide **[7]**
101/06 . . Mixed oxides, e.g. aluminium silicate or glass **[7]**
101/08 . based on non-oxides, e.g. non-oxide ceramic fibres **[7]**
101/10 . . Carbon **[7]**
101/12 . . Carbides **[7]**
101/14 . . . Silicon carbide **[7]**
101/16 . . Nitrides **[7]**
101/18 . . . Silicon nitride **[7]**
101/20 . . Boron **[7]**
101/22 . . Borides **[7]**

111/00 Metallic fibres or filaments [7]
111/02 . Refractory metal fibres or filaments, e.g. tungsten fibres **[7]**

121/00 Pretreated fibres or filaments [7]
121/02 . Coated fibres or filaments, e.g. ceramic fibres with protective coatings **[7]**

C22F CHANGING THE PHYSICAL STRUCTURE OF NON-FERROUS METALS OR NON-FERROUS ALLOYS (general methods or devices for heat treatment of ferrous or non-ferrous metals or alloys C21D; surface treatment of metallic material involving at least one process provided for in class C23 and at least one process covered by this subclass C23F 17/00)

1/00 Changing the physical structure of non-ferrous metals or alloys by heat treatment or by hot or cold working
1/02 . in inert or controlled atmosphere or vacuum
1/04 . of aluminium or alloys based thereon
1/043 . . of alloys with silicon as the next major constituent **[4]**
1/047 . . of alloys with magnesium as the next major constituent **[4]**

1/05 . . of alloys of the Al-Si-Mg type, i.e. containing silicon and magnesium in approximately equal proportions **[4]**

1/053 . . of alloys with zinc as the next major constituent **[4]**

1/057 . . of alloys with copper as the next major constituent **[4]**

1/06 . of magnesium or alloys based thereon

1/08 . of copper or alloys based thereon

1/10 . of nickel or cobalt or alloys based thereon

1/11 . of chromium or alloys based thereon

1/12 . of lead or alloys based thereon

1/14 . of noble metals or alloys based thereon

1/16 . of other metals or alloys based thereon

1/18 . . High-melting or refractory metals or alloys based thereon

3/00 Changing the physical structure of non-ferrous metals or alloys by special physical methods, e.g. treatment with neutrons

3/02 . by solidifying a melt controlled by supersonic waves or electric or magnetic fields

C23 COATING METALLIC MATERIAL; COATING MATERIAL WITH METALLIC MATERIAL; CHEMICAL SURFACE TREATMENT; DIFFUSION TREATMENT OF METALLIC MATERIAL; COATING BY VACUUM EVAPORATION, BY SPUTTERING, BY ION IMPLANTATION OR BY CHEMICAL VAPOUR DEPOSITION, IN GENERAL; INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL [2]

Note

In this class, the following expression is used with the meaning indicated:
– "metallic material" covers:
(a) metals; **[4]**
(b) alloys (attention is drawn to the Note following the title of subclass C22C).

C23C COATING METALLIC MATERIAL; COATING MATERIAL WITH METALLIC MATERIAL; SURFACE TREATMENT OF METALLIC MATERIAL BY DIFFUSION INTO THE SURFACE, BY CHEMICAL CONVERSION OR SUBSTITUTION; COATING BY VACUUM EVAPORATION, BY SPUTTERING, BY ION IMPLANTATION OR BY CHEMICAL VAPOUR DEPOSITION, IN GENERAL (applying liquids or other fluent materials to surfaces in general B05; making metal-coated products by extrusion B21C 23/22; covering with metal by connecting pre-existing layers to articles, see the relevant places, e.g. B21D 39/00, B23K; working of metal by the action of a high concentration of electric current on a workpiece using an electrode B23H; metallising of glass C03C; metallising mortars, concrete, artificial stone, ceramics or natural stone C04B 41/00; paints, varnishes, lacquers C09D; enamelling of, or applying a vitreous layer to, metals C23D; inhibiting corrosion of metallic material or incrustation in general C23F; treating metal surfaces or coating of metals by electrolysis or electrophoresis C25D, C25F; single-crystal film growth C30B; by metallising textiles D06M 11/83; decorating textiles by locally metallising D06Q 1/04; details of scanning-probe apparatus, in general G01Q; manufacture of semiconductor devices H01L; manufacture of printed circuits H05K) **[4]**

Note

In this subclass, an operation is considered as pretreatment or after-treatment when it is specially adapted for, but quite distinct from, the coating process concerned and constitutes an independent operation. If an operation results in the formation of a permanent sub- or upper layer, it is not considered as pretreatment or after-treatment and is classified as a multi-coating process. **[4]**

Subclass index

Coating by applying the coating material in the molten state [4]

2/00 Hot-dipping or immersion processes for applying the coating material in the molten state without affecting the shape; Apparatus therefor [4]

2/02 . Pretreatment of the material to be coated, e.g. for coating on selected surface areas (C23C 2/30 takes precedence) **[4]**
2/04 . characterised by the coating material **[4]**
2/06 . . Zinc or cadmium or alloys based thereon **[4]**
2/08 . . Tin or alloys based thereon **[4]**
2/10 . . Lead or alloys based thereon **[4]**
2/12 . . Aluminium or alloys based thereon **[4]**
2/14 . Removing excess of molten coatings; Controlling or regulating the coating thickness (controlling or regulating thickness in general G05D 5/02) **[4]**
2/16 . . using fluids under pressure, e.g. air knives **[4]**
2/18 . . . Removing excess of molten coatings from elongated material **[4]**
2/20 . . . . Strips; Plates **[4]**
2/22 . . by rubbing, e.g. using knives **[4]**
2/24 . . using magnetic or electric fields **[4]**
2/26 . After-treatment (C23C 2/14 takes precedence) **[4]**
2/28 . . Thermal after-treatment, e.g. treatment in oil bath **[4]**
2/30 . Fluxes or coverings on molten baths (C23C 2/22 takes precedence) **[4]**
2/32 . using vibratory energy applied to the bath or substrate (C23C 2/14 takes precedence) **[4]**
2/34 . characterised by the shape of the material to be treated (C23C 2/14 takes precedence) **[4]**
2/36 . . Elongated material **[4]**
2/38 . . . Wires; Tubes **[4]**
2/40 . . . Plates; Strips **[4]**

4/00 Coating by spraying the coating material in the molten state, e.g. by flame, plasma or electric discharge (built-up welding B23K, e.g. B23K 5/18, B23K 9/04; spraying guns B05B; making alloys containing fibres or filaments by thermal spraying of metal C22C 47/16; plasma guns H05H) **[4]**

4/02 . Pretreatment of the material to be coated, e.g. for coating on selected surface areas **[4]**
4/04 . characterised by the coating material **[4]**

4/06 . . Metallic material **[4]**
4/08 . . . containing only metal elements **[4]**
4/10 . . Oxides, borides, carbides, nitrides, silicides or mixtures thereof **[4]**
4/12 . characterised by the method of spraying **[4]**
4/14 . . for covering elongated material **[4]**
4/16 . . . Wires; Tubes **[4]**
4/18 . After-treatment **[4]**

6/00 Coating by casting molten material on the substrate [4]

Solid state diffusion into metallic material surfaces [4]

8/00 Solid state diffusion of only non-metal elements into metallic material surfaces (diffusion of silicon C23C 10/00); **Chemical surface treatment of metallic material by reaction of the surface with a reactive gas, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals** (C23C 14/00 takes precedence) **[4]**
8/02 . Pretreatment of the material to be coated (C23C 8/04 takes precedence) **[4]**
8/04 . Treatment of selected surface areas, e.g. using masks **[4]**
8/06 . using gases **[4]**
8/08 . . only one element being applied **[4]**
8/10 . . . Oxidising **[4]**
8/12 . . . . using elemental oxygen or ozone **[4]**
8/14 . . . . . Oxidising of ferrous surfaces **[4]**
8/16 . . . . using oxygen-containing compounds, e.g. H_2O, CO_2 **[4]**
8/18 . . . . . Oxidising of ferrous surfaces **[4]**
8/20 . . . Carburising **[4]**
8/22 . . . . of ferrous surfaces **[4]**
8/24 . . . Nitriding **[4]**
8/26 . . . . of ferrous surfaces **[4]**
8/28 . . more than one element being applied in one step **[4]**
8/30 . . . Carbo-nitriding **[4]**
8/32 . . . . of ferrous surfaces **[4]**
8/34 . . more than one element being applied in more than one step **[4]**
8/36 . . using ionised gases, e.g. ionitriding (discharge tubes with provision for introducing objects or material to be exposed to the discharge H01J 37/00) **[4]**
8/38 . . . Treatment of ferrous surfaces **[4]**
8/40 . using liquids, e.g. salt baths, liquid suspensions **[4]**
8/42 . . only one element being applied **[4]**
8/44 . . . Carburising **[4]**
8/46 . . . . of ferrous surfaces **[4]**
8/48 . . . Nitriding **[4]**
8/50 . . . . of ferrous surfaces **[4]**
8/52 . . more than one element being applied in one step **[4]**
8/54 . . . Carbo-nitriding **[4]**
8/56 . . . . of ferrous surfaces **[4]**
8/58 . . more than one element being applied in more than one step **[4]**
8/60 . using solids, e.g. powders, pastes (using liquid suspensions of solids C23C 8/40) **[4]**
8/62 . . only one element being applied **[4]**
8/64 . . . Carburising **[4]**
8/66 . . . . of ferrous surfaces **[4]**
8/68 . . . Boronising **[4]**
8/70 . . . . of ferrous surfaces **[4]**
8/72 . . more than one element being applied in one step **[4]**
8/74 . . . Carbo-nitriding **[4]**
8/76 . . . . of ferrous surfaces **[4]**
8/78 . . more than one element being applied in more than one step **[4]**
8/80 . After-treatment **[4]**

10/00 Solid state diffusion of only metal elements or silicon into metallic material surfaces [4]
10/02 . Pretreatment of the material to be coated (C23C 10/04 takes precedence) **[4]**
10/04 . Diffusion into selected surface areas, e.g. using masks **[4]**
10/06 . using gases **[4]**
10/08 . . only one element being diffused **[4]**
10/10 . . . Chromising **[4]**
10/12 . . . . of ferrous surfaces **[4]**
10/14 . . more than one element being diffused in one step **[4]**
10/16 . . more than one element being diffused in more than one step **[4]**
10/18 . using liquids, e.g. salt baths, liquid suspensions **[4]**
10/20 . . only one element being diffused **[4]**
10/22 . . . Metal melt containing the element to be diffused **[4]**
10/24 . . . Salt bath containing the element to be diffused **[4]**
10/26 . . more than one element being diffused **[4]**
10/28 . using solids, e.g. powders, pastes **[4]**
10/30 . . using a layer of powder or paste on the surface (using liquid suspensions of solids C23C 10/18) **[4]**
10/32 . . . Chromising **[4]**
10/34 . . Embedding in a powder mixture, i.e. pack cementation **[4]**
10/36 . . . only one element being diffused **[4]**
10/38 . . . . Chromising **[4]**
10/40 . . . . . of ferrous surfaces **[4]**
10/42 . . . . . in the presence of volatile transport additives, e.g. halogenated substances **[4]**
10/44 . . . . Siliconising **[4]**
10/46 . . . . . of ferrous surfaces **[4]**
10/48 . . . . Aluminising **[4]**
10/50 . . . . . of ferrous surfaces **[4]**
10/52 . . . more than one element being diffused in one step **[4]**
10/54 . . . . Diffusion of at least chromium **[4]**
10/56 . . . . . and at least aluminium **[4]**
10/58 . . . more than one element being diffused in more than one step **[4]**
10/60 . After-treatment **[4]**

12/00 Solid state diffusion of at least one non-metal element other than silicon and at least one metal element or silicon into metallic material surfaces [4]
12/02 . Diffusion in one step **[4]**

Coating by vacuum evaporation, by sputtering or by ion implantation [4]

14/00 Coating by vacuum evaporation, by sputtering or by ion implantation of the coating forming material (discharge tubes with provision for introducing objects or material to be exposed to the discharge H01J 37/00) **[4]**

14/02 . Pretreatment of the material to be coated (C23C 14/04 takes precedence) **[4]**

14/04 . Coating on selected surface areas, e.g. using masks **[4]**

14/06 . characterised by the coating material (C23C 14/04 takes precedence) **[4]**

14/08 . . Oxides (C23C 14/10 takes precedence) **[4]**

14/10 . . Glass or silica **[4]**

14/12 . . Organic material **[4]**

14/14 . . Metallic material, boron or silicon **[4]**

14/16 . . . on metallic substrates or on substrates of boron or silicon **[4]**

14/18 . . . on other inorganic substrates **[4]**

14/20 . . . on organic substrates **[4]**

14/22 . characterised by the process of coating **[4]**

14/24 . . Vacuum evaporation **[4]**

14/26 . . . by resistance or inductive heating of the source **[4]**

14/28 . . . by wave energy or particle radiation (C23C 14/32 to C23C 14/48 take precedence) **[4]**

14/30 . . . . by electron bombardment **[4]**

14/32 . . . by explosion; by evaporation and subsequent ionisation of the vapours (C23C 14/34 to C23C 14/48 take precedence) **[4]**

14/34 . . Sputtering **[4]**

14/35 . . . by application of a magnetic field, e.g. magnetron sputtering **[5]**

14/36 . . . Diode sputtering (C23C 14/35 takes precedence) **[4,5]**

14/38 . . . . by direct current glow discharge **[4]**

14/40 . . . . with alternating current discharge, e.g. high-frequency discharge **[4]**

14/42 . . . Triode sputtering (C23C 14/35 takes precedence) **[4,5]**

14/44 . . . . by application of high frequencies and additional direct voltages **[4]**

14/46 . . . by ion beam produced by an external ion source (C23C 14/40 takes precedence) **[4]**

14/48 . . Ion implantation **[4]**

14/50 . . Substrate holders **[4]**

14/52 . . Means for observation of the coating process **[4]**

14/54 . . Controlling or regulating the coating process (controlling or regulating in general G05) **[4]**

14/56 . . Apparatus specially adapted for continuous coating; Arrangements for maintaining the vacuum, e.g. vacuum locks **[4]**

14/58 . After-treatment **[4]**

Chemical deposition or plating by decomposition; **Contact plating [4]**

16/00 Chemical coating by decomposition of gaseous compounds, without leaving reaction products of surface material in the coating, i.e. chemical vapour deposition (CVD) processes (reactive sputtering or vacuum evaporation C23C 14/00) **[4]**

16/01 . on temporary substrates, e.g. on substrates subsequently removed by etching **[7]**

16/02 . Pretreatment of the material to be coated (C23C 16/04 takes precedence) **[4]**

16/04 . Coating on selected surface areas, e.g. using masks **[4]**

16/06 . characterised by the deposition of metallic material **[4]**

16/08 . . from metal halides **[4]**

16/10 . . . Deposition of chromium only **[4]**

16/12 . . . Deposition of aluminium only **[4]**

16/14 . . . Deposition of only one other metal element **[4]**

16/16 . . from metal carbonyl compounds **[4]**

16/18 . . from metallo-organic compounds **[4]**

16/20 . . . Deposition of aluminium only **[4]**

16/22 . characterised by the deposition of inorganic material, other than metallic material **[4]**

16/24 . . Deposition of silicon only **[4]**

16/26 . . Deposition of carbon only **[4]**

16/27 . . . Diamond only **[7]**

16/28 . . Deposition of only one other non-metal element **[4]**

16/30 . . Deposition of compounds, mixtures or solid solutions, e.g. borides, carbides, nitrides **[4]**

16/32 . . . Carbides **[4]**

16/34 . . . Nitrides **[4]**

16/36 . . . Carbo-nitrides **[4]**

16/38 . . . Borides **[4]**

16/40 . . . Oxides **[4]**

16/42 . . . Silicides **[4]**

16/44 . characterised by the method of coating (C23C 16/04 takes precedence) **[4]**

16/442 . . using fluidised bed processes **[7]**

16/448 . . characterised by the method used for generating reactive gas streams, e.g. by evaporation or sublimation of precursor materials **[7]**

16/452 . . . by activating reactive gas streams before introduction into the reaction chamber, e.g. by ionization or by addition of reactive species **[7]**

16/453 . . passing the reaction gases through burners or torches, e.g. atmospheric pressure CVD (C23C 16/513 takes precedence; for flame or plasma spraying of coating material in the molten state C23C 4/00) **[7]**

16/455 . . characterised by the method used for introducing gases into the reaction chamber or for modifying gas flows in the reaction chamber **[7]**

16/458 . . characterised by the method used for supporting substrates in the reaction chamber **[7]**

16/46 . . characterised by the method used for heating the substrate (C23C 16/48, C23C 16/50 take precedence) **[4]**

16/48 . . by irradiation, e.g. photolysis, radiolysis, particle radiation **[4]**

16/50 . . using electric discharges **[4]**

16/503 . . . using dc or ac discharges **[7]**

16/505 . . . using radio frequency discharges **[7]**

16/507 . . . . using external electrodes, e.g. in tunnel type reactors **[7]**

16/509 . . . . using internal electrodes **[7]**

16/511 . . . using microwave discharges **[7]**

16/513 . . . using plasma jets **[7]**

16/515 . . . using pulsed discharges **[7]**

16/517 . . . using a combination of discharges covered by two or more of groups C23C 16/503 to C23C 16/515 **[7]**

16/52 . . Controlling or regulating the coating process (controlling or regulating in general G05) **[4]**

16/54 . . Apparatus specially adapted for continuous coating **[4]**

16/56 . After-treatment **[4]**

18/00 Chemical coating by decomposition of either liquid compounds or solutions of the coating forming compounds, without leaving reaction products of surface material in the coating (chemical surface reaction C23C 8/00, C23C 22/00); **Contact plating [4]**

Note

This group covers also suspensions containing reactive liquids and non-reactive solid particles. **[4]**

18/02 . by thermal decomposition **[4]**
18/04 . . Pretreatment of the material to be coated (C23C 18/06 takes precedence) **[4]**
18/06 . . Coating on selected surface areas, e.g. using masks **[4]**
18/08 . . characterised by the deposition of metallic material **[4]**
18/10 . . . Deposition of aluminium only **[4]**
18/12 . . characterised by the deposition of inorganic material other than metallic material **[4]**
18/14 . Decomposition by irradiation, e.g. photolysis, particle radiation **[4]**
18/16 . by reduction or substitution, i.e. electroless plating (C23C 18/54 takes precedence) **[4]**
18/18 . . Pretreatment of the material to be coated **[4]**
18/20 . . . of organic surfaces, e.g. resins **[4]**
18/22 . . . . Roughening, e.g. by etching **[4]**
18/24 . . . . . using acid aqueous solutions **[4]**
18/26 . . . . . using organic liquids **[4]**
18/28 . . . . Sensitising or activating **[4]**
18/30 . . . . . Activating **[4]**
18/31 . . Coating with metals **[5]**
18/32 . . . Coating with one of iron, cobalt or nickel; Coating with mixtures of phosphorus or boron with one of these metals **[4,5]**
18/34 . . . . using reducing agents **[4,5]**
18/36 . . . . . using hypophosphites **[4,5]**
18/38 . . . Coating with copper **[4,5]**
18/40 . . . . using reducing agents **[4,5]**
18/42 . . . Coating with noble metals **[4,5]**
18/44 . . . . using reducing agents **[4,5]**
18/48 . . Coating with alloys **[4,5]**
18/50 . . . with alloys based on iron, cobalt or nickel (C23C 18/32 takes precedence) **[4,5]**
18/52 . . using reducing agents for coating with metallic material not provided for in a single one of groups C23C 18/32 to C23C 18/50 **[4]**
18/54 . Contact plating, i.e. electroless electrochemical plating **[4]**

20/00 Chemical coating by decomposition of either solid compounds or suspensions of the coating forming compounds, without leaving reaction products of surface material in the coating (chemical surface reaction C23C 8/00, C23C 22/00) **[4]**

Note

This group covers also suspensions containing non-reactive liquids and reactive solid particles. **[4]**

20/02 . Coating with metallic material **[4]**
20/04 . . with metals **[4]**
20/06 . Coating with inorganic material, other than metallic material **[4]**
20/08 . . with compounds, mixtures or solid solutions, e.g. borides, carbides, nitrides **[4]**

22/00 Chemical surface treatment of metallic material by reaction of the surface with a reactive liquid, leaving reaction products of surface material in the coating, e.g. conversion coatings, passivation of metals (wash primers C09D 5/12) **[4]**

(1) This group covers also suspensions containing reactive liquids and non-reactive solid particles. **[4]**
(2) Rejuvenating of the bath is classified in the appropriate place for the specific bath composition. **[4]**

Note

In groups C23C 22/02 to C23C 22/86, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

22/02 . using non-aqueous solutions **[4]**
22/03 . . containing phosphorus compounds **[4]**
22/04 . . containing hexavalent chromium compounds **[4]**
22/05 . using aqueous solutions **[5]**
22/06 . . using aqueous acidic solutions with pH < 6 **[4,5]**
22/07 . . . containing phosphates **[4,5]**
22/08 . . . . Orthophosphates **[4,5]**
22/10 . . . . . containing oxidants **[4,5]**
22/12 . . . . . containing zinc cations **[4,5]**
22/13 . . . . . containing also nitrate or nitrite anions **[4,5]**
22/14 . . . . . containing also chlorate anions **[4,5]**
22/16 . . . . . containing also peroxy-compounds **[4,5]**
22/17 . . . . . containing also organic acids **[4,5]**
22/18 . . . . . containing manganese cations **[4,5]**
22/20 . . . . . containing aluminium cations **[4,5]**
22/22 . . . . . containing alkaline earth metal cations **[4,5]**
22/23 . . . . Condensed phosphates **[4,5]**
22/24 . . . containing hexavalent chromium compounds **[4,5]**
22/26 . . . . containing also organic compounds **[4,5]**
22/27 . . . . . Acids **[4,5]**
22/28 . . . . . Macromolecular compounds **[4,5]**
22/30 . . . . containing also trivalent chromium **[4,5]**
22/32 . . . . containing also pulverulent metals **[4,5]**
22/33 . . . . containing also phosphates **[4,5]**
22/34 . . . containing fluorides or complex fluorides **[4,5]**
22/36 . . . . containing also phosphates **[4,5]**
22/37 . . . . containing also hexavalent chromium compounds **[4,5]**
22/38 . . . . . containing also phosphates **[4,5]**
22/40 . . . containing molybdates, tungstates or vanadates **[4,5]**
22/42 . . . . containing also phosphates **[4,5]**
22/43 . . . . containing also hexavalent chromium compounds **[4,5]**
22/44 . . . . containing also fluorides or complex fluorides **[4,5]**
22/46 . . . containing oxalates **[4,5]**
22/47 . . . . containing also phosphates **[4,5]**

22/48 . . . not containing phosphates, hexavalent chromium compounds, fluorides or complex fluorides, molybdates, tungstates, vanadates or oxalates **[4,5]**
22/50 . . . . Treatment of iron or alloys based thereon **[4,5]**
22/52 . . . . Treatment of copper or alloys based thereon **[4,5]**
22/53 . . . . Treatment of zinc or alloys based thereon **[4,5]**
22/54 . . . . Treatment of refractory metals or alloys based thereon **[4,5]**
22/56 . . . . Treatment of aluminium or alloys based thereon **[4,5]**
22/57 . . . . Treatment of magnesium or alloys based thereon **[4,5]**
22/58 . . . . Treatment of other metallic material **[4,5]**
22/60 . . using alkaline aqueous solutions with pH > 8 **[4,5]**
22/62 . . . Treatment of iron or alloys based thereon **[4,5]**
22/63 . . . Treatment of copper or alloys based thereon **[4,5]**
22/64 . . . Treatment of refractory metals or alloys based thereon **[4,5]**
22/66 . . . Treatment of aluminium or alloys based thereon **[4,5]**
22/67 . . . . with solutions containing hexavalent chromium **[4,5]**
22/68 . . using aqueous solutions with pH between 6 and 8 **[4,5]**
22/70 . using melts **[4]**
22/72 . . Treatment of iron or alloys based thereon **[4]**
22/73 . characterised by the process **[4]**
22/74 . . for obtaining burned-in conversion coatings **[4]**
22/76 . . Applying the liquid by spraying **[4]**
22/77 . . Controlling or regulating of the coating process (controlling or regulating in general G05) **[4]**
22/78 . Pretreatment of the material to be coated **[4]**
22/80 . . with solutions containing titanium or zirconium compounds **[4]**
22/82 . After-treatment **[4]**
22/83 . . Chemical after-treatment **[4]**
22/84 . . Dyeing **[4]**
22/86 . Regeneration of coating baths **[4]**

24/00 Coating starting from inorganic powder (spraying of the coating material in molten state C23C 4/00; solid state diffusion C23C 8/00 to C23C 12/00; manufacture of composite layers, workpieces or articles by sintering metallic powder B22F 7/00; friction welding B23K 20/12) **[4]**
24/02 . by application of pressure only **[4]**
24/04 . . Impact or kinetic deposition of particles **[4]**
24/06 . . Compressing powdered coating material, e.g. by milling **[4]**
24/08 . by application of heat or pressure and heat (C23C 24/04 takes precedence) **[4]**
24/10 . . with intermediate formation of a liquid phase in the layer **[4]**

26/00 Coating not provided for in groups C23C 2/00 to C23C 24/00 [4]
26/02 . applying molten material to the substrate (applying melts to surfaces, in general B05) **[4]**

28/00 Coating for obtaining at least two superposed coatings either by methods not provided for in a single one of main groups C23C 2/00 to C23C 26/00, or by combinations of methods provided for in subclasses C23C and C25C or C25D [4]
28/02 . only coatings of metallic material **[4]**
28/04 . only coatings of inorganic non-metallic material **[4]**

30/00 Coating with metallic material characterised only by the composition of the metallic material, i.e. not characterised by the coating process (C23C 26/00, C23C 28/00 take precedence) **[4]**

C23D ENAMELLING OF, OR APPLYING A VITREOUS LAYER TO, METALS (chemical composition of the enamels C03C)

Subclass index

1/00 Melting or fritting the enamels; **Apparatus or furnaces therefor**
1/02 . Granulating the melt; Drying the granules

Coating with the enamels

3/00 Chemical treatment of the metal surfaces prior to coating (cleaning or de-greasing of metallic objects C23G)

5/00 Coating with enamels or vitreous layers [4]
5/02 . by wet methods
5/04 . by dry methods
5/06 . producing designs or letters
5/08 . Applying enamels non-uniformly over the surface

7/00 Treating the coatings, e.g. drying before burning

Firing the enamels

9/00 Ovens specially adapted for firing enamels
9/02 . Non-electric muffle furnaces
9/04 . Non-electric tunnel ovens
9/06 . Electric furnaces
9/08 . Supporting devices for burning-bars
9/10 . Loading or unloading devices

11/00 Continuous processes for firing enamels; **Apparatus therefor**

After-treatment

13/00 After-treatment of the enamelled articles

13/02 . Removing defects by local re-melting of the enamel; Adjusting the shape

15/00 Joining enamelled articles to other enamelled articles by processes involving an enamelling step

17/00 De-enamelling

C23F NON-MECHANICAL REMOVAL OF METALLIC MATERIAL FROM SURFACES (working of metal by electro-erosion B23H; desurfacing by applying flames B23K 7/00; working metal by laser beam B23K 26/00; producing decorative effects by removing surface-material, e.g. by engraving, by etching, B44C 1/22); **INHIBITING CORROSION OF METALLIC MATERIAL**; **INHIBITING INCRUSTATION IN GENERAL** (treating metal surfaces or coating of metals by electrolysis or electrophoresis C25D, C25F); **MULTI-STEP PROCESSES FOR SURFACE TREATMENT OF METALLIC MATERIAL INVOLVING AT LEAST ONE PROCESS PROVIDED FOR IN CLASS C23 AND AT LEAST ONE PROCESS COVERED BY SUBCLASS C21D OR C22F OR CLASS C25** (inhibition or prevention of corrosion or incrustation during processing of hydrocarbons C10G 7/10, C10G 9/16, C10G 75/00) **[4]**

(1) This subclass covers inhibiting corrosion or incrustation in general, whether of or on metallic or non-metallic surfaces, subject to Note (2) below.

(2) This subclass does not cover:
- protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. B05, B44, C09D, C10M, C23C;
- mechanical devices or constructional features of particular articles for inhibiting incrustation; these are classified in the appropriate places, e.g. in pipes or pipe fittings F16L 58/00;
- articles characterised by being made of materials selected for their properties of resistance to corrosion or incrustation; these are classified in the appropriate places, e.g. turbine blades F01D 5/28.

(3) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 Etching metallic material by chemical means (manufacture of printing surfaces B41C; manufacture of printed circuits H05K) **[2]**

1/02 . Local etching
1/04 . . Chemical milling
1/06 . Sharpening files
1/08 . Apparatus, e.g. for photomechanical printing surfaces (photomechanical reproduction G03F)
1/10 . Etching compositions (C23F 1/44 takes precedence) **[4]**
1/12 . . Gaseous compositions **[4]**
1/14 . . Aqueous compositions **[4]**
1/16 . . . Acidic compositions (C23F 1/42 takes precedence) **[4]**
1/18 . . . . for etching copper or alloys thereof **[4]**
1/20 . . . . for etching aluminium or alloys thereof **[4]**
1/22 . . . . for etching magnesium or alloys thereof **[4]**
1/24 . . . . for etching silicon or germanium **[4]**
1/26 . . . . for etching refractory metals **[4]**
1/28 . . . . for etching iron group metals **[4]**
1/30 . . . . for etching other metallic material **[4]**
1/32 . . . Alkaline compositions (C23F 1/42 takes precedence) **[4]**
1/34 . . . . for etching copper or alloys thereof **[4]**
1/36 . . . . for etching aluminium or alloys thereof **[4]**
1/38 . . . . for etching refractory metals **[4]**
1/40 . . . . for etching other metallic material **[4]**
1/42 . . . containing a dispersed water-immiscible liquid **[4]**
1/44 . Compositions for etching metallic material from a metallic material substrate of different composition **[4]**
1/46 . Regeneration of etching compositions **[4]**

3/00 Brightening metals by chemical means [2]

3/02 . Light metals
3/03 . . with acidic solutions **[4]**
3/04 . Heavy metals
3/06 . . with acidic solutions **[4]**

4/00 Processes for removing metallic material from surfaces, not provided for in group C23F 1/00 or C23F 3/00 [4]

4/02 . by evaporation **[4]**
4/04 . by physical dissolution **[4]**

11/00 Inhibiting corrosion of metallic material by applying inhibitors to the surface in danger of corrosion or adding them to the corrosive agent (compositions for in situ inhibition of corrosion in boreholes or wells C09K 8/54; adding inhibitors to mineral oils, fuels or lubricants C10; adding inhibitors to pickling solutions C23G)

11/02 . in air or gases by adding vapour phase inhibitors

11/04 . in markedly acid liquids
11/06 . in markedly alkaline liquids
11/08 . in other liquids
11/10 . . using organic inhibitors

Note

In groups C23F 11/12 to C23F 11/173 in the absence of an indication to the contrary, a compound is classified in the last appropriate place.

11/12 . . . Oxygen-containing compounds
11/14 . . . Nitrogen-containing compounds
11/16 . . . Sulfur-containing compounds
11/167 . . . Phosphorus-containing compounds **[4]**
11/173 . . . Macromolecular compounds **[4]**
11/18 . . using inorganic inhibitors

13/00 Inhibiting corrosion of metals by anodic or cathodic protection
13/02 . cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions **[5]**
13/04 . . Controlling or regulating desired parameters **[5]**
13/06 . . Constructional parts, or assemblies of cathodic-protection apparatus **[5]**
13/08 . . . Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto **[5]**
13/10 . . . . Electrodes characterised by the structure (C23F 13/16 takes precedence) **[5]**
13/12 . . . . Electrodes characterised by the material (C23F 13/16 takes precedence) **[5]**
13/14 . . . . . Material for sacrificial anodes **[5]**
13/16 . . . . Electrodes characterised by the combination of the structure and the material **[5]**
13/18 . . . . Means for supporting electrodes **[5]**
13/20 . . . . Conducting electric current to electrodes **[5]**
13/22 . . . . Monitoring arrangements therefor **[5]**

14/00 Inhibiting incrustation in apparatus for heating liquids for physical or chemical purposes (adding scale preventives or removers to water C02F 5/00) **[2]**
14/02 . by chemical means

15/00 Other methods of preventing corrosion or incrustation

17/00 Multi-step processes for surface treatment of metallic material involving at least one process provided for in class C23 and at least one process covered by subclass C21D or C22F or class C25 (C23C 28/00 takes precedence) **[4]**

C23G CLEANING OR DE-GREASING OF METALLIC MATERIAL BY CHEMICAL METHODS OTHER THAN ELECTROLYSIS (polishing compositions C09G; detergents in general C11D)

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

1/00 Cleaning or pickling metallic material with solutions or molten salts (with organic solvents C23G 5/02)
1/02 . with acid solutions
1/04 . . using inhibitors
1/06 . . . organic inhibitors
1/08 . . Iron or steel
1/10 . . Other heavy metals
1/12 . . Light metals
1/14 . with alkaline solutions
1/16 . . using inhibitors
1/18 . . . Organic inhibitors
1/19 . . Iron or steel **[4]**
1/20 . . Other heavy metals **[4]**
1/22 . . Light metals
1/24 . with neutral solutions
1/26 . . using inhibitors
1/28 . with molten salts
1/30 . . using inhibitors
1/32 . . Heavy metals
1/34 . . Light metals
1/36 . Regeneration of waste pickling liquors

3/00 Apparatus for cleaning or pickling metallic material (with organic solvents C23G 5/04)
3/02 . for cleaning wires, strips, filaments continuously
3/04 . for cleaning pipes

5/00 Cleaning or de-greasing metallic material by other methods; **Apparatus for cleaning or de-greasing metallic material with organic solvents**

Note

In groups C23G 5/02 to C23G 5/06, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

5/02 . using organic solvents
5/024 . . containing hydrocarbons **[4]**
5/028 . . containing halogenated hydrocarbons **[4]**
5/032 . . containing oxygen-containing compounds **[4]**
5/036 . . . having also nitrogen **[4]**
5/04 . . Apparatus
5/06 . using emulsions **[4]**

C25 ELECTROLYTIC OR ELECTROPHORETIC PROCESSES; APPARATUS THEREFOR [4]

(1) Electrolytic or electrophoretic processes or apparatus or operational features are classified
(i) in the groups for the compounds or articles produced, and
(ii) in the groups which cover the apparatus or operational features. **[2]**

(2) The electrolytic or electrophoretic purification of materials is classified according to the nature of the liquid in the relevant places, e.g. A01K 63/00, C02F 1/46, C25B 15/08, C25D 21/16, C25F 7/02. **[2]**

Class index

C25B ELECTROLYTIC OR ELECTROPHORETIC PROCESSES FOR THE PRODUCTION OF COMPOUNDS OR NON-METALS; APPARATUS THEREFOR (anodic or cathodic protection C23F; single-crystal growth C30B) **[2]**

(1) In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2]**

(2) Compounds of particular interest are also classified in the relevant classes, e.g. in C01, C07. **[2]**

1/00 Electrolytic production of inorganic compounds or non-metals [2]

1/02 . of hydrogen or oxygen **[2]**
1/04 . . by electrolysis of water **[2]**
1/06 . . . in cells with flat or plate-like electrodes **[2]**
1/08 . . . . of the filter-press type **[2]**
1/10 . . . in diaphragm cells **[2]**
1/12 . . . in pressure cells **[2]**
1/13 . of ozone **[7]**
1/14 . of alkali metal compounds **[2]**
1/16 . . Hydroxides **[2]**
1/18 . of alkaline earth metal compounds or magnesium compounds **[2]**
1/20 . . Hydroxides **[2]**
1/21 . of manganese oxides **[7]**
1/22 . of inorganic acids **[2]**
1/24 . of halogens or compounds thereof **[2]**
1/26 . . Chlorine; Compounds thereof **[2]**
1/28 . of per-compounds **[2]**
1/30 . . Peroxides **[2]**
1/32 . . Perborates **[2]**
1/34 . Simultaneous production of alkali metal hydroxides and chlorine, its oxyacids or salts **[2]**
1/36 . . in mercury cathode cells **[2]**
1/38 . . . with vertical mercury cathode **[2]**
1/40 . . . with horizontal mercury cathode **[2]**
1/42 . . . Decomposition of amalgams **[2]**
1/44 . . . . with the aid of catalysts **[2]**
1/46 . . in diaphragm cells **[2]**

3/00 Electrolytic production of organic compounds [2]

3/02 . by oxidation **[2]**
3/04 . by reduction **[2]**
3/06 . by halogenation **[2]**
3/08 . . by fluorination **[2]**
3/10 . by coupling reactions, e.g. dimerisation **[2]**
3/12 . of organo-metallic compounds **[2]**

5/00 Electrogenerative processes, i.e. processes for producing compounds in which simultaneously electricity is generated [2]

7/00 Electrophoretic production of compounds or non-metals (separation or purification of peptides, e.g. of proteins, by electrophoresis C07K 1/26) **[2]**

9/00 Cells or assemblies of cells; Constructional parts of cells; Assemblies of constructional parts, e.g. electrode-diaphragm assemblies [2,7]

9/02 . Holders for electrodes **[2]**
9/04 . Devices for current supply (electrical connections in general H01R); Electrode connections; Electric inter-cell connections **[2]**

9/06 . Cells comprising dimensionally-stable non-movable electrodes; Assemblies of constructional parts thereof **[7]**
9/08 . . with diaphragms **[7]**
9/10 . . . including an ion-exchange membrane in or on which electrode material is embedded **[7]**
9/12 . Cells or assemblies of cells comprising at least one movable electrode, e.g. rotary electrodes; Assemblies of constructional parts thereof **[7]**
9/14 . . Liquid electrodes, e.g. mercury electrodes **[7]**
9/16 . Cells or assemblies of cells comprising at least one electrode made of particles; Assemblies of constructional parts thereof **[7]**
9/18 . Assemblies comprising a plurality of cells (assemblies of cells with movable electrodes C25B 9/12; assemblies of cells with electrodes made of particles C25B 9/16) **[7]**
9/20 . . of the filter-press type **[7]**

11/00 **Electrodes**; **Manufacture thereof not otherwise provided for [2]**
11/02 . characterised by shape or form **[2]**
11/03 . . perforated or foraminous **[2]**
11/04 . characterised by the material **[2]**
11/06 . . by the catalytic materials used (catalysts in general B01J) **[2]**
11/08 . . . Noble metals **[2]**
11/10 . . Electrodes based on barrier-type metals, e.g. titanium **[2]**
11/12 . . Electrodes based on carbon (carbon masses in general C04B 35/52) **[2]**
11/14 . . . Impregnation of carbon electrodes (C25B 11/06 takes precedence) **[2]**
11/16 . . Electrodes based on manganese dioxide or lead dioxide **[2]**
11/18 . . Mercury or amalgam electrodes **[2]**

13/00 **Diaphragms**; **Spacing elements [4]**
13/02 . characterised by form or shape **[2]**
13/04 . characterised by the material **[2]**
13/06 . . based on asbestos **[2]**
13/08 . . based on organic materials **[2]**

15/00 **Operating or servicing of cells [2]**
15/02 . Process control or regulation (controlling or regulating in general G05) **[2]**
15/04 . Regulation of the inter-electrode distance (working of metal by the action of a high concentration of electric current B23H) **[2]**
15/06 . Detection or inhibition of short circuits in the cell **[2]**
15/08 . Supplying or removing reactants or electrolytes; Regeneration of electrolytes **[2]**

C25C **PROCESSES FOR THE ELECTROLYTIC PRODUCTION, RECOVERY OR REFINING OF METALS**; **APPARATUS THEREFOR** (anodic or cathodic protection C23F; single-crystal growth C30B) **[2]**

1/00 **Electrolytic production, recovery or refining of metals by electrolysis of solutions** (C25C 5/00 takes precedence) **[2]**
1/02 . of light metals **[2]**
1/04 . . in mercury cathode cells **[2]**
1/06 . of iron group metals, refractory metals or manganese **[2]**
1/08 . . of nickel or cobalt **[2]**
1/10 . . of chromium or manganese **[2]**
1/12 . of copper **[2]**
1/14 . of tin **[2]**
1/16 . of zinc, cadmium or mercury **[2]**
1/18 . of lead **[2]**
1/20 . of noble metals **[2]**
1/22 . of metals not provided for in groups C25C 1/02 to C25C 1/20 **[2]**
1/24 . Alloys obtained by cathodic reduction of all their ions **[2]**

3/00 **Electrolytic production, recovery or refining of metals by electrolysis of melts** (C25C 5/00 takes precedence) **[2]**
3/02 . of alkali or alkaline earth metals **[2]**
3/04 . of magnesium **[2]**
3/06 . of aluminium **[2]**
3/08 . . Cell construction, e.g. bottoms, walls, cathodes **[2]**
3/10 . . . External supporting frames or structures **[2]**
3/12 . . . Anodes **[2]**
3/14 . . Devices for feeding or crust breaking **[2]**
3/16 . . Electric current supply devices, e.g. bus bars **[2]**
3/18 . . Electrolytes **[2]**
3/20 . . Automatic control or regulation of cells (controlling or regulating in general G05) **[2]**
3/22 . . Collecting emitted gases **[2]**
3/24 . . Refining **[2]**
3/26 . of titanium, zirconium, hafnium, tantalum or vanadium **[2]**
3/28 . . of titanium **[2]**
3/30 . of manganese **[2]**
3/32 . of chromium **[2]**
3/34 . of metals not provided for in groups C25C 3/02 to C25C 3/32 **[2]**
3/36 . Alloys obtained by cathodic reduction of all their ions **[2]**

5/00 **Electrolytic production, recovery or refining of metal powders or porous metal masses [2]**
5/02 . from solutions **[2]**
5/04 . from melts **[2]**

7/00 **Constructional parts, or assemblies thereof, of cells**; **Servicing or operating of cells** (for the production of aluminium C25C 3/06 to C25C 3/22) **[2]**
7/02 . Electrodes (consumable anodes for the refining of metals C25C 1/00 to C25C 5/00); Connections thereof **[2]**
7/04 . Diaphragms; Spacing elements **[2]**
7/06 . Operating or servicing **[2]**
7/08 . . Separating of deposited metals from the cathode **[2]**

C25D PROCESSES FOR THE ELECTROLYTIC OR ELECTROPHORETIC PRODUCTION OF COATINGS; **ELECTROFORMING** (manufacturing printed circuits by metal deposition H05K 3/18); **JOINING WORKPIECES BY ELECTROLYSIS**; **APPARATUS THEREFOR** (anodic or cathodic protection C23F; single-crystal growth C30B) **[2,6]**

1/00 Electroforming [2]
1/02 . Tubes; Rings; Hollow bodies **[2]**
1/04 . Wires; Strips; Foils **[2]**
1/06 . Wholly-metallic mirrors **[2]**
1/08 . Perforated or foraminous objects, e.g. sieves (C25D 1/10 takes precedence) **[2]**
1/10 . Moulds; Masks; Masterforms **[2]**
1/12 . by electrophoresis **[2]**
1/14 . . of inorganic material **[2]**
1/16 . . . Metals **[2]**
1/18 . . of organic material **[2]**
1/20 . Separation of the formed objects from the electrodes **[2]**
1/22 . . Separating compounds **[2]**

2/00 Joining workpieces by electrolysis [6]

3/00 Electroplating; **Baths therefor [2]**
3/02 . from solutions (C25D 5/24 to C25D 5/32 take precedence) **[2]**
3/04 . . of chromium **[2]**
3/06 . . . from solutions of trivalent chromium **[2]**
3/08 . . . Deposition of black chromium **[2]**
3/10 . . . characterised by the organic bath constituents used **[2]**
3/12 . . of nickel or cobalt **[2]**
3/14 . . . from baths containing acetylenic or heterocyclic compounds **[2]**
3/16 . . . . Acetylenic compounds **[2]**
3/18 . . . . Heterocyclic compounds **[2]**
3/20 . . of iron **[2]**
3/22 . . of zinc **[2]**
3/24 . . . from cyanide baths **[2]**
3/26 . . of cadmium **[2]**
3/28 . . . from cyanide baths **[2]**
3/30 . . of tin **[2]**
3/32 . . . characterised by the organic bath constituents used **[2]**
3/34 . . of lead **[2]**
3/36 . . . characterised by the organic bath constituents used **[2]**
3/38 . . of copper **[2]**
3/40 . . . from cyanide baths **[2]**
3/42 . . of light metals **[2]**
3/44 . . . Aluminium **[2]**
3/46 . . of silver **[2]**
3/48 . . of gold **[2]**
3/50 . . of platinum group metals **[2]**
3/52 . . . characterised by the organic bath constituents used **[2]**
3/54 . . of metals not provided for in groups C25D 3/04 to C25D 3/50 **[2]**
3/56 . . of alloys **[2]**
3/58 . . . containing more than 50% by weight of copper **[2]**
3/60 . . . containing more than 50% by weight of tin **[2]**
3/62 . . . containing more than 50% by weight of gold **[2]**
3/64 . . . containing more than 50% by weight of silver **[2]**
3/66 . from melts **[2]**

5/00 Electroplating characterised by the process; **Pretreatment or after-treatment of workpieces [2]**
5/02 . Electroplating of selected surface areas **[2]**
5/04 . Electroplating with moving electrodes **[2]**
5/06 . . Brush or pad plating **[2]**
5/08 . Electroplating with moving electrolyte, e.g. jet electroplating **[2]**
5/10 . Electroplating with more than one layer of the same or of different metals (for bearings C25D 7/10) **[2]**
5/12 . . at least one layer being of nickel or chromium **[2]**
5/14 . . . two or more layers being of nickel or chromium, e.g. duplex or triplex layers **[2]**
5/16 . Electroplating with layers of varying thickness **[2]**
5/18 . Electroplating using modulated, pulsed or reversing current **[2]**
5/20 . Electroplating using ultrasonics **[2]**
5/22 . Electroplating combined with mechanical treatment during the deposition **[2]**
5/24 . Electroplating of metal surfaces to which a coating cannot readily be applied (C25D 5/34 takes precedence) **[2]**
5/26 . . of iron or steel surfaces **[2]**
5/28 . . of surfaces of refractory metals **[2]**
5/30 . . of surfaces of light metals **[2]**
5/32 . . of surfaces of actinides **[2]**
5/34 . Pretreatment of metallic surfaces to be electroplated **[2]**
5/36 . . of iron or steel **[2]**
5/38 . . of refractory metals or nickel **[2]**
5/40 . . . Nickel; Chromium **[2]**
5/42 . . of light metals **[2]**
5/44 . . . Aluminium **[2]**
5/46 . . of actinides **[2]**
5/48 . After-treatment of electroplated surfaces **[2]**
5/50 . . by heat-treatment **[2]**
5/52 . . by brightening or burnishing **[2]**
5/54 . Electroplating of non-metallic surfaces (C25D 7/12 takes precedence) **[2]**
5/56 . . of plastics **[2]**

7/00 Electroplating characterised by the article coated [2]
7/02 . Slide fasteners **[2]**
7/04 . Tubes; Rings; Hollow bodies **[2]**
7/06 . Wires; Strips; Foils **[2]**
7/08 . Mirrors; Reflectors **[2]**
7/10 . Bearings **[2]**
7/12 . Semiconductors **[2]**

9/00 Electrolytic coating other than with metals (C25D 11/00, C25D 15/00 take precedence; electrophoretic coating C25D 13/00) **[2]**
9/02 . with organic materials **[2]**
9/04 . with inorganic materials **[2]**
9/06 . . by anodic processes **[2]**
9/08 . . by cathodic processes **[2]**

9/10 . . . on iron or steel **[2]**
9/12 . . . on light metals **[2]**

11/00 Electrolytic coating by surface reaction, i.e. forming conversion layers [2]
11/02 . Anodisation **[2]**
11/04 . . of aluminium or alloys based thereon **[2]**
11/06 . . . characterised by the electrolytes used **[2]**
11/08 . . . . containing inorganic acids **[2]**
11/10 . . . . containing organic acids **[2]**
11/12 . . . Anodising more than once, e.g. in different baths **[2]**
11/14 . . . Producing integrally coloured layers **[2]**
11/16 . . . Pretreatment **[2]**
11/18 . . . After-treatment, e.g. pore-sealing (lacquering B44D) **[2]**
11/20 . . . . Electrolytic after-treatment **[2]**
11/22 . . . . . for colouring layers **[2]**
11/24 . . . . Chemical after-treatment **[2]**
11/26 . . of refractory metals or alloys based thereon **[2]**
11/28 . . of actinides or alloys based thereon **[2]**
11/30 . . of magnesium or alloys based thereon **[2]**
11/32 . . of semiconducting materials **[2]**
11/34 . . of metals or alloys not provided for in groups C25D 11/04 to C25D 11/32 **[2]**
11/36 . Phosphatising **[2]**
11/38 . Chromatising **[2]**

13/00 Electrophoretic coating (C25D 15/00 takes precedence; apparatus for continuously conveying articles into baths B65G, e.g. B65G 49/00; compositions for electrophoretic coating C09D 5/44) **[2]**
13/02 . with inorganic material **[2]**
13/04 . with organic material **[2]**
13/06 . . polymers **[2]**
13/08 . . . by polymerisation in situ of monomeric materials **[2]**
13/10 . characterised by the additives used **[2]**
13/12 . characterised by the article coated **[2]**
13/14 . . Tubes; Rings; Hollow bodies **[2]**
13/16 . . Wires; Strips; Foils **[2]**
13/18 . using modulated, pulsed or reversing current **[2]**
13/20 . Pretreatment **[2]**
13/22 . Servicing or operating **[2]**
13/24 . . Regeneration of process liquids **[2]**

15/00 Electrolytic or electrophoretic production of coatings containing embedded materials, e.g. particles, whiskers, wires [2]
15/02 . Combined electrolytic and electrophoretic processes **[2]**

17/00 Constructional parts, or assemblies thereof, of cells for electrolytic coating (apparatus for continuously conveying articles into baths B65G, e.g. B65G 49/00; electric devices, see the relevant places, e.g. H01B, H02G) **[2]**
17/02 . Tanks; Installations therefor **[2]**
17/04 . . External supporting frames or structures **[2]**
17/06 . Suspending or supporting devices for articles to be coated **[2]**
17/08 . . Racks **[2]**
17/10 . Electrodes **[2]**
17/12 . . Shape or form (C25D 17/14 takes precedence) **[2]**
17/14 . . for pad-plating **[2]**
17/16 . Apparatus for electrolytic coating of small objects in bulk **[2]**
17/18 . . having closed containers **[2]**
17/20 . . . Horizontal barrels **[2]**
17/22 . . having open containers **[2]**
17/24 . . . Oblique barrels **[2]**
17/26 . . . Oscillating baskets **[2]**
17/28 . . with means for moving the objects individually through the apparatus during the treatment **[2]**

19/00 Electrolytic coating plants [2]

21/00 Processes for servicing or operating cells for electrolytic coating [2]
21/02 . Heating or cooling **[2]**
21/04 . Removal of gases or vapours **[2]**
21/06 . Filtering **[2]**
21/08 . Rinsing **[2]**
21/10 . Agitating of electrolytes; Moving of racks **[2]**
21/11 . Use of protective surface layers on electrolytic baths **[3]**
21/12 . Process control or regulation (controlling or regulating in general G05) **[2]**
21/14 . . Controlled addition of electrolyte components **[2]**
21/16 . Regeneration of process solutions **[2]**
21/18 . . of electrolytes (C25D 21/22 takes precedence) **[2]**
21/20 . . of rinse-solutions (C25D 21/22 takes precedence) **[2]**
21/22 . . by ion-exchange **[2]**

C25F PROCESSES FOR THE ELECTROLYTIC REMOVAL OF MATERIALS FROM OBJECTS; **APPARATUS THEREFOR** (treatment of water, waste water or sewage by electrochemical methods C02F 1/46; anodic or cathodic protection C23F) **[2]**

Note

In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2]**

1/00 Electrolytic cleaning, degreasing, pickling, or descaling [2]
1/02 . Pickling; Descaling **[2]**
1/04 . . in solution **[2]**
1/06 . . . of iron or steel **[2]**
1/08 . . . of refractory metals **[2]**
1/10 . . . of actinides **[2]**
1/12 . . in melts **[2]**
1/14 . . . of iron or steel **[2]**
1/16 . . . of refractory metals **[2]**
1/18 . . . of actinides **[2]**

3/00 Electrolytic etching or polishing [2]
3/02 . Etching **[2]**
3/04 . . of light metals **[2]**
3/06 . . of iron or steel **[2]**

3/08 . . of refractory metals **[2]**
3/10 . . of actinides **[2]**
3/12 . . of semiconducting materials **[2]**
3/14 . . locally **[2]**
3/16 . Polishing **[2]**
3/18 . . of light metals **[2]**
3/20 . . . of aluminium **[2]**
3/22 . . of heavy metals **[2]**
3/24 . . . of iron or steel **[2]**
3/26 . . . of refractory metals **[2]**
3/28 . . . of actinides **[2]**
3/30 . . of semiconducting materials **[2]**

5/00 Electrolytic stripping of metallic layers or coatings [2]

7/00 Constructional parts, or assemblies thereof, of cells for electrolytic removal of material from objects (for both electrolytic coating and removal C25D); **Servicing or operating [2]**
7/02 . Regeneration of process liquids **[2]**

C30 CRYSTAL GROWTH [3]

C30B **SINGLE-CRYSTAL GROWTH** (by using ultra-high pressure, e.g. for the formation of diamonds B01J 3/06); **UNIDIRECTIONAL SOLIDIFICATION OF EUTECTIC MATERIAL OR UNIDIRECTIONAL DEMIXING OF EUTECTOID MATERIAL**; **REFINING BY ZONE-MELTING OF MATERIAL** (zone-refining of metals or alloys C22B); **PRODUCTION OF A HOMOGENEOUS POLYCRYSTALLINE MATERIAL WITH DEFINED STRUCTURE** (casting of metals, casting of other substances by the same processes or devices B22D; working of plastics B29; modifying the physical structure of metals or alloys C21D, C22F); **SINGLE CRYSTALS OR HOMOGENEOUS POLYCRYSTALLINE MATERIAL WITH DEFINED STRUCTURE**; **AFTER-TREATMENT OF SINGLE CRYSTALS OR A HOMOGENEOUS POLYCRYSTALLINE MATERIAL WITH DEFINED STRUCTURE** (for producing semiconductor devices or parts thereof H01L); **APPARATUS THEREFOR [3]**

(1) In this subclass, the following expressions are used with the meaning indicated:
- "single crystal" includes also twin crystals and a predominantly single crystal product; **[3]**
- "homogeneous polycrystalline material" means a material with crystal particles, all of which have the same chemical composition; **[5]**
- "defined structure" means the structure of a material with grains which are oriented in a preferential way or have larger dimensions than normally obtained. **[5]**

(2) In this subclass:
- the preparation of single crystals or a homogeneous polycrystalline material with defined structure of particular materials or shapes is classified in the group for the process as well as in group C30B 29/00; **[3]**
- an apparatus specially adapted for a specific process is classified in the appropriate group for the process. Apparatus to be used in more than one kind of process is classified in group C30B 35/00. **[3]**

Subclass index

Single-crystal growth from solids or gels [3]

1/00 **Single-crystal growth directly from the solid state** (unidirectional demixing of eutectoid materials C30B 3/00; under a protective fluid C30B 27/00) **[3]**

1/02 . by thermal treatment, e.g. strain annealing (C30B 1/12 takes precedence) **[3]**

1/04 . . Isothermal recrystallisation **[3]**

1/06 . . Recrystallisation under a temperature gradient **[3]**

1/08 . . . Zone recrystallisation **[3]**

1/10 . by solid state reactions or multi-phase diffusion **[3]**

1/12 . by pressure treatment during the growth **[3]**

3/00 **Unidirectional demixing of eutectoid materials [3]**

5/00 **Single-crystal growth from gels** (under a protective fluid C30B 27/00) **[3]**

5/02 . with addition of doping materials **[3]**

Single-crystal growth from liquids; **Unidirectional solidification of eutectic materials [3]**

7/00 **Single-crystal growth from solutions using solvents which are liquid at normal temperature, e.g. aqueous solutions** (from molten solvents C30B 9/00; by normal or gradient freezing C30B 11/00; under a protective fluid C30B 27/00) **[3]**

7/02 . by evaporation of the solvent **[3]**

7/04 . . using aqueous solvents **[3]**

7/06 . . using non-aqueous solvents **[3]**

7/08 . by cooling of the solution **[3]**

7/10 . by application of pressure, e.g. hydrothermal processes **[3]**

7/12 . by electrolysis **[3]**

7/14 . the crystallising materials being formed by chemical reactions in the solution **[3]**

9/00 **Single-crystal growth from melt solutions using molten solvents** (by normal or gradient freezing C30B 11/00; by zone-melting C30B 13/00; by crystal pulling C30B 15/00; on immersed seed crystal C30B 17/00; by liquid phase epitaxial growth C30B 19/00; under a protective fluid C30B 27/00) **[3]**

9/02 . by evaporation of the molten solvent **[3]**

9/04 . by cooling of the solution **[3]**

9/06 . . using as solvent a component of the crystal composition **[3]**

9/08 . . using other solvents **[3]**

9/10 . . . Metal solvents **[3]**

9/12 . . . Salt solvents, e.g. flux growth **[3]**

9/14 . by electrolysis **[3]**

11/00 **Single-crystal-growth by normal freezing or freezing under temperature gradient, e.g. Bridgman-Stockbarger method** (C30B 13/00, C30B 15/00, C30B 17/00, C30B 19/00 take precedence; under a protective fluid C30B 27/00) **[3]**

11/02 . without using solvents (C30B 11/06 takes precedence) **[3]**

11/04 . adding crystallising materials or reactants forming it in situ to the melt **[3]**

11/06 . . at least one but not all components of the crystal composition being added **[3]**

11/08 . . every component of the crystal composition being added during the crystallisation **[3]**

11/10 . . . Solid or liquid components, e.g. Verneuil method **[3]**

11/12 . . . Vaporous components, e.g. vapour-liquid-solid-growth **[3]**

11/14 . characterised by the seed, e.g. its crystallographic orientation **[3]**

13/00 **Single-crystal growth by zone-melting**; **Refining by zone-melting** (C30B 17/00 takes precedence; by changing the cross-section of the treated solid C30B 15/00; under a protective fluid C30B 27/00; for the growth of homogeneous polycrystalline material with defined structure C30B 28/00; zone-refining of specific materials, see the relevant subclasses for the materials) **[3,5]**

13/02 . Zone-melting with a solvent, e.g. travelling solvent process **[3]**

13/04 . Homogenisation by zone-levelling **[3]**

13/06 . the molten zone not extending over the whole cross-section **[3]**

13/08 . adding crystallising materials or reactants forming it in situ to the molten zone **[3]**

13/10 . . with addition of doping materials **[3]**

13/12 . . . in the gaseous or vapour state **[3]**

13/14 . Crucibles or vessels **[3]**

13/16 . Heating of the molten zone **[3]**

13/18 . . the heating element being in contact with, or immersed in, the molten zone **[3]**

13/20 . . by induction, e.g. hot wire technique (C30B 13/18 takes precedence) **[3]**

13/22 . . by irradiation or electric discharge **[3]**

13/24 . . . using electromagnetic waves **[3]**

13/26 . Stirring of the molten zone **[3]**

13/28 . Controlling or regulating **[3]**

13/30 . . Stabilisation or shape controlling of the molten zone, e.g. by concentrators, by electromagnetic fields; Controlling the section of the crystal **[3]**

13/32 . Mechanisms for moving either the charge or the heater **[3]**

13/34 . characterised by the seed, e.g. by its crystallographic orientation **[3]**

15/00 **Single-crystal growth by pulling from a melt, e.g. Czochralski method** (under a protective fluid C30B 27/00) **[3]**

15/02 . adding crystallising materials or reactants forming it in situ to the melt **[3]**

15/04 . . adding doping materials, e.g. for n–p-junction **[3]**

15/06 . Non-vertical pulling **[3]**

15/08 . Downward pulling **[3]**

15/10 . Crucibles or containers for supporting the melt **[3]**

15/12 . . Double crucible methods **[3]**

15/14 . Heating of the melt or the crystallised materials **[3]**

15/16 . . by irradiation or electric discharge **[3]**

15/18 . . using direct resistance heating in addition to other methods of heating, e.g. using Peltier heat **[3]**

15/20 . Controlling or regulating (controlling or regulating in general G05) **[3]**

15/22 . . Stabilisation or shape controlling of the molten zone near the pulled crystal; Controlling the section of the crystal **[3]**

15/24 . . . using mechanical means, e.g. shaping guides (shaping dies for edge-defined film-fed crystal growth C30B 15/34) **[3]**

15/26 . . . using television detectors; using photo or X-ray detectors **[3]**

15/28 . . . using weight changes of the crystal or the melt, e.g. flotation methods **[3]**

15/30 . Mechanisms for rotating or moving either the melt or the crystal (flotation methods C30B 15/28) **[3]**

15/32 . Seed holders, e.g. chucks **[3]**

15/34 . Edge-defined film-fed crystal growth using dies or slits **[3]**

15/36 . characterised by the seed, e.g. its crystallographic orientation **[3]**

17/00 **Single-crystal growth on to a seed which remains in the melt during growth, e.g. Nacken-Kyropoulos method** (C30B 15/00 takes precedence) **[3]**

19/00 **Liquid-phase epitaxial-layer growth** **[3]**

19/02 . using molten solvents, e.g. flux **[3]**

19/04 . . the solvent being a component of the crystal composition **[3]**

19/06 . Reaction chambers; Boats for supporting the melt; Substrate holders **[3]**

19/08 . Heating of the reaction chamber or the substrate **[3]**

19/10 . Controlling or regulating (controlling or regulating in general G05) **[3]**

19/12 . characterised by the substrate **[3]**

21/00 **Unidirectional solidification of eutectic materials** **[3]**

21/02 . by normal casting or gradient freezing **[3]**

21/04 . by zone-melting **[3]**

21/06 . by pulling from a melt **[3]**

Single-crystal growth from vapours **[3]**

23/00 **Single-crystal growth by condensing evaporated or sublimed materials** **[3]**

23/02 . Epitaxial-layer growth **[3]**

23/04 . . Pattern deposit, e.g. by using masks **[3]**

23/06 . . Heating of the deposition chamber, the substrate, or the materials to be evaporated **[3]**

23/08 . . by condensing ionised vapours (by reactive sputtering C30B 25/06) **[3]**

25/00 **Single-crystal growth by chemical reaction of reactive gases, e.g. chemical vapour deposition growth** **[3]**

25/02 . Epitaxial-layer growth **[3]**

25/04 . . Pattern deposit, e.g. by using masks **[3]**

25/06 . . by reactive sputtering **[3]**

25/08 . . Reaction chambers; Selection of materials therefor **[3]**

25/10 . . Heating of the reaction chamber or the substrate **[3]**

25/12 . . Substrate holders or susceptors **[3]**

25/14 . . Feed and outlet means for the gases; Modifying the flow of the reactive gases **[3]**

25/16 . . Controlling or regulating (controlling or regulating in general G05) **[3]**
25/18 . . characterised by the substrate **[3]**
25/20 . . . the substrate being of the same materials as the epitaxial layer **[3]**
25/22 . . Sandwich processes **[3]**

27/00 Single-crystal growth under a protective fluid [3]
27/02 . by pulling from a melt **[3]**

28/00 Production of homogeneous polycrystalline material with defined structure [5]
28/02 . directly from the solid state **[5]**
28/04 . from liquids **[5]**
28/06 . . by normal freezing or freezing under temperature gradient **[5]**
28/08 . . by zone-melting **[5]**
28/10 . . by pulling from a melt **[5]**
28/12 . directly from the gas state **[5]**
28/14 . . by chemical reaction of reactive gases **[5]**

29/00 Single crystals or homogeneous polycrystalline material with defined structure characterised by the material or by their shape [3,5]

(1) In groups C30B 29/02 to C30B 29/54, in the absence of an indication to the contrary, a material is classified in the last appropriate place. **[3]**
(2) Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**

29/02 . Elements **[3]**
29/04 . . Diamond **[3]**
29/06 . . Silicon **[3]**
29/08 . . Germanium **[3]**
29/10 . Inorganic compounds or compositions **[3]**
29/12 . . Halides **[3]**
29/14 . . Phosphates **[3]**
29/16 . . Oxides **[3]**
29/18 . . . Quartz **[3]**
29/20 . . . Aluminium oxides **[3]**
29/22 . . . Complex oxides **[3]**
29/24 . . . . with formula $AMeO_3$, wherein A is a rare earth metal and Me is Fe, Ga, Sc, Cr, Co, or Al, e.g. ortho ferrites **[3]**
29/26 . . . . with formula BMe_2O_4, wherein B is Mg, Ni, Co, Al, Zn or Cd and Me is Fe, Ga, Sc, Cr, Co, or Al **[3]**
29/28 . . . . with formula $A_3Me_5O_{12}$, wherein A is a rare earth metal and Me is Fe, Ga, Sc, Cr, Co or Al, e.g. garnets **[3]**
29/30 . . . . Niobates; Vanadates; Tantalates **[3]**
29/32 . . . . Titanates; Germanates; Molybdates; Tungstates **[3]**
29/34 . . Silicates **[3]**
29/36 . . Carbides **[3]**
29/38 . . Nitrides **[3]**
29/40 . . $A_{III}B_V$ compounds **[3]**
29/42 . . . Gallium arsenide **[3]**
29/44 . . . Gallium phosphide **[3]**
29/46 . . Sulfur-, selenium- or tellurium-containing compounds **[3]**
29/48 . . . $A_{II}B_{VI}$ compounds **[3]**
29/50 . . . . Cadmium sulfide **[3]**
29/52 . . Alloys **[3]**
29/54 . Organic compounds **[3]**
29/56 . . Tartrates **[3]**
29/58 . . Macromolecular compounds **[3]**
29/60 . characterised by shape **[3]**
29/62 . . Whiskers or needles **[3]**
29/64 . . Flat crystals, e.g. plates, strips, disks **[5]**
29/66 . . Crystals of complex geometrical shape, e.g. tubes, cylinders **[5]**
29/68 . . Crystals with laminate structure, e.g. "superlattices" **[5]**

30/00 Production of single crystals or homogeneous polycrystalline material with defined structure characterised by the action of electric or magnetic fields, wave energy or other specific physical conditions [5]

Note

When classifying in this group, classification is also made in groups C30B 1/00 to C30B 28/00 according to the process of crystal growth. **[5]**

30/02 . using electric fields, e.g. electrolysis **[5]**
30/04 . using magnetic fields **[5]**
30/06 . using mechanical vibrations **[5]**
30/08 . in conditions of zero-gravity or low gravity **[5]**

After-treatment of single crystals or homogeneous polycrystalline material with defined structure [3,5]

31/00 Diffusion or doping processes for single crystals or homogeneous polycrystalline material with defined structure; Apparatus therefor [3,5]
31/02 . by contacting with diffusion materials in the solid state **[3]**
31/04 . by contacting with diffusion materials in the liquid state **[3]**
31/06 . by contacting with diffusion material in the gaseous state (C30B 31/18 takes precedence) **[3]**
31/08 . . the diffusion materials being a compound of the elements to be diffused **[3]**
31/10 . . Reaction chambers; Selection of materials therefor **[3]**
31/12 . . Heating of the reaction chamber **[3]**
31/14 . . Substrate holders or susceptors **[3]**
31/16 . . Feed and outlet means for the gases; Modifying the flow of the gases **[3]**
31/18 . . Controlling or regulating **[3]**
31/20 . Doping by irradiation with electromagnetic waves or by particle radiation **[3]**
31/22 . . by ion-implantation **[3]**

33/00 After-treatment of single crystals or homogeneous polycrystalline material with defined structure (C30B 31/00 takes precedence) **[3,5]**
33/02 . Heat treatment (C30B 33/04, C30B 33/06 take precedence) **[5]**
33/04 . using electric or magnetic fields or particle radiation **[5]**
33/06 . Joining of crystals **[5]**
33/08 . Etching **[5]**

33/10 . . in solutions or melts **[5]**
33/12 . . in gas atmosphere or plasma **[5]**

35/00 Apparatus in general, specially adapted for the growth, production or after-treatment of single crystals or a homogeneous polycrystalline material with defined structure [3,5]

COMBINATORIAL TECHNOLOGY

C40 COMBINATORIAL TECHNOLOGY [8]

C40B COMBINATORIAL CHEMISTRY; LIBRARIES, E.G. CHEMICAL LIBRARIES, IN SILICO LIBRARIES [8]

(1) In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[8]**

(2) When classifying in this subclass, subject matter of interest is also classified in other appropriate places: **[8]**

(a) library members are also classified in the appropriate places elsewhere in the IPC (e.g. in section C) according to established procedure relating to "Markush"-type formulae (see paragraphs 100 and 101 of the Guide); **[8]**

(b) methods or apparatus covered by this subclass are also classified for their biological, chemical, physical or other features in the appropriate places in the IPC, if such features are of interest, e.g. **[8]**

A01N	Biocides
A61K	Preparations for medical, dental or toilet purposes
A61P	Therapeutic activity of compounds
B01D	Separation
B01J	Chemical or physical processes, e.g. catalysis; Apparatus therefor
B01L	Chemical or physical laboratory apparatus
B29	Shaped plastics
C01, C07, C08	Inorganic, organic or organic macromolecular compounds; Methods of preparation or separation thereof
C12	Biochemistry, microbiology, enzymology including micro-organisms or enzymes, preparing them, using them to synthesise compounds or compositions; Measuring or testing processes involving micro-organisms or enzymes; Mutation or genetic engineering
C22	Metal alloys
G01N	Chemical or physical analysis
G01R, G01T	Physical measurements methods; Apparatus therefor
G03F	Photomechanical methods
G06F	Electrical digital data processing
G06K	Data processing
G06T	Image data processing
G09F	Displaying; Advertising

10/00 Directed molecular evolution of macromolecules, e.g. RNA, DNA or proteins [8]

20/00 Methods specially adapted for identifying library members [8]

20/02 . Identifying library members by their fixed physical location on a support or substrate **[8]**

20/04 . Identifying library members by means of a tag, label, or other readable or detectable entity associated with the library members, e.g. decoding processes **[8]**

20/06 . using iterative deconvolution techniques **[8]**

20/08 . Direct analysis of the library members per se by physical methods, e.g. spectroscopy **[8]**

30/00 Methods of screening libraries [8]

30/02 . In silico screening **[8]**

30/04 . by measuring the ability to specifically bind a target molecule, e.g. antibody-antigen binding, receptor-ligand binding **[8]**

30/06 . by measuring effects on living organisms, tissues or cells **[8]**

30/08 . by measuring catalytic activity **[8]**

30/10 . by measuring physical properties, e.g. mass **[8]**

40/00 Libraries per se, e.g. arrays, mixtures [8]

40/02 . Libraries contained in or displayed by micro-organisms, e.g. bacteria or animal cells; Libraries contained in or displayed by vectors, e.g. plasmids; Libraries containing only micro-organisms or vectors **[8]**

40/04 . Libraries containing only organic compounds **[8]**

Note

Libraries containing salts of organic compounds are classified in the groups for the libraries containing the parent compounds **[8]**

40/06 . . Libraries containing nucleotides or polynucleotides, or derivatives thereof **[8]**

40/08 . . . Libraries containing RNA or DNA which encodes proteins, e.g. gene libraries **[8]**

40/10 . . Libraries containing peptides or polypeptides, or derivatives thereof **[8]**

40/12 . . Libraries containing saccharides or polysaccharides, or derivatives thereof **[8]**

40/14 . . Libraries containing macromolecular compounds and not covered by groups C40B 40/06 to C40B 40/12 **[8]**

40/16 . . Libraries containing metal-containing organic compounds **[8]**

40/18 . Libraries containing only inorganic compounds or inorganic materials **[8]**

50/00 Methods of creating libraries, e.g. combinatorial synthesis [8]

50/02 . In silico or mathematical conception of libraries **[8]**

50/04 . using dynamic combinatorial chemistry techniques **[8]**

50/06 . Biochemical methods, e.g. using enzymes or whole viable micro-organisms **[8]**

50/08 . Liquid phase synthesis, i.e. wherein all library building blocks are in liquid phase or in solution during library creation; Particular methods of cleavage from the liquid support **[8]**

50/10 . . involving encoding steps **[8]**

50/12 . . using a particular method of attachment to the liquid support **[8]**

50/14 . Solid phase synthesis, i.e. wherein one or more library building blocks are bound to a solid support during library creation; Particular methods of cleavage from the solid support **[8]**

50/16 . . involving encoding steps **[8]**

50/18 . . using a particular method of attachment to the solid support **[8]**

60/00 Apparatus specially adapted for use in combinatorial chemistry or with libraries [8]

60/02 . Integrated apparatus specially adapted for creating libraries, screening libraries and for identifying library members **[8]**

60/04 . Integrated apparatus specially adapted for both screening libraries and identifying library members **[8]**

60/06 . Integrated apparatus specially adapted for both creating libraries and identifying library members **[8]**

60/08 . Integrated apparatus specially adapted for both creating and screening libraries **[8]**

60/10 . for identifying library members **[8]**

60/12 . for screening libraries **[8]**

60/14 . for creating libraries **[8]**

70/00 Tags or labels specially adapted for combinatorial chemistry or libraries, e.g. fluorescent tags or bar codes [8]

80/00 Linkers or spacers specially adapted for combinatorial chemistry or libraries, e.g. traceless linkers or safety-catch linkers [8]

99/00 Subject matter not provided for in other groups of this subclass [8]

C99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

C99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION D – TEXTILES; PAPER

TEXTILES OR FLEXIBLE MATERIALS NOT OTHERWISE PROVIDED FOR

D01 NATURAL OR ARTIFICIAL THREADS OR FIBRES; SPINNING

Note

In this class, the following terms are used with the meanings indicated:
– "fibre" means a relatively-short, elongated member of natural or artificial material;
– "filament" means an endless or quasi-endless, elongated member of natural or artificial material;
– "yarn" means a unitary assembly of fibres, usually produced by spinning;
– "thread" means an assembly of yarns or filaments, usually produced by twisting.

D01B MECHANICAL TREATMENT OF NATURAL FIBROUS OR FILAMENTARY MATERIAL TO OBTAIN FIBRES OR FILAMENTS, E.G. FOR SPINNING (crude extraction of asbestos fibres from ores B03B; apparatus for retting D01C)

Note

Attention is drawn to the Note following the title of class D01.

Subclass index

1/00 Mechanical separation of fibres from plant material, e.g. seeds, leaves, stalks

1/02 . Separating vegetable fibres from seeds, e.g. cotton
1/04 . . Ginning
1/06 . . . Roller gins, e.g. Macarthy type
1/08 . . . Saw gins
1/10 . Separating vegetable fibres from stalks or leaves
1/12 . . Rippling
1/14 . . Breaking or scutching, e.g. of flax; Decorticating
1/16 . . . with devices dependent on a bending action to break or loosen fibre-bearing materials (crushing rollers D01B 1/22)
1/18 . . . with stamping devices
1/20 . . . with scraping devices
1/22 . . . with crushing or breaking rollers or plates
1/24 . . . with toothed or other pointed devices
1/26 . . . with beaters rotating about an axis parallel to the fibre bundle
1/28 . . . with beaters rotating about an axis perpendicular to the fibre bundle
1/30 . . . Details of machines
1/32 . . . . Feeding arrangements
1/34 . . . . Devices holding fibres or fibre-bearing materials during treatment
1/36 . . . . . Conveying devices, e.g. moving bands or ropes
1/38 . . . . Delivery or discharge arrangements
1/40 . . . . Arrangements for disposing of non-fibrous materials
1/42 . . . . . employing liquids
1/44 . . . . Framework; Casings; Coverings; Grids
1/46 . . . . Driving arrangements
1/48 . . Drying retted fibres
1/50 . Obtaining fibres from other specified vegetable matter, e.g. peat, Spanish moss

3/00 Mechanical removal of impurities from animal fibres (carbonising rags to recover animal fibres D01C 5/00) **[2]**

3/02 . De-burring machines or apparatus (de-burring arrangements forming part of, or intimately associated with, carding or drafting machines, e.g. burr-crushing rollers, D01G)
3/04 . Machines or apparatus for washing or scouring loose wool fibres
3/06 . . with circular movement of either wool or liquid
3/08 . . with longitudinal movement of either wool or liquid
3/10 . . Details of machines or apparatus

5/00 Hackling or heckling machines (hand heckling tools D01G 33/00)

5/02 . Details
5/04 . . Apparatus for feeding, holding, or conveying materials to or in machines
5/06 . . Construction, mounting, or operating features of heckling devices
5/08 . . Arrangements for removing, or disposing of, tow or waste
5/10 . . Touch pins or other ending devices
5/12 . . Framework; Casings; Coverings

5/14 . . Driving arrangements
5/16 . . Arrangements for confining or removing dust or the like

7/00 Obtaining silk fibres or filaments
7/02 . Cleaning or classifying silk cocoons
7/04 . Reeling silk
7/06 . Obtaining silk from cocoons or portions thereof not suitable for reeling (de-gumming silk D01C 3/02)

9/00 Other mechanical treatment of natural fibrous or filamentary material to obtain fibres or filaments

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D01C CHEMICAL TREATMENT OF NATURAL FILAMENTARY OR FIBROUS MATERIAL TO OBTAIN FILAMENTS OR FIBRES FOR SPINNING; CARBONISING RAGS TO RECOVER ANIMAL FIBRES

(1) Attention is drawn to the Note following the title of class D01.
(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

1/00 Treatment of vegetable material
1/02 . by chemical methods to obtain bast fibres
1/04 . Bacteriological retting

3/00 Treatment of animal material, e.g. chemical scouring of wool (recovery of lanolin or wool wax C11B 11/00)
3/02 . De-gumming silk

5/00 Carbonising rags to recover animal fibres (chemical removal of vegetable impurities from threads or fabrics of animal fibres D06M)

D01D MECHANICAL METHODS OR APPARATUS IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS (metal threads B21; fibres or filaments of softened glass, minerals or slag C03B 37/00)

(1) Attention is drawn to the Note following the title of class D01.
(2) Apparatus specially adapted for the manufacture of carbon filaments are classified in group D01F 9/12. **[5]**

Subclass index

1/00 Treatment of filament-forming or like material (working of plastics or substances in a plastic state, in general B29)
1/02 . Preparation of spinning solutions
1/04 . Melting filament-forming substances
1/06 . Feeding liquid to the spinning head (constructions of pumps F04)
1/09 . . Pressure, temperature or feeding rate regulation **[3]**
1/10 . Filtering or de-aerating the spinning solution or melt

4/00 Spinnerette packs; **Cleaning thereof** (D01D 5/24, D01D 5/253, D01D 5/28 take precedence) **[3]**
4/02 . Spinnerettes (alloys therefor C22C) **[3]**
4/04 . Cleaning spinnerettes or other parts of the spinnerette packs (cleaning in general B08B) **[3]**
4/06 . Distributing spinning solution or melt to spinning nozzles **[3]**
4/08 . Supporting spinnerettes or other parts of spinnerette packs **[3]**

5/00 Formation of filaments, threads, or the like
5/02 . Starting the formation
5/04 . Dry spinning methods
5/06 . Wet spinning methods
5/08 . Melt-spinning methods
5/084 . . Heating filaments, threads or the like, leaving the spinnerettes **[3]**
5/088 . . Cooling filaments, threads or the like, leaving the spinnerettes **[3]**
5/092 . . . in shafts or chimneys **[3]**
5/096 . . Humidity control, or oiling, of filaments, threads or the like, leaving the spinnerettes **[3]**

5/098 . . with simultaneous stretching **[4]**
5/10 . . using organic materials
5/11 . Flash-spinning **[3]**
5/12 . Stretch-spinning methods (finishing by stretching D02J 1/22)
5/14 . . with flowing liquid stretching media
5/16 . . using rollers, or like mechanical devices, e.g. snubbing pins
5/18 . by means of rotating spinnerets
5/20 . with varying denier along their length
5/22 . with a crimped or curled structure; with a special structure to simulate wool (producing crimped or curled effects in filaments or threads after formation D02G 1/00)
5/23 . . by asymmetrical cooling of filaments, threads, or the like, leaving the spinnerettes **[3]**
5/24 . with a hollow structure; Spinnerette packs therefor (D01D 5/38 takes precedence; producing tubes of plastic material B29D; addition of agents forming hollow filaments D01F 1/08) **[3]**
5/247 . . Discontinuous hollow structure or microporous structure **[3]**
5/253 . with a non-circular cross section; Spinnerette packs therefor (D01D 5/38 takes precedence) **[3]**
5/26 . Formation of staple fibres (by flash-spinning D01D 5/11)
5/28 . while mixing different spinning solutions or melts during the spinning operation; Spinnerette packs therefor
5/30 . . Conjugate filaments; Spinnerette packs therefor **[3]**
5/32 . . . Side-by-side structure; Spinnerette packs therefor **[3]**
5/34 . . . Core-skin structure; Spinnerette packs therefor **[3]**
5/36 . . . Matrix structure; Spinnerette packs therefor **[3]**
5/38 . Formation of filaments, threads, or the like during polymerisation **[3]**
5/40 . by applying a shearing force to a dispersion or solution of filament formable polymers, e.g. by stirring **[3]**
5/42 . by cutting films into narrow ribbons or filaments or by fibrillation of films **[3]**

7/00 **Collecting the newly-spun products** (collecting newly-spun products with the imparting of twist D01H)
7/02 . in centrifugal spinning pots **[3]**

10/00 **Physical treatment of artificial filaments or the like during manufacture, i.e. during a continuous production process before the filaments have been collected** (finishing D02J) **[4]**
10/02 . Heat treatment (heating for finishing D02J 13/00) **[4]**
10/04 . Supporting filaments or the like during their treatment **[4]**
10/06 . Washing or drying **[4]**

11/00 **Other features of manufacture**
11/02 . Opening bundles to space the threads or filaments from one another
11/04 . Fixed guides
11/06 . Coating with spinning solutions or melts

13/00 **Complete machines for producing artificial threads**
13/02 . Elements of machines in combination

D01F CHEMICAL FEATURES IN THE MANUFACTURE OF ARTIFICIAL FILAMENTS, THREADS, FIBRES, BRISTLES, OR RIBBONS; APPARATUS SPECIALLY ADAPTED FOR THE MANUFACTURE OF CARBON FILAMENTS [2]

(1) Attention is drawn to the Note following the title of class D01.
(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 **General methods for the manufacture of artificial filaments or the like**
1/02 . Addition of substances to the spinning solution or to the melt (addition of substances to viscose D01F 2/08)
1/04 . . Pigments
1/06 . . Dyes
1/07 . . for making fire- or flame-proof filaments **[4]**
1/08 . . for forming hollow filaments
1/09 . . for making electroconductive or anti-static filaments **[4]**
1/10 . . Other agents for modifying properties **[2]**

2/00 **Monocomponent artificial filaments or the like of cellulose or cellulose derivatives; Manufacture thereof [2]**
2/02 . from solutions of cellulose in acids, bases, or salts **[2]**
2/04 . . from cuprammonium solutions **[2]**
2/06 . from viscose (preparation of alkali cellulose C08B) **[2]**

2/08 . . Composition of the spinning solution or the bath (preparing or dissolving cellulose xanthate C08B) **[2]**
2/10 . . . Addition to the spinning solution or spinning bath of substances which exert their effect equally well in either **[2]**
2/12 . . . Addition of delustring agents to the spinning solution **[2]**
2/14 . . . . Addition of pigments **[2]**
2/16 . . . Addition of dyes to the spinning solution **[2]**
2/18 . . . Addition to the spinning solution of substances to influence ripening **[2]**
2/20 . . . for the manufacture of hollow threads **[2]**
2/22 . . by the dry spinning process **[2]**
2/24 . from cellulose derivatives **[2]**
2/26 . . from nitrocellulose **[2]**
2/28 . . from organic cellulose esters or ethers, e.g. cellulose acetate **[2]**
2/30 . . . by the dry spinning process **[2]**

4/00 Monocomponent artificial filaments or the like of proteins; **Manufacture thereof [2]**

4/02 . from fibroin **[2]**
4/04 . from casein **[2]**
4/06 . from globulins, e.g. groundnut protein **[2]**

6/00 Monocomponent artificial filaments or the like of synthetic polymers; **Manufacture thereof [2]**

Note

In this group, the percentage for determining the major constituent is expressed in mole percent. **[8]**

6/02 . from homopolymers obtained by reactions only involving carbon-to-carbon unsaturated bonds **[2]**
6/04 . . from polyolefins **[2]**
6/06 . . . from polypropylene **[2]**
6/08 . . from polymers of halogenated hydrocarbons **[2]**
6/10 . . . from polyvinyl chloride or polyvinylidene chloride **[2]**
6/12 . . . from polymers of fluorinated hydrocarbons **[2]**
6/14 . . from polymers of unsaturated alcohols, e.g. polyvinyl alcohol, or of their acetals or ketals **[2]**
6/16 . . from polymers of unsaturated carboxylic acids or unsaturated organic esters, e.g. polyacrylic esters, polyvinyl acetate **[2]**
6/18 . . from polymers of unsaturated nitriles, e.g. polyacrylonitrile, polyvinylidene cyanide **[2]**
6/20 . . from polymers of cyclic compounds with one carbon-to-carbon double bond in the side chain **[2]**
6/22 . . . from polystyrene **[2]**
6/24 . . from polymers of aliphatic compounds with more than one carbon-to-carbon double bond **[2]**
6/26 . . from other polymers **[2]**
6/28 . from copolymers obtained by reactions only involving carbon-to-carbon unsaturated bonds **[2]**
6/30 . . comprising olefins as the major constituent **[2]**
6/32 . . comprising halogenated hydrocarbons as the major constituent **[2]**
6/34 . . comprising unsaturated alcohols, acetals, or ketals as the major constituent **[2]**
6/36 . . comprising unsaturated carboxylic acids or unsaturated organic esters as the major constituent **[2]**
6/38 . . comprising unsaturated nitriles as the major constituent **[2]**
6/40 . . Modacrylic fibres, i.e. containing 35 to 85% acrylonitrile **[2]**
6/42 . . comprising cyclic compounds containing one carbon-to-carbon double bond in the side chain as major constituent **[2]**
6/44 . from mixtures of polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds as major constituent with other polymers or low-molecular-weight compounds **[2]**
6/46 . . of polyolefins **[2]**
6/48 . . of polymers of halogenated hydrocarbons **[2]**
6/50 . . of polyalcohols, polyacetals or polyketals **[2]**
6/52 . . of polymers of unsaturated carboxylic acids or unsaturated esters **[2]**
6/54 . . of polymers of unsaturated nitriles **[2]**
6/56 . . of polymers of cyclic compounds with one carbon-to-carbon double bond in the side chain **[2]**
6/58 . from homopolycondensation products **[2]**
6/60 . . from polyamides (from polyamino acids or polypeptides D01F 6/68) **[2]**
6/62 . . from polyesters **[2]**
6/64 . . . from polycarbonates **[2]**
6/66 . . from polyethers **[2]**
6/68 . . from polyaminoacids or polypeptides **[2]**
6/70 . . from polyurethanes **[2]**
6/72 . . from polyureas **[2]**
6/74 . . from polycondensates of cyclic compounds, e.g. polyimides, polybenzimidazoles **[2]**
6/76 . . from other polycondensation products **[2]**
6/78 . from copolycondensation products **[2]**
6/80 . . from copolyamides **[2]**
6/82 . . from polyester amides or polyether amides **[2]**
6/84 . . from copolyesters **[2]**
6/86 . . from polyetheresters **[2]**
6/88 . from mixtures of polycondensation products as major constituent with other polymers or low-molecular-weight compounds **[2]**
6/90 . . of polyamides **[2]**
6/92 . . of polyesters **[2]**
6/94 . . of other polycondensation products **[2]**
6/96 . from other synthetic polymers **[2]**

8/00 Conjugated, i.e. bi- or multicomponent, artificial filaments or the like; **Manufacture thereof [2]**

8/02 . from cellulose, cellulose derivatives, or proteins **[2]**
8/04 . from synthetic polymers **[2]**
8/06 . . with at least one polyolefin as constituent **[2]**
8/08 . . with at least one polyacrylonitrile as constituent **[2]**
8/10 . . with at least one other macromolecular compound obtained by reactions only involving carbon-to-carbon unsaturated bonds as constituent **[2]**
8/12 . . with at least one polyamide as constituent **[2]**
8/14 . . with at least one polyester as constituent **[2]**
8/16 . . with at least one other macromolecular compound obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[2]**
8/18 . from other substances **[2]**

9/00 Artificial filaments or the like of other substances; **Manufacture thereof**; **Apparatus specially adapted for the manufacture of carbon filaments [5]**

9/02 . of reaction products of rubber with acids or acid anhydrides, e.g. sulfur dioxide

9/04 . of alginates
9/08 . of inorganic material (from softened glass, minerals, or slags C03B 37/00; incandescent bodies F21H, H01K 1/02, H01K 3/02) **[2]**
9/10 . . by decomposition of organic substances (D01F 9/12 takes precedence) **[2]**
9/12 . . Carbon filaments; Apparatus specially adapted for the manufacture thereof **[2,5]**
9/127 . . . by thermal decomposition of hydrocarbon gases or vapours **[5]**
9/133 . . . . Apparatus therefor **[5]**
9/14 . . . by decomposition of organic filaments **[2,5]**
9/145 . . . . from pitch or distillation residues **[5]**
9/15 . . . . . from coal pitch **[5]**
9/155 . . . . . from petroleum pitch **[5]**
9/16 . . . . from products of vegetable origin or derivatives thereof, e.g. from cellulose acetat (D01F 9/18 takes precedence) **[2,5]**
9/17 . . . . . from lignin **[5]**
9/18 . . . . from proteins, e.g. from wool **[2]**
9/20 . . . . from polyaddition, polycondensation or polymerisation products (D01F 9/145, D01F 9/16, D01F 9/18 take precedence) **[2,5]**
9/21 . . . . . from macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
9/22 . . . . . from polyacrylonitriles **[2,5]**
9/24 . . . . . from macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
9/26 . . . . . from polyesters **[5]**
9/28 . . . . . from polyamides **[5]**
9/30 . . . . . from aromatic polyamides **[5]**
9/32 . . . . Apparatus therefor **[5]**

11/00 Chemical after-treatment of artificial filaments or the like during manufacture (finishing D06M) **[2]**
11/02 . of cellulose, cellulose derivatives, or proteins **[2]**
11/04 . of synthetic polymers **[2]**
11/06 . . of macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[2]**
11/08 . . of macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[2]**
11/10 . of carbon **[2]**
11/12 . . with inorganic substances **[5]**
11/14 . . with organic compounds, e.g. macromolecular compounds **[5]**
11/16 . . by physicochemical methods **[5]**

13/00 Recovery of starting material, waste material, or solvents during the manufacture of artificial filaments or the like [2]
13/02 . of cellulose, cellulose derivatives, or proteins **[2]**
13/04 . of synthetic polymers **[2]**

D01G PRELIMINARY TREATMENT OF FIBRES, E.G. FOR SPINNING (winding or unwinding, conducting or guiding laps, webs, slivers, or rovings in general, sliver or roving cans, depositing in sliver or roving cans B65H; preparation of fibres for paper-making D21)

Note

Attention is drawn to the Note following the title of class D01.

Subclass index

1/00 Severing continuous filaments or long fibres, e.g. stapling (drafting arrangements, twisting arrangements D01H)
1/02 . to form staple fibres not delivered in strand form
1/04 . . by cutting
1/06 . Converting tows to slivers or yarns, e.g. in direct spinning
1/08 . . by stretching or abrading
1/10 . . by cutting

3/00 Roughening of fibres

5/00 Separating, e.g. sorting, fibres (separating fibres of differing lengths in silk-dressing machines D01G 17/00; in combing machines D01G 19/00)

7/00 Breaking or opening fibre bales

7/02 . by means of beater arms

7/04 . by means of toothed members

7/06 . Details of apparatus or machines

7/08 . . Arrangements for feeding bales to comminuting elements

7/10 . . Arrangements for discharging fibres

7/12 . . Framework; Casings; Coverings; Grids

7/14 . . Driving arrangements

9/00 Opening or cleaning fibres, e.g. scutching cotton (scutching flax or like fibres D01B; making cellulose wadding in paper-making machines D21F 11/14)

9/02 . by agitation within a moving receptacle

9/04 . by means of beater arms

9/06 . by means of toothed members

9/08 . by means of air draught arrangements

9/10 . . using foraminous cylinders (foraminous suction cylinders for lap-forming D01G 25/00)

9/12 . Combinations of opening or cleaning machines

9/14 . Details of machines or apparatus

9/16 . . Feeding arrangements (fibre-feeding apparatus of general application in fibre-treating machines D01G 23/00)

9/18 . . Arrangements for discharging fibres

9/20 . . Framework; Casings; Coverings; Grids

9/22 . . Driving arrangements

11/00 Disintegrating fibre-containing articles to obtain fibres for re-use

11/02 . Opening, unravelling, or teasing ropes or like fibrous strands to obtain fibres for re-use

11/04 . Opening rags to obtain fibres for re-use (mechanical treatment of rags for paper-making D21B)

13/00 Mixing, e.g. blending, fibres; **Mixing non-fibrous materials with fibres** (mixing of fibres combined with other operations, e.g. bale-breaking or fibre-opening, see the appropriate groups for such operations)

15/00 Carding machines or accessories; **Card clothing**; **Burr-crushing or removing arrangements associated with carding or other preliminary-treatment machines** (de-burring apparatus or machines operating independently D01B)

15/02 . Carding machines

15/04 . . with worker and stripper or like rollers operating in association with a main cylinder

15/06 . . . Garnett machines

15/08 . . with flats or like members or endless card sheets operating in association with a main cylinder

15/10 . . with other apparatus, e.g. drafting devices, in integral or closely-associated combination (web-dividing apparatus D01G 15/46; burr-crushing or removing arrangements D01G 15/94)

15/12 . . Details

15/14 . . . Constructional features of carding elements, e.g. for facilitating attachment of card clothing

15/16 . . . . Main cylinders; Breasts

15/18 . . . . Workers; Strippers; Doffers (doffers specially adapted for web dividing D01G 15/54)

15/20 . . . . Feed rollers; Takers-in

15/22 . . . . Fancies

15/24 . . . . Flats or like members

15/26 . . . Arrangements or disposition of carding elements

15/28 . . . Supporting arrangements for carding elements; Arrangements for adjusting relative positions of carding elements

15/30 . . . . Bends

15/32 . . . Framework; Casings; Coverings

15/34 . . . Grids; Dirt knives; Angle blades

15/36 . . . Driving or speed control arrangements

15/38 . . . . for use during the grinding of card clothing

15/40 . . . Feeding apparatus (fibre-feeding apparatus of general application to fibre-treating machines, e.g. hopper feeders, D01G 23/00)

15/42 . . . . Feeding from laps

15/44 . . . . Intermediate feeds

15/46 . . . Doffing or like arrangements for removing fibres from carding elements; Web-dividing apparatus; Condensers (lap-forming devices D01G 25/00; fibre condensing guides D01H 5/72)

15/48 . . . . Stripping-combs

15/50 . . . . Stripping-rollers or like devices

15/52 . . . . Web-dividing arrangements

15/54 . . . . . employing doffers specially adapted for web dividing

15/56 . . . . . employing tapes

15/58 . . . . Sliver or like rubbing apparatus

15/60 . . . . . Constructions of rubbing leathers

15/62 . . . . Slubbing-winding apparatus (winding apparatus of general application to the winding of filamentary material B65H)

15/64 . . . . Drafting or twisting apparatus associated with doffing arrangements or with web-dividing apparatus

15/66 . . . . . with arrangements inserting false twist (false-twist devices D01H)

15/68 . . . . . with arrangements inserting permanent twist, e.g. spinning

15/70 . . Arrangements for producing decorative or fancy effects in products

15/72 . . Arrangements for returning waste to be re-carded

15/74 . . Air draught arrangements (air draught arrangements for stripping or for removing dust or fly D01G 15/76)

15/76 . Stripping or cleaning carding surfaces; Maintaining cleanliness of carding area

15/78 . . Arrangements for stripping flats

15/80 . . Arrangements for stripping cylinders or rollers

15/82 . . Arrangements for confining or removing dust, fly, or the like

15/84 . Card clothing; Manufacture thereof not otherwise provided for (arrangements for driving carding-machine elements during grinding D01G 15/38; grinding card clothing B24B)

15/86 . . with flexible non-metallic backing

15/88 . . formed from metal sheets or strips

15/90 . . Lags, e.g. for jute cards

15/92 . . Attaching card clothing to carding elements

15/94 . Burr-crushing or removing arrangements

15/96 . . Burr-crushing rollers

15/98 . . Morel or like apparatus

17/00 Silk-dressing machines

19/00 **Combining machines**
19/02 . with pinned circles, e.g. Noble
19/04 . with pinned cylinders, e.g. rectilinear
19/06 . Details
19/08 . . Feeding apparatus
19/10 . . Construction, mounting, or operating features of combing elements
19/12 . . Devices for laying or holding fibres in combs, e.g. dabbing brushes
19/14 . . Drawing-off and delivery apparatus
19/16 . . . Nipper mechanisms
19/18 . . . Roller, or roller and apron, devices, e.g. operating to draw-off fibres continuously
19/20 . . . . operating to draw-off fibres intermittently
19/22 . . Arrangements for removing, or disposing of, noil or waste
19/24 . . Framework; Casings; Coverings
19/26 . . Driving arrangements
19/28 . . Air draught or like pneumatic arrangements
19/30 . . Heating arrangements

21/00 **Combinations of machines, apparatus, or processes, e.g. for continuous processing** (D01G 1/06, D01G 9/12, D01G 15/46, D01G 15/94 take precedence)

23/00 **Feeding fibres to machines**; **Conveying fibres between machines** (D01G 21/00 takes precedence; intermediate feeds in carding machines D01G 15/40)
23/02 . Hoppers; Delivery shoots
23/04 . . with means for regulating of feed
23/06 . Arrangements in which a machine or apparatus is regulated in response to changes in the volume or weight of fibres fed, e.g. piano motions (arrangements in which draft is regulated in response to irregularities in fibre supply D01H)
23/08 . Air draught or like pneumatic arrangements

25/00 **Lap-forming devices not integral with machines specified above** (forming mats or batts of continuous filaments for non-woven fabrics D04H)

27/00 **Lap- or sliver-winding devices, e.g. for products of cotton scutchers, jute cards, or worsted gill boxes**
27/02 . with lap roll or the like loaded to provide firm packages
27/04 . with automatic discharge of lap roll or the like

29/00 **Arrangements for lubricating fibres, e.g. in gill boxes** (processes involving the use of particular lubricants D06M 15/00)

31/00 **Warning or safety devices, e.g. automatic fault detectors, stop motions** (safety devices of general application F16P; indicating devices of general application G08B)

33/00 **Hand tools for treatment of fibres**

35/00 **Treatment of oakum**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

D01H **SPINNING OR TWISTING** (unwinding, paying-out, forwarding, winding, or coiling filamentary material, not intimately associated with spinning or twisting, B65H; cores, formers, supports, or holders for coiled or wound material, e.g. bobbins, B65H; twisting oakum D01G 35/00; crimping or curling of fibres, filaments, or yarns D02G 1/00; making chenille D03D, D04D 3/00; testing yarns, rovings, slivers, fibres, or fibre webs G01)

Note

Attention is drawn to the Note following the title of class D01.

Subclass index

Kinds or types of spinning or twisting machines; **Drafting machines or arrangements**; **Twisting arrangements**

1/00 **Spinning or twisting machines in which the product is wound-up continuously** (open-end spinning machines D01H 4/00) **[5]**
1/02 . ring type
1/04 . flyer type
1/06 . cap type
1/08 . cup, pot, or disc type, in which annular masses of yarn are formed by centrifugal action
1/10 . for imparting multiple twist, e.g. two-for-one twisting
1/11 . Spinning by false-twisting **[5]**
1/115 . . using pneumatic means **[5]**
1/14 . Details (drafting arrangements D01H 5/00; twisting arrangements D01H 7/00)
1/16 . . Framework; Casings; Coverings
1/18 . . Supports for supply packages
1/20 . . Driving or stopping arrangements (for open-end spinning machines D01H 4/12, D01H 4/20, D01H 4/42; safety devices D01H 13/14) **[5]**
1/22 . . . for rollers (regulating or varying draft D01H 5/32)
1/24 . . . for twisting arrangements, e.g. spindles (braking arrangements for spindles D01H 7/22; interrelated flyer and bobbin drive mechanisms D01H 7/50)
1/241 . . . . driven by belt **[2]**

1/242 . . . . driven by toothed wheels **[2]**
1/243 . . . . driven by friction discs **[2]**
1/244 . . . . each spindle driven by an electric motor **[2]**
1/26 . . . . with two or more speeds; with variable-speed arrangements
1/28 . . . for two or more machine elements possessing different characteristics but in operative association
1/30 . . . . with two or more speeds; with variable-speed arrangements
1/32 . . . for complete machines
1/34 . . . . with two or more speeds; with variable-speed arrangements
1/36 . . Package-shaping arrangements, e.g. building motions
1/38 . . Arrangements for winding reserve lengths of yarn on take-up packages, e.g. transfer tails
1/40 . . Arrangements for connecting continuously-delivered material to bobbins or the like
1/42 . . Guards or protectors for yarns or threads, e.g. separator plates, anti-ballooning devices (anti-ballooning devices on spindles D01H 7/18)

3/00 Spinning or twisting machines in which the product is wound-up intermittently, e.g. mules

3/02 . Details (drafting arrangements D01H 5/00; twisting arrangements D01H 7/00)
3/04 . . Carriages; Mechanisms effecting carriage movements
3/06 . . . Carriages; Carriage rails; Squaring motions
3/08 . . . Drawing-out or taking-in motions
3/10 . . . Moving-creel arrangements, e.g. for twiners
3/12 . . Package-shaping motions; Faller arrangements
3/14 . . Roller-driving arrangements (drafting arrangements of general application in spinning machines D01H 5/18)
3/16 . . Spindle-driving arrangements (spindles, spindle bearings, spindle supports D01H 7/04)
3/18 . . . Tin rollers; Driving arrangements intimately associated with tin rollers
3/20 . . . Spindle-driving arrangements during drawing-out or backing-off
3/22 . . . Spindle-driving arrangements during taking-in
3/24 . . . . Quadrant motions; Nosing motions
3/26 . . Driving or stopping arrangements not otherwise provided for; Locking motions (safety devices D01H 13/14)

4/00 Open-end spinning machines or arrangements for imparting twist to independently moving fibres separated from slivers; **Piecing arrangements therefor**; **Covering endless core threads with fibres by open-end spinning techniques [5]**

Note

In this group, the expression “open-end spinning” covers such expressions as “break spinning”, “ringless spinning”, “rotor spinning” and “friction spinning”, but does not cover the expression “spinning by false-twisting”. **[5]**

4/02 . imparting twist by a fluid, e.g. air vortex **[5]**
4/04 . imparting twist by contact of fibres with a running surface **[5]**
4/06 . . co-operating with suction means (D01H 4/08, D01H 4/16 take precedence) **[5]**
4/08 . . Rotor spinning, i.e. the running surface being provided by a rotor **[5]**
4/10 . . . Rotors **[5]**
4/12 . . . Rotor bearings; Arrangements for driving or stopping (control therefor D01H 4/42) **[5]**
4/14 . . . . Rotor driven by an electric motor **[5]**
4/16 . . Friction spinning, i. e. the running surface being provided by a pair of closely spaced friction drums, e.g. at least one suction drum **[5]**
4/18 . . . Friction drums, e.g. arrangement of suction holes **[5]**
4/20 . . . Drum bearings; Arrangements for driving or stopping (control therefor D01H 4/42) **[5]**
4/22 . . Cleaning of running surfaces **[5]**
4/24 . . . in rotor spinning **[5]**
4/26 . . . in friction spinning **[5]**
4/28 . using electrostatic fields **[5]**
4/30 . Arrangements for separating slivers into fibres; Orienting or straightening fibres **[5]**
4/32 . . using opening rollers **[5]**
4/34 . . using air-jet streams **[5]**
4/36 . . with means for taking away impurities **[5]**
4/38 . Channels for feeding fibres to the yarn forming region **[5]**
4/40 . Removing running yarn from the yarn forming region, e.g. using tubes **[5]**
4/42 . Control of driving or stopping **[5]**
4/44 . . in rotor spinning **[5]**
4/46 . . in friction spinning **[5]**
4/48 . Piecing arrangements; Control therefor **[5]**
4/50 . . for rotor spinning **[5]**
4/52 . . for friction spinning **[5]**

5/00 Drafting machines or arrangements (arrangements in which draft is dependent on linear movement of take-up spindles, e.g. in mules, D01H 3/00; devices for combing or orienting fibres for open-end spinning machines D01H 4/30)

5/02 . Gill boxes or other drafting machines employing fallers or like pinned bars (lubricating fibres in gill boxes D01G 29/00)
5/04 . . with pinned bars actuated by screw members
5/06 . . . Intersecting gill boxes
5/08 . . with bars connected by links, chains, or the like
5/10 . . with pinned bars unconnected with each other but actuated through pressure of one against another
5/12 . . Details
5/14 . . . Pinned bars
5/16 . . . Framework; Casings; Coverings
5/18 . Drafting machines or arrangements without fallers or like pinned bars
5/20 . . in which fibres are controlled by contact with stationary or reciprocating surfaces
5/22 . . in which fibres are controlled by rollers only
5/24 . . . with porcupines or like pinned rotary members
5/26 . . in which fibres are controlled by one or more endless aprons
5/28 . . in which fibres are controlled by inserting twist during drafting (mules D01H 3/00; constructions of false-twist devices D02G 1/04)
5/30 . . incorporating arrangements for severing continuous filaments, e.g. in direct spinning (converting tows to slivers or yarns D01G 1/06)
5/32 . . Regulating or varying draft
5/34 . . . by manual adjustments

5/36 . . . according to a pre-arranged pattern, e.g. to produce slubs
5/38 . . . in response to irregularities in material
5/40 . . . . employing mechanical time-delay devices
5/42 . . . . employing electrical time-delay devices
5/44 . . Adjusting drafting elements, e.g. altering ratch
5/46 . . Loading arrangements
5/48 . . . using weights
5/50 . . . using springs
5/52 . . . using fluid pressure
5/54 . . . using magnetic arrangements
5/56 . . Supports for drafting elements (saddles or top roller arms forming essential components of weighting arrangements D01H 5/48)
5/58 . . Arrangements for traversing drafting elements (traversing arrangements for roving guides D01H 13/06)
5/60 . . Arrangements maintaining drafting elements free of fibre accumulations
5/62 . . . Non-rotary cleaning pads or plates; Scrapers
5/64 . . . Rollers or aprons with cleaning surfaces
5/66 . . . Suction devices
5/68 . . . . Suction end-catchers
5/70 . . Constructional features of drafting elements
5/72 . . . Fibre-condensing guides (guides for slivers, rovings, or yarns applicable solely for spinning, twisting, curling, or crimping purposes D01H 13/04)
5/74 . . . Rollers
5/76 . . . . Loose-boss assemblies
5/78 . . . . with flutes or other integral surface characteristics
5/80 . . . . with covers; Cots or covers
5/82 . . . . Arrangements for coupling roller sections
5/84 . . . . Porcupines
5/86 . . . Aprons; Apron supports; Apron-tensioning arrangements
5/88 . . . . Cradles; Tensors

7/00 Spinning or twisting arrangements (for open-end spinning D01H 4/00) **[5]**
7/02 . for imparting permanent twist
7/04 . . Spindles (spindle bearings, supports therefor, in general F16C)
7/06 . . . Stationary spindles with package-holding sleeves
7/08 . . . Mounting arrangements
7/10 . . . . Spindle supports; Rails; Rail supports, e.g. poker guides
7/12 . . . . Bolsters; Bearings
7/14 . . . . Holding-down arrangements
7/16 . . . Arrangements for coupling bobbins or like to spindles
7/18 . . . Arrangements on spindles for suppressing yarn balloons (thread guards or protectors D01H 1/42)
7/20 . . . Lubricating arrangements
7/22 . . . Braking arrangements
7/24 . . Flyer or like arrangements (multiple-twist arrangements D01H 7/86)
7/26 . . . Flyer constructions
7/28 . . . . arranged to guide material over exterior of legs
7/30 . . . . with guide channels formed in legs, e.g. slubbing flyers
7/32 . . . . . with pressing devices
7/34 . . . . with haul pulleys or like arrangements
7/36 . . . . with traversing devices
7/38 . . . . Ring flyers
7/40 . . . Flyer supports, e.g. rails
7/42 . . . Arrangements coupling flyers to spindles
7/44 . . . Drag arrangements for bobbins or flyers
7/46 . . . Devices attached to, or integral with, flyers for temporarily increasing twist in material passing to them
7/48 . . . Eyes or like guiding arrangements (D01H 7/46 takes precedence)
7/50 . . . Interrelated flyer and bobbin drive mechanisms, e.g. winding-on motions for cotton-roving frames (package-building mechanisms D01H 1/36)
7/52 . . Ring-and-traveller arrangements
7/54 . . . with fixed rings
7/56 . . . with freely-rotatable rings; with braked or dragged rings
7/58 . . . with driven rings
7/60 . . . Rings or travellers; Manufacture thereof not otherwise provided for (hand tools for applying travellers to rings D01H 17/02)
7/62 . . . Arrangements providing lubricant for travellers
7/64 . . . Ring supports, e.g. ring rails (poker guides or other rail supports D01H 7/10)
7/66 . . Cap arrangements
7/68 . . . Cap constructions
7/70 . . . Arrangements for supporting caps on spindles
7/72 . . . Bobbin-supporting arrangements, e.g. bobbin rails (poker guides or other rail supports D01H 7/10)
7/74 . . Cup or like arrangements
7/76 . . . Rotary discs
7/78 . . . Constructions of cups, e.g. spinning boxes
7/80 . . . . adapted to collect wet yarns
7/82 . . . Casings or guards for rotary cups or the like
7/84 . . . Spindles or yarn carriers for co-operation with rotary cups (removing yarn from centrifugal cups on to yarn carriers D01H 9/06)
7/86 . . Multiple-twist arrangements, e.g. two-for-one twisting devices
7/88 . . Hollow-spindle arrangements (D01H 7/86 takes precedence)
7/90 . . Arrangements with two or more twisting devices in combination (D01H 7/86, D01H 7/88 take precedence)
7/92 . for imparting transient twist

Common features or details of, or accessories for, spinning or twisting machines of various kinds or types

9/00 Arrangements for replacing or removing bobbins, cores, receptacles, or completed packages at paying-out or take-up stations (arrangements of general interest in the winding of filamentary material B65H)
9/02 . for removing completed take-up packages and replacing by bobbins, cores, or receptacles at take-up stations; Transferring material between adjacent full and empty take-up elements
9/04 . . Doffing arrangements integral with spinning or twisting machines
9/06 . . . Removing yarn from centrifugal cups on to yarn carriers
9/08 . . Doffing arrangements independent of spinning or twisting machines

9/10 . . . Doffing carriages
9/12 . . . Manual cop-tube applying apparatus; Stands for cop-tube applying apparatus
9/14 . . for preparing machines for doffing of yarns (stop motions responsive to delivery of a measured length of material D01H 13/24)
9/16 . . Yarn-severing arrangements
9/18 . for supplying bobbins, cores, receptacles, or completed packages to, or transporting from, paying-out or take-up stations (D01H 9/10 takes precedence)

11/00 **Arrangements for confining or removing dust, fly, or the like** (cleaning of running surfaces in open-end spinning machines D01H 4/22; separation in general B01D; cleaning in general B08B; air-conditioning F24F, e.g. by filtering F24F 3/16) **[5]**

13/00 **Other common constructional features, details, or accessories** (for open-end spinning D01H 4/00) **[5]**
13/02 . Roller arrangements not otherwise provided for
13/04 . Guides for slivers, rovings, or yarns; Smoothing dies (fibre-condensing guides D01H 5/72)
13/06 . . Traversing arrangements
13/08 . Twist arresters
13/10 . Tension devices
13/12 . Arrangements preventing snarls or inadvertent doubling of yarns (suction end-catchers D01H 5/68)
13/14 . Warning or safety devices, e.g. automatic fault detectors, stop motions (warning or safety devices for filamentary material, not intimately associated with spinning or like machines B65H; safety devices of general application F16P; indicating devices of general application G08B)
13/16 . . responsive to reduction in material tension, failure of supply, or breakage, of material
13/18 . . . stopping supply only
13/20 . . responsive to excessive tension or irregular operation of apparatus
13/22 . . responsive to presence of irregularities in running material
13/24 . . responsive to delivery of a measured length of material, completion of winding of a package or filling of a receptacle
13/26 . Arrangements facilitating the inspection or testing of yarns or the like in connection with spinning or twisting
13/28 . Heating or cooling arrangements
13/30 . Moistening, sizing, oiling, waxing, colouring, or drying yarns or the like as incidental measures during spinning or twisting
13/32 . Counting, measuring, recording, or registering devices (in general, see in the appropriate subclass of section G, e.g. G01B)

15/00 **Piecing arrangements** (for open-end spinning machines D01H 4/48; in machines for producing textile fabrics, see the appropriate subclasses) **[5]**
15/007 . for two-for-one twisting machines **[5]**
15/013 . Carriages travelling along the machines **[5]**

17/00 **Hand tools** (cop-tube applying apparatus D01H 9/12)
17/02 . Arrangements for storing ring travellers; Devices for applying travellers to rings

D02 YARNS; MECHANICAL FINISHING OF YARNS OR ROPES; WARPING OR BEAMING

Note

In this class, the following terms are used with the meanings indicated:
– "fibre" means a relatively-short, elongated member of natural or artificial material;
– "filament" means an endless or quasi-endless, elongated member of natural or artificial material;
– "yarn" means a unitary assembly of fibres, usually produced by spinning;
– "thread" means an assembly of yarns or filaments, usually produced by twisting.

D02G CRIMPING OR CURLING FIBRES, FILAMENTS, YARNS, OR THREADS; YARNS OR THREADS

Note

Attention is drawn to the Note following the title of class D02.

1/00 Producing crimped or curled fibres, filaments, yarns, or threads, giving them latent characteristics (yarns per se D02G 3/00; during formation of artificial filaments, threads, or the like D01D 5/22; general aspects of chemical treatment D06M)

1/02 . by twisting, fixing the twist and backtwisting, i.e. by imparting false twist

1/04 . . Devices for imparting false twist

1/06 . . . Spindles

1/08 . . . Rollers

1/10 . using knife edges, e.g. heated knife edges, for edge crimping

1/12 . using stuffer boxes

1/14 . using grooved rollers or gear-wheel-type members

1/16 . using jets or streams of turbulent gases, e.g. air, steam

1/18 . by combining fibres, filaments, or yarns, having different shrinkage characteristics

1/20 . Combinations of two or more of the above-mentioned operations or devices; After-treatments for fixing crimp or curl

3/00 Yarns or threads, e.g. fancy yarns; Processes or apparatus for the production thereof, not otherwise provided for (for producing crimped or curled yarns D02G 1/00)

3/02 . Yarns or threads characterised by the material or by the materials from which they are made

3/04 . . Blended or other yarns or threads containing components made from different materials

3/06 . . Threads formed from strip material other than paper

3/08 . . Paper yarns or threads

3/10 . . Yarns or threads formed from collagenous materials, e.g. catgut

3/12 . . Threads containing metallic filaments or strips

3/14 . . Horse-hair threads

3/16 . . Yarns or threads made from mineral substances

3/18 . . . from glass or the like

3/20 . . . from asbestos

3/22 . Yarns or threads characterised by constructional features

3/24 . . Bulked yarns or threads, e.g. formed from staple fibre components with different relaxation characteristics

3/26 . . with characteristics dependent on the amount or direction of twist

3/28 . . . Doubled, plied, or cabled threads

3/30 . . . Crêped or other highly-twisted yarns or threads

3/32 . . Elastic yarns or threads

3/34 . . Yarns or threads having slubs, knops, spirals, loops, tufts, or other irregular or decorative effects, i.e. effect yarns

3/36 . . Cored or coated yarns or threads (elastic yarns or threads D02G 3/32)

3/38 . . Threads in which fibres, filaments, or yarns are wound with other yarns or filaments (covering endless core threads with fibres by using open-end spinning techniques D01H 4/00)

3/40 . . Yarns in which fibres are united by adhesives; Impregnated yarns or threads

3/42 . . Chenille threads

3/44 . Yarns or threads characterised by the purpose for which they are designed

3/46 . . Sewing-cottons or the like

3/48 . . Tyre cords

D02H WARPING, BEAMING, OR LEASING

Note

Attention is drawn to the Note following the title of class D02.

Subclass index

1/00 Creels, i.e. apparatus for supplying a multiplicity of individual threads

3/00 Warping machines

5/00 Beaming machines

5/02 . combined with apparatus for sizing or other treatment of warps (sizing per se D06B)

7/00 Combined warping and beaming machines

9/00 Leasing

9/02 . Lease rods or bands

11/00 Methods or apparatus not provided for in groups D02H 1/00 to D02H 9/00, e.g. for cleaning the warp

13/00 Details of machines of the other groups of this subclass

13/02 . Stop motions
13/04 . . responsive to breakage, slackness, or excessive tension of threads, with detectors for individual threads or small groups of threads
13/06 . . . mechanical
13/08 . . . electrical
13/10 . . responsive to thread-measuring devices, e.g. stopping the machine when required length of warp has been wound
13/12 . Variable-speed driving mechanisms
13/14 . . controlled automatically by tension in the warp
13/16 . Reeds, combs, or other devices for determining the spacing of threads
13/18 . . with adjustable spacing
13/20 . . with fixed spacing
13/22 . Tensioning devices
13/24 . . for individual threads
13/26 . . for threads in warp form (controlling the driving of beams, or the like, to keep tension constant D02H 13/14)
13/28 . Warp beams (cloth beams D03D 49/20)
13/30 . . with flanges
13/32 . . . adjustable
13/34 . . sectional
13/36 . . Means for attaching warp to beam
13/38 . Storage racks for beams

D02J FINISHING OR DRESSING OF FILAMENTS, YARNS, THREADS, CORDS, ROPES, OR THE LIKE (curling or crimping D02G; by treatment with liquids, gases or vapours D06B; finishing other than by liquid treatment, of yarns in warp or sheet form D06C; for chemical matters, see D06L, D06M, D06P, D06Q; treatment during rope-making, apparatus for treating ropes auxiliary to rope-making D07B)

Note

Attention is drawn to the Note following the title of class D02.

Subclass index

1/00 Modifying the structure or properties resulting from a particular structure; **Modifying, retaining, or restoring the physical form or cross-sectional shape, e.g. by use of dies or squeeze rollers** (modifying only the surface D02J 3/00)

1/02 . Bulking, e.g. looping (by crimping, by curling D02G)
1/04 . Compacting
1/06 . Imparting irregularity, e.g. slubbing or other non-uniform features, e.g. high- and low-shrinkage or strengthened and weakened sections
1/08 . Interlacing constituent filaments without breakage thereof, e.g. by use of turbulent air streams
1/12 . Modifying stretch/bulk properties of textured yarns or the like by after-treatment
1/14 . Rendering uniform or evening non-uniform features

1/16 . Rubbing or similar working, e.g. to redistribute or remove fibres

1/18 . Separating or spreading

1/20 . Stressing or stress-relieving, e.g. by vibration or subjection to electrostatic stress or electric discharge

1/22 . Stretching or tensioning, shrinking or relaxing, e.g. by use of overfeed and underfeed apparatus, or preventing stretch (stretch spinning D01D 5/12)

3/00 Modifying the surface

3/02 . by abrading, scraping, scuffing, cutting, or nicking (preliminary roughening of fibres, e.g. for spinning, D01G 3/00)

3/04 . by brushing

3/06 . by polishing, e.g. glazing, glossing

3/08 . . by compressing, e.g. by calendering or ironing

3/10 . by indenting

3/12 . by removing projecting ends of fibres

3/14 . . by shearing

3/16 . . by singeing

3/18 . Treating with particulate, semi-solid, or solid substances, e.g. wax (during package formation B65H 71/00; waxing yarns or the like as incidental measures during spinning or twisting D01H 13/30)

7/00 Cleaning, e.g. removing dust, loose fibres, charred ends (in combination with the shearing, singeing, or otherwise removing of projecting fibre ends D02J 3/12, D02J 3/14, D02J 3/16)

11/00 Combinations, not covered by any one of groups D02J 1/00 to D02J 7/00, of processes provided for in such groups; **Plant for carrying-out such combinations of processes**

13/00 Heating or cooling the yarn, thread, cord, rope, or the like, not specific to any one of the processes provided for in this subclass (heating, cooling, or drying during spinning or twisting D01H; drying of yarns, or the like, in general F26B)

D03 WEAVING

D03C SHEDDING MECHANISMS; PATTERN CARDS OR CHAINS; PUNCHING OF CARDS; DESIGNING PATTERNS

Subclass index

1/00 Dobbies

1/02 . Single-lift dobbies, i.e. dobbies in which the same draw-knife or equivalent operates for every pick (D03C 1/10 takes precedence)

1/04 . . Open-shed single-lift dobbies

1/06 . Double-lift dobbies, i.e. dobbies in which separate draw-knives or equivalent operate on alternate picks

1/08 . . reversible, i.e. correct sheds open automatically when the loom is driven backwards

1/10 . Centre-shed dobbies, i.e. shed formed by lifting some threads and lowering the others from central shed-closed position

1/12 . Dobbies employing toothed gearing instead of draw-knives

1/14 . Features common to dobbies of different types (stop motions acting on defective operation of shedding mechanisms D03D 51/46)

1/16 . . Arrangements of dobby in relation to loom

1/18 . . Knives; Knife frames

1/20 . . Hooks; Lifters

1/22 . . Needles; Needle boxes; Needle boards

1/24 . . Cylinders; Cylinder battens

1/26 . . Facilitating engagement of lifting-hooks with draw-knives

1/28 . . . by creating and then eliminating back-lash between hooks and knives

1/30 . . . wherein all the hooks are disengaged from the knives, and selected hooks then re-engaged

1/32 . . . wherein all the hooks are engaged with the knives, and unselected hooks then disengaged

1/34 . . Arrangements wherein warp threads pass one another at different heights to avoid congestion

1/36 . . Card- or chain-saving arrangements, e.g. cross-border dobbies

3/00 Jacquards (controlling jacquard by scanning design D03C 17/06; for gripper Axminster looms D03D 39/08)

3/02 . Single-lift jacquards

3/04 . . of open-shed type

3/06 . Double-lift jacquards

3/08 . . of open-shed type

3/10 . Centre-shed jacquards

3/12 . Multiple-shed jacquards, i.e. jacquards which move warp threads to several different heights, e.g. for weaving pile fabrics

3/14 . Jacquards not employing lifting-hooks, e.g. employing knotted cords in conjunction with keyhole slots

3/16 . Verdol or other jacquards having intermediate power-operated needles between reading needles and lifting-hooks

3/18 . Selvedge jacquards

3/20 . Electrically-operated jacquards

3/22 . Fluid-operated jacquards

3/24 . Features common to jacquards of different types

3/26 . . General arrangements of jacquards, or disposition in relation to loom

3/28 . . Pick-finding arrangements; Arrangements for preventing next shed from being opened during stopping of loom

3/30 . . Arrangements wherein hooks are positively operated to close shed

3/32 . . Jacquard driving mechanisms

3/34 . . . Cylinder operating mechanisms

3/36 . . . Griffe operating mechanisms

3/38 . . Comber boards

3/40 . . Constructions of lifting-cords

3/42 . . Arrangements of lifting-cords

3/44 . . Lingoes

5/00 Cam or other direct-acting shedding mechanisms, i.e. operating heald frames without intervening power-supplying devices

5/02 . operated by rotating cams

5/04 . . Construction or shape of cams (cams in general F16H 53/00)

5/06 . operated by cam devices other than rotating cams

7/00 Leno or similar shedding mechanisms

7/02 . Gauze healds

7/04 . Mechanisms having discs oscillating about a weftwise axis and having apertures for warp threads

7/06 . Mechanisms having eyed needles for moving warp threads from side to side of other warp threads

7/08 . Devices for twisting warp threads repeatedly in the same direction

9/00 Healds; **Heald frames** (for leno shedding D03C 7/00)

9/02 . Healds

9/04 . . Metal healds

9/06 . Heald frames

11/00 Selvedge shedding mechanisms not forming part of main shedding mechanism (selvedge jacquards D03C 3/18; leno selvedge mechanism D03C 7/00)

13/00 Shedding mechanisms not otherwise provided for

15/00 Pattern cards or chains

15/02 . Chains of metal, wood, or similar material with projecting pattern-indicating elements

15/04 . Cards or paper perforated to indicate pattern

15/06 . Apparatus for setting pegs in, or removing pegs from, pattern cards

15/08 . Apparatus for interconnecting, e.g. by lacing, or disconnecting pattern cards

17/00 Card-punching apparatus (marking record carriers in digital fashion G06K)

17/02 . manually-controlled, i.e. holes to be punched determined by the operator

17/04 . . power-operated

17/06 . automatic, i.e. design scanned optically or otherwise to control punching apparatus or to control loom jacquard directly

19/00 Methods or devices concerned with designing or making patterns, not provided for in other groups of this subclass

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D03D WOVEN FABRICS; METHODS OF WEAVING; LOOMS

(1) Class D06 takes precedence over this subclass in respect of processes involving both weaving and finishing steps and in respect of the finished fabrics.

(2) A method of weaving is classified in the group designating the fabric woven unless the method is characterised by the operation of a particular loom rather than by the production of a particular fabric. In this case, the method is classified in the group for the loom.

(3) In this subclass, if there is any doubt as to which of the essential features is the most important (this is usually the most restrictive feature), the groups designating woven fabrics should be considered in the order in which they appear at each level of indentation, except that groups designating woven pile fabrics are to be considered as taking precedence over groups designating other woven fabrics.

Subclass index

Woven fabrics; Methods of weaving other than those characterised by the operation of a particular loom

1/00 Woven fabrics designed to make specified articles

1/02 . Inflatable articles

1/04 . Sack- or bag-like articles

1/06 . Curtain heading tapes

1/08 . Ladder tapes (ladder tapes for venetian blinds E06B 9/382)

3/00 Woven fabrics characterised by their shape

3/02 . Tubular fabrics

3/04 . Endless fabrics

3/06 . Fabrics of varying width

3/08 . Arched, corrugated, or like fabrics

5/00 Selvedges

7/00 Woven fabrics designed to be resilient, i.e. to recover from compressive stress

9/00 Open-work fabrics (ladder-tape fabrics D03D 1/08)

11/00 Double or multi-ply fabrics not otherwise provided for

11/02 . Fabrics formed with pockets, tubes, loops, folds, tucks, or flaps (fabrics for curtain heading tapes D03D 1/06; fabrics consisting of a single tube D03D 3/02)

13/00 Woven fabrics characterised by the special disposition of the warp or weft threads, e.g. with curved weft threads, with discontinuous warp threads, with diagonal warp or weft

15/00 Woven fabrics characterised by the material or construction of the yarn or other warp or weft elements used

15/02 . the warp or weft elements being of stiff material, e.g. wire, cane, slat

15/04 . woven to produce shapes or effects upon differential shrinkage

15/06 . using scaffolding threads, i.e. threads removed after weaving

15/08 . using stretchable or elastic threads (woven fabrics whose elastic or stretch properties are due to the manner of weaving D03D 17/00)

15/10 . using threads having high or low coefficients of friction

15/12 . using heat-resistant or fireproof threads

17/00 Woven fabrics having elastic or stretch properties due to manner of weaving (fabrics using stretchable or elastic threads D03D 15/08)

19/00 Gauze or leno-woven fabrics

21/00 Lappet- or swivel-woven fabrics

23/00 General weaving methods not special to the production of any particular woven fabric or the use of any particular loom; **Weaves not provided for in any other single group**

25/00 Woven fabrics not otherwise provided for

27/00 Woven pile fabrics

27/02 . wherein the pile is formed by warp or weft

27/04 . . Weft pile fabrics

27/06 . . Warp pile fabrics

27/08 . . . Terry fabrics

27/10 . . Fabrics woven face-to-face, e.g. double velvet

27/12 . wherein pile tufts are inserted during weaving

27/14 . . with tufts around warps

27/16 . . with tufts around wefts

27/18 . Chenille fabrics

Looms; **Methods of weaving characterised by the operation of particular looms**

29/00 Hand looms

31/00 Lappet, swivel or other looms for forming embroidery-like decoration on fabrics

33/00 Multiple looms, i.e. two or more looms assembled together, whether or not they have mechanisms in common (D03D 35/00 takes precedence)

35/00 Smallware looms, i.e. looms for weaving ribbons or other narrow fabrics (D03D 47/00 takes precedence)

37/00 Circular looms (looms for weaving separate fabrics disposed in a circle or polygon D03D 33/00)

39/00 Pile-fabric looms

39/02 . Axminster looms, i.e. wherein pile tufts are inserted during weaving

39/04 . . Spool Axminster looms

39/06 . . . Tuft yarn tube or spool frames

39/08 . . Gripper Axminster looms

39/10 . Wire-tapestry looms, e.g. for weaving velvet or Brussels or Wilton carpets, the pile being formed over weftwise wires

39/12 . . Mechanisms for operating the pile wires

39/14 . . Construction of the pile wires, e.g. pile wires which cut

39/16 . Double-plush looms, i.e. for weaving two pile fabrics face-to-face

39/18 . . Separating the two plush layers, e.g. by cutting

39/20 . Looms forming pile over warpwise wires

39/22 . Terry looms

39/24 . Devices for cutting the pile on the loom (pile wires which cut D03D 39/14; separating two plush layers D03D 39/18)

41/00 Looms not otherwise provided for, e.g. for weaving chenille yarn; **Details peculiar to these looms**

43/00 Looms with change-boxes

43/02 . with drop boxes

43/04 . . Operating mechanisms

43/06 . with rotary boxes

43/08 . . Operating mechanisms

43/10 . Weft catchers, i.e. means for preventing entanglement of wefts

45/00 Looms with automatic weft replenishment (automatic replenishment in smallware looms D03D 35/00, in circular looms D03D 37/00; bobbins rewound on loom D03J 1/12)

45/02 . Controlling replenishment

45/04 . . Pirn feelers or other detectors for initiating replenishment (weft stop motions D03D 51/34)

45/06 . . . mechanical

45/08 . . . . of the side-slip type

45/10 . . . electrical

45/12 . . . optical

45/14 . . Storing the need for replenishment or the colour required until the spent shuttle returns to the replenishing end of the loom

45/16 . . . selecting thereby weft of correct colour

45/18 . . Shuttle feelers or other devices for preventing replenishment if shuttle is incorrectly positioned in shuttle box (shuttle stop motions D03D 51/40)

45/20 . Changing bobbins, cops, or other shuttle stock

45/22 . . effected with shuttle in normal shuttle box

45/24 . . effected otherwise than in normal box

45/26 . . Magazines

45/28 . . . for one type of thread, e.g. same colour

45/30 . . . . rotary

45/32 . . . for several types of thread, e.g. multicolour

45/34 . Shuttle changing

45/36 . . fresh shuttle being substituted for spent shuttle in the same cell of shuttle box

45/38 . . Shuttle box with an extra cell which is used only during replenishment

45/40 . . . the spent shuttle being received in the normal cell and the fresh shuttle being picked from the extra cell

45/42 . . . the spent shuttle being received in the extra cell and the fresh shuttle being picked from the normal cell

45/44 . . Magazines

45/46 . . . for one type of thread, e.g. single colour

45/48 . . . for several types of threads, e.g. multicolour

45/50 . Cutting, holding, manipulating, or disposing of, weft ends

45/52 . . Cutting weft of depleted shuttle near shuttle and holding the piece attached to the fabric
45/54 . . Cutting fresh weft and holding the piece attached to the fabric
45/56 . . Cutting depleted and fresh wefts at selvedge
45/58 . . Removing tip bunch or fresh weft end from fresh bobbin
45/60 . . . substantially by air stream or suction
45/62 . . Disposing of waste pieces of cut weft end (D03D 45/58 takes precedence)

47/00 Looms in which bulk supply of weft does not pass through shed, e.g. shuttleless looms, gripper shuttle looms, dummy shuttle looms (circular looms D03D 37/00)
47/02 . wherein loops of continuous weft thread are inserted, i.e. double picks (D03D 47/27 takes precedence) **[3]**
47/04 . . by a reciprocating needle having a permanently-threaded eye
47/06 . . by a pivoted having a permanently-threaded eye
47/08 . . . the path of the needle being modified by cams, linkages, or other means
47/10 . . by a forked needle pushing loop of weft through shed
47/12 . wherein single picks of weft thread are inserted, i.e. with shedding between each pick (D03D 47/27 takes precedence) **[3]**
47/14 . . by a gripper needle taking the end of the weft through the shed
47/16 . . by a gripper needle entering the shed empty and drawing the weft as it retracts
47/18 . . two weft inserters meeting at or near the middle of the shed and transferring the weft from one to the other
47/20 . . Constructional features of the thread-engaging device on the inserters
47/22 . . . adapted for working a loop of weft part-way inserted in the shed and then straightened-out
47/23 . . . Thread grippers (in dummy or gripper shuttles D03J 5/06) **[3]**
47/24 . . by gripper or dummy shuttle (travelling-wave-shed looms D03D 47/26; inserting mechanisms for shuttles D03D 49/24; gripper or dummy shuttles per se D03J 5/06)
47/25 . . . inserted from only one side of loom **[3]**
47/26 . . Travelling-wave-shed looms
47/27 . Drive or guide mechanisms for weft inserting **[3]**
47/28 . wherein the weft itself is projected into the shed
47/30 . . by gas jet
47/32 . . by liquid jet
47/34 . Handling the weft between bulk storage and weft-inserting means
47/36 . . Measuring and cutting the weft
47/38 . . Weft pattern mechanisms
47/39 . wherein cane, straw, slats, material for hair-cloth or similar material is handled **[3]**
47/40 . Forming selvedges
47/42 . . by knitting or interlacing loops of weft
47/44 . . . with additional selvedge thread
47/46 . . by selvedge shuttle or other device passing selvedge thread through loop of weft (by knitting D03D 47/44)
47/48 . . by inserting cut end of weft in next shed, e.g. by tucking, by blowing
47/50 . . by adhesion

49/00 Details or constructional features not peculiar to looms of a particular type (temples D03J 1/22)
49/02 . Construction of loom framework
49/04 . Control of the tension in warp or cloth
49/06 . . Warp let-off mechanisms (construction of warp beam D02H)
49/08 . . . Warp beam brakes
49/10 . . . Driving the warp beam to let the warp off
49/12 . . Controlling warp tension by means other than let-off mechanisms
49/14 . . . Compensating for tension differences during shedding
49/16 . . . Warp supplied by creel
49/18 . . Devices for indicating warp tension (measuring tension of threads in general G01L 5/04)
49/20 . . Take-up motions; Cloth beams (storage racks for beams D02H)
49/22 . . Back rests; Lease rods; Brest beams
49/24 . Mechanisms for inserting shuttle in shed (shuttles per se D03J 5/00)
49/26 . . Picking mechanisms, e.g. for propelling gripper shuttles or dummy shuttles
49/28 . . . Driving mechanisms for the picker stick
49/30 . . . . operated by cam
49/32 . . . . operated by previously-loaded spring or equivalent
49/34 . . . . operated by liquid or gas pressure
49/36 . . . Pickers; Arresting means therefor (check straps D03D 49/40)
49/38 . . . Picking sticks; Arresting means therefor (check straps D03D 49/40)
49/40 . . . Check straps; Lug straps; Similar strap components
49/42 . . whereby the shuttle is propelled by liquid or gas pressure
49/44 . . whereby the shuttle is propelled by electric or magnetic means
49/46 . . wherein the shuttle is pushed or pulled positively (travelling-wave-shed type looms D03D 47/26)
49/48 . . positioning shuttle in readiness for picking
49/50 . . Devices or arrangements concerning insertion of the weft, not otherwise provided for
49/52 . Shuttle boxes (change-boxes D03D 43/00)
49/54 . . Braking means; Swells
49/56 . . . Shuttle relief mechanisms, i.e. reducing shuttle swell pressure before picking
49/58 . Shuttle guards
49/60 . Construction or operation of slay
49/62 . . Reeds mounted on slay
49/64 . . wherein the slay dwells or moves slowly while the weft is being inserted
49/66 . . Shuttle races
49/68 . Reeds or beat-up combs not mounted on the slay (loose reed stop motion D03D 51/42)
49/70 . Devices for cutting weft threads (cutting weft in looms with automatic weft replenishment D03D 45/50; apparatus for slitting fabric D03J 1/08)

51/00 Driving, starting, or stopping arrangements; Automatic stop motions
51/02 . General arrangements of driving mechanism
51/04 . Manual controls
51/06 . using particular methods of stopping
51/08 . . stopping at definite point in weaving cycle, or moving to such point after stopping
51/10 . . stopping suddenly

51/12 . for adjusting speed
51/14 . for reducing speed temporarily
51/16 . for varying speed cyclically
51/18 . Automatic stop motions
51/20 . . Warp stop motions
51/22 . . . mechanical
51/24 . . . . wherein droppers are suspended on individual warp threads or small groups of threads
51/26 . . . . Detector healds
51/28 . . . electrical
51/30 . . . . wherein droppers are suspended on individual warp threads or small groups of threads
51/32 . . . . Detector healds
51/34 . . Weft stop motions
51/36 . . . Centre weft forks
51/38 . . . Side weft forks
51/40 . . Shuttle stop motions
51/42 . . . Loose reed mechanisms
51/44 . . acting on defective operation of loom mechanisms
51/46 . . . of shedding mechanisms

D03J AUXILIARY WEAVING APPARATUS; WEAVERS' TOOLS; SHUTTLES

1/00 Auxiliary apparatus combined with or associated with looms
1/02 . for treating warp, e.g. cleaning, moistening
1/04 . for treating weft
1/06 . for treating fabric (cutting pile on the loom D03D 39/24)
1/08 . . for slitting fabric
1/10 . for indicating pattern to weaver
1/12 . transferring bobbins between loom and winding station (bobbin-winding machines B65H)
1/13 . for leasing warp (leasing in general D02H 9/00) **[2]**
1/14 . Apparatus for threading warp stop-motion droppers, healds, or reeds
1/16 . Apparatus for joining warp ends (knot-tying tools D03J 3/00)
1/18 . . for joining, e.g. tying, a complete series of fresh warp threads to the used warp threads
1/20 . Measuring length of fabric or number of picks woven
1/22 . Temples
1/24 . Mirrors or other arrangements for inspecting loom parts

3/00 Weavers' tools, e.g. knot-tying tools
3/02 . Reed and heald hooks
3/04 . Shuttle-threading tools (threading devices in shuttles D03J 5/20)

5/00 Shuttles (swivel shuttles D03D 31/00; shuttles for smallware looms D03D 35/00; circular loom shuttles D03D 37/00; selvedge shuttles D03D 47/46)
5/02 . Construction of shuttle body
5/04 . . Shuttle tips
5/06 . Dummy shuttles; Gripper shuttles
5/08 . Supports for pirns, bobbins, or cops
5/10 . . Pegs or spindles
5/12 . . . removable
5/14 . . . pivoted
5/16 . . Bobbin clamps, e.g. for automatic bobbin-changing loom shuttles
5/18 . . for coreless cops, i.e. shuttles having no peg or bobbin clamp
5/20 . Devices in shuttles for threading (separate tools for threading shuttles D03J 3/04)
5/22 . . for self-threading, i.e. threading automatically when shuttle is picked
5/24 . Tension devices

D04 BRAIDING; LACE-MAKING; KNITTING; TRIMMINGS; NON-WOVEN FABRICS

D04B KNITTING

(1) In this subclass, groups designating machines, apparatus, devices, or implements include processes characterised by, or dependent on, their use, and the products of such processes.

(2) Knitted products, i.e. fabrics, articles, are classified in this subclass only if they have constructional features which are of interest from the knitting aspect.

Subclass index

Weft knitting; **Machines therefor**

1/00 Weft knitting processes for the production of fabrics or articles not dependent on the use of particular machines; **Fabrics or articles defined by such processes**

1/02 . Pile fabrics or articles having similar surface features
1/04 . . characterised by thread material
1/06 . Non-run fabrics or articles
1/08 . . characterised by thread material
1/10 . Patterned fabrics or articles
1/12 . . characterised by thread material
1/14 . Other fabrics or articles characterised primarily by the use of particular thread materials
1/16 . . synthetic threads
1/18 . . elastic threads
1/20 . . . crimped threads
1/22 . specially adapted for knitting goods of particular configuration
1/24 . . wearing apparel
1/26 . . . stockings
1/28 . . . gloves

3/00 Hand tools or implements for weft knitting

3/02 . Needles
3/04 . Finger protectors; Thread tensioners
3/06 . Ball holders or receptacles

5/00 Weft knitting apparatus or machines without needles for domestic use (with needles D04B 7/08)

7/00 Flat-bed knitting machines with independently-movable needles (straight-bar machines with fixed needles D04B 11/00)

7/02 . with one set of needles
7/04 . with two sets of needles
7/06 . . for purl work or Links-Links loop formation
7/08 . for domestic use
7/10 . with provision for narrowing or widening to produce fully-fashioned goods
7/12 . with provision for incorporating pile threads
7/14 . with provision for incorporating internal threads in laid-in fabrics
7/16 . for producing fabrics consisting of, or incorporating, elastic threads
7/18 . . incorporated as weft or inlaid threads
7/20 . with provision for changing the fabric construction, e.g. from plain to rib-loop fabric
7/22 . with special provision for commencing goods, e.g. with non-run edges
7/24 . for producing patterned fabrics
7/26 . . with colour patterns
7/28 . . with stitch patterns
7/30 . specially adapted for knitting goods of particular configuration
7/32 . . tubular goods
7/34 . . . gloves

9/00 Circular weft knitting machines with independently-movable needles (with fixed spring or bearded needles D04B 13/00)

9/02 . with one set of needles

9/04 . . with spring or bearded needles
9/06 . with needle cylinder and dial for ribbed goods
9/08 . . for interlock goods
9/10 . with two needle cylinders for purl work or for Links-Links loop formation
9/12 . with provision for incorporating pile threads
9/14 . with provision for incorporating loose fibres, e.g. in high-pile fabrics
9/16 . with provision for incorporating internal threads in laid-in fabrics
9/18 . with provision for splicing by incorporating reinforcing threads
9/20 . with provision for narrowing or widening; with reciprocatory action, e.g. for knitting of flat portions
9/22 . with provision for changing the fabric construction, e.g. from plain to rib-loop fabric
9/24 . with special provision for commencing goods, e.g. with non-run edges
9/26 . for producing patterned fabrics
9/28 . . with colour patterns
9/30 . . . by striping
9/32 . . . . by wrap striping
9/34 . . . by plating
9/36 . . . Intarsia work obtained by reciprocatory action
9/38 . . with stitch patterns
9/40 . with provision for transfer of knitted goods from one machine to another
9/42 . specially adapted for producing goods of particular configuration
9/44 . . elongated tubular articles of small diameter, e.g. coverings for cables (sheathing electric cables H01B 13/22)
9/46 . . stockings, or portions thereof
9/48 . . . non-run stockings
9/50 . . . . micromesh stockings
9/52 . . . surgical stockings
9/54 . . . welts, e.g. double or turned welts
9/56 . . . heel or toe portions
9/58 . . gloves

11/00 Straight-bar knitting machines with fixed needles (flat-bed machines with independently-movable needles D04B 7/00)

11/02 . with one set of needles
11/04 . with two sets of needles
11/06 . with provision for narrowing or widening to produce fully-fashioned goods
11/08 . with provision for incorporating pile threads
11/10 . with provision for incorporating internal threads in laid-in fabrics
11/12 . for producing fabrics from, or incorporating, elastic threads
11/14 . with provision for changing the fabric construction, e.g. from plain to rib-loop fabric
11/16 . with special provision for commencing goods, e.g. with non-run edges
11/18 . for producing patterned fabrics
11/20 . . with colour patterns
11/22 . . with stitch patterns
11/24 . with provision for transfer of knitted goods from one machine to another
11/26 . specially adapted for producing goods of particular configuration
11/28 . . stockings, or portions thereof
11/30 . . . non-run stockings
11/32 . . . welts, e.g. double or turned welts
11/34 . . . heel or toe portions
11/36 . . other wearing apparel

13/00 Circular weft knitting machines with fixed spring or bearded needles, e.g. loop-wheel machines (with independently-movable needles D04B 9/00)

13/02 . with horizontal needles

15/00 Details of, or auxiliary devices incorporated in, weft knitting machines, restricted to machines of this kind (details or auxiliary devices not so restricted D04B 35/00)

15/02 . Loop-transfer points
15/04 . . for straight-bar knitting machines
15/06 . Sinkers
15/08 . Needle latch openers; Brushes
15/10 . Needle beds
15/12 . . Shogging devices therefor
15/14 . Needle cylinders
15/16 . . Driving devices for reciprocatory action
15/18 . Dials
15/20 . Needle bars
15/22 . . Driving devices therefor
15/24 . Sinker heads; Sinker bars
15/26 . Slurcocks
15/28 . Needle pressers
15/30 . Driving devices for thread-carrier rods
15/32 . Cam systems or assemblies for operating knitting instruments
15/34 . . for dials
15/36 . . for flat-bed knitting machines
15/38 . Devices for supplying, feeding, or guiding threads to needles
15/40 . . Holders or supports for thread packages
15/42 . . . Frames for assemblies of two or more reels
15/44 . . Tensioning devices for individual threads
15/46 . . . for elastic threads
15/48 . . Thread-feeding devices
15/50 . . . for elastic threads
15/52 . . . for straight-bar knitting machines
15/54 . . Thread guides
15/56 . . . for flat-bed knitting machines
15/58 . . . for circular knitting machines; Thread-changing devices
15/60 . . . . with thread-clamping or -severing devices
15/61 . . . . . arranged within needle circle
15/62 . . . . with thread knotters
15/64 . . . for straight-bar knitting machines
15/66 . Devices for determining or controlling patterns
15/68 . . characterised by the knitting instruments used
15/70 . . . in flat-bed knitting machines
15/72 . . . in straight-bar knitting machines
15/74 . . . Pattern drums
15/76 . . . Pattern wheels
15/78 . . . Electrical devices
15/80 . . characterised by the thread guides used
15/82 . . characterised by the needle cams used
15/84 . . Jacquard cards or mechanisms (stamping apparatus therefor D03C)
15/86 . . . in flat-bed knitting machines
15/88 . Take-up or draw-off devices for knitting products
15/90 . . for flat-bed knitting machines
15/92 . . pneumatic
15/94 . Driving-gear not otherwise provided for

15/96 . . in flat-bed knitting machines
15/98 . . in straight-bar knitting machines
15/99 . . electrically controlled

Repairing or unravelling knitted fabrics

17/00 Repairing knitted fabrics by knitting operations
17/02 . by darning
17/04 . by picking-up dropped stitches

19/00 Unravelling knitted fabrics

Warp knitting; **Machines therefor**

21/00 Warp knitting processes for the production of fabrics or articles not dependent on the use of particular machines; **Fabrics or articles defined by such processes**
21/02 . Pile fabrics or articles having similar surface features
21/04 . . characterised by thread material
21/06 . Patterned fabrics or articles (open-work fabrics D04B 21/10)
21/08 . . characterised by thread material
21/10 . Open-work fabrics
21/12 . . characterised by thread material
21/14 . Fabrics characterised by the incorporation by knitting, in one or more thread, fleece, or fabric layers, of reinforcing, binding, or decorative threads; Fabrics incorporating small auxiliary elements, e.g. for decorative purposes (pile fabrics D04B 21/02; non-woven fabrics in general D04H)
21/16 . . incorporating synthetic threads
21/18 . . incorporating elastic threads
21/20 . specially adapted for knitting articles of particular configuration

23/00 Flat warp knitting machines
23/02 . with two sets of needles
23/04 . with independently-movable knitting needles
23/06 . for producing fabrics consisting of, or incorporating, elastic threads
23/08 . with provision for incorporating pile threads
23/10 . for knitting through thread, fleece, or fabric layers, or around elongated core material
23/12 . with provision for incorporating unlooped wefts extending from selvedge to selvedge
23/14 . with provision for incorporating small auxiliary elements, e.g. for decorative purposes
23/16 . specially adapted for producing fabrics, or article blanks, of particular form or configuration
23/18 . . with provision for narrowing or widening
23/20 . . for producing stocking blanks
23/22 . with special thread-guiding means
23/24 . with cut needle presser arrangements to produce patterns

25/00 Warp knitting machines not otherwise provided for
25/02 . Tubular machines
25/04 . Milanese machines
25/06 . Galloon crocheting machines
25/08 . . for producing pile fabrics
25/10 . . for producing patterned fabrics
25/12 . . . with independently-movable weft-thread guides controlled by Jacquard mechanisms
25/14 . . specially adapted for producing articles of particular configuration

27/00 Details of, or auxiliary devices incorporated in, warp knitting machines, restricted to machines of this kind (details or auxiliary devices not so restricted D04B 35/00)
27/02 . Warp-thread guides
27/04 . Sinkers
27/06 . Needle bars; Sinker bars
27/08 . . Driving devices therefor
27/10 . Devices for supplying, feeding, or guiding threads to needles
27/12 . . Tensioning devices for individual threads
27/14 . . Thread tensioning rod arrangements
27/16 . . Warp beams; Bearings therefor
27/18 . . . Warp beam braking devices for thread tensioning
27/20 . . . Warp beam driving devices
27/22 . . . . electrically controlled
27/24 . . Thread guide bar assemblies
27/26 . . . Shogging devices therefor
27/28 . . . . with arrangements to reduce the number of members of pattern chains
27/30 . . . . with driving-gear comprising force-multiplication devices
27/32 . . . with independently-movable thread guides controlled by Jacquard mechanisms
27/34 . Take-up or draw-off devices for knitted products
27/36 . . with temples

Crocheting; **Apparatus therefor**

31/00 Crocheting processes for the production of fabrics or articles
31/02 . Crocheted strips or threads

33/00 Crocheting tools or apparatus (galloon crocheting machines for warp knitting D04B 25/06)

35/00 Details of, or auxiliary devices incorporated in, knitting machines, not otherwise provided for
35/02 . Knitting tools or instruments not provided for in group D04B 15/00 or D04B 27/00 (needle manufacture B21G 1/00)
35/04 . . Latch needles
35/06 . . Sliding-tongue needles
35/08 . . Spring or bearded needles
35/10 . Indicating, warning, or safety devices, e.g. stop motions
35/12 . . responsive to thread consumption
35/14 . . responsive to thread breakage
35/16 . . . with detectors associated with a series of threads
35/18 . . responsive to breakage, misplacement, or malfunctioning of knitting instruments
35/20 . . responsive to defects, e.g. holes in knitted products
35/22 . Devices for preparatory treatment of threads
35/24 . . by moistening or lubricating
35/26 . . by heating
35/28 . Devices for lubricating machine parts (in general F16N)
35/30 . Devices for controlling temperature of machine parts
35/32 . Devices for removing lint or fluff
35/34 . Devices for cutting knitted fabrics
35/36 . Devices for printing, coating, or napping knitted fabrics

37/00 **Auxiliary apparatus or devices for use with knitting machines** (Jacquard cards, pattern chains, apparatus for punching same D03C)
37/02 . with weft knitting machines
37/04 . . for inserting or adjusting pattern pins or like elements in pattern drums or wheels
37/06 . with warp knitting machines

39/00 **Knitting processes, apparatus or machines, not otherwise provided for**
39/02 . with work carrier in screw form
39/04 . adapted for combined weft and warp knitting
39/06 . adapted for combined knitting and weaving
39/08 . Sewing machines modified for knitting

D04C **BRAIDING OR MANUFACTURE OF LACE, INCLUDING BOBBIN-NET OR CARBONISED LACE**; **BRAIDING MACHINES**; **BRAID**; **LACE** (machines for making soles from strips of material A43D 29/00; cane working B27J 1/00)

1/00 **Braid or lace, e.g. pillow-lace**; **Processes for the manufacture thereof**
1/02 . made from particular materials
1/04 . . Carbonised or like lace
1/06 . Braid or lace serving particular purposes
1/08 . . Tulle fabrics
1/10 . . . Pattern tulle fabrics
1/12 . . Cords, lines, or tows

3/00 **Braiding or lacing machines**
3/02 . with spool carriers guided by track plates or by bobbin heads exclusively
3/04 . . with spool carriers guided and reciprocating in non-endless paths
3/06 . . with spool carriers moving always in the same direction in endless paths
3/08 . . with means for superimposing threads or braids
3/10 . . with means for forming edge loops, ears, or eyes
3/12 . . with means for introducing core threads
3/14 . . Spool carriers
3/16 . . . for horizontal spools
3/18 . . . for vertical spools
3/20 . . Arrangement of bobbin heads and guides or track plates in the machine
3/22 . . Guides or track plates (with means for controlling spool carriers D04C 3/24)
3/24 . . Devices for controlling spool carriers to obtain patterns, e.g. devices on guides or track plates
3/26 . . . by stopping bobbin heads
3/28 . . . by stopping only the spool carrier
3/30 . . . by controlling switches of guides or track plates
3/32 . . Pattern input
3/34 . . Beater or beat-up mechanisms
3/36 . . Frames
3/38 . . Driving-gear; Starting or stopping mechanisms
3/40 . for making tubular braids by circulating strand supplies around braiding centre at equal distances
3/42 . . with means for forming sheds by controlling guides for individual threads
3/44 . . with means for forming sheds by subsequently diverting various threads using the same guiding means
3/46 . . with thread carriers supported on rolls
3/48 . Auxiliary devices

5/00 **Twist or bobbin-net lace-making machines** (bobbins B65H 75/02)
5/02 . Net looms for tulle fabrics
5/04 . Net or lace curtain machines
5/06 . Machines for making twist-lace fabrics
5/08 . Bobbin carriages
5/10 . Bobbin-carriage guides; Drives for swinging bobbin carriages
5/12 . Drives for advancing bobbin carriages
5/14 . . Pattern input
5/16 . Warp thread feeding or guiding devices
5/18 . . Guide bars; Guiding means therefor; Pattern input by control thereof
5/20 . . Jacks or pickers; Pattern input by control thereof
5/22 . Delivery devices
5/24 . Driving-gear; Starting or stopping mechanisms
5/26 . Auxiliary devices

7/00 **Tools or apparatus for braiding or lacing by hand**

D04D **TRIMMINGS**; **RIBBONS, TAPES, OR BANDS, NOT OTHERWISE PROVIDED FOR** (fittings or trimmings for hats, e.g. hat bands, A42C 5/00; decorating art B44; yarns or threads D02G; weaving D03; braid or lace D04C; non-woven fabrics D04H)

Note

In this subclass, the following term is used with the meaning indicated:
– "trimmings" means decorative or ornamental articles made wholly or partly of textile or analogous material, or strips of textile or analogous material intended to be used for decorative or ornamental purposes, not otherwise provided for.

1/00 **Ropes or like decorative or ornamental elongated trimmings made from filamentary material** (ropes or cords in general D07B)
1/02 . by twisting strands around centrally arranged cores
1/04 . by threading or stringing pearls or beads on filamentary material

3/00 **Chenille trimmings** (chenille yarns D02G; making chenille trimmings by weaving D03D)

5/00 **Fringes** (tasselled D04D 7/08)

7/00 **Decorative or ornamental textile articles**
7/02 . Flat articles

7/04 . Three-dimensional articles (ornamental buttons A44B 1/04)
7/06 . . Ball-like tufts, e.g. pompons
7/08 . . Tassels or tasselled fringes
7/10 . . Decorative bow structures (neckties with ready-made knots or bows A41D 25/02)

9/00 Ribbons, tapes, welts, bands, beadings, or other decorative or ornamental strips, not otherwise provided for (made by laminating B32B; binders for packaging purposes B65D; adhesive tape C09J 7/02; made by weaving D03; made by braiding D04C)
9/02 . made by lengthwise folding of fabric strip
9/04 . built-up from several strips or elements
9/06 . made by working plastics

11/00 Ribbon-threading apparatus or devices (needles D05B)

D04G MAKING NETS BY KNOTTING OF FILAMENTARY MATERIAL; **MAKING KNOTTED CARPETS OR TAPESTRIES**; **KNOTTING NOT OTHERWISE PROVIDED FOR** (binding knotters for harvesters A01D 59/04; wire netting B21F; tying articles by knotting B65B; knotting in association with winding or unwinding B65H 69/00; knotting in weaving D03J; making nets, carpets, or tapestries by other techniques, see the relevant subclasses)

1/00 Making nets by knotting of filamentary material
1/02 . in machines
1/04 . . using a single thread
1/06 . . using a single thread and a series of threads
1/08 . . using two series of threads

3/00 Making knotted carpets or tapestries
3/02 . by hand; Tools therefor
3/04 . in machines

5/00 Knotting not otherwise provided for

D04H MAKING TEXTILE FABRICS, E.G. FROM FIBRES OR FILAMENTARY MATERIAL (weaving D03; knitting D04B; braiding D04C; net-making D04G; sewing D05B; tufting D05C; finishing non-woven fabrics D06); **FABRICS MADE BY SUCH PROCESSES OR APPARATUS, E.G. FELTS, NON-WOVEN FABRICS**; **COTTON-WOOL**; **WADDING** (non-woven fabrics having an intermediate or external layer of a different kind, e.g. of woven fabric, B32B)

(1) In this subclass, the following expression is used with the meaning indicated:
– "non-woven fabrics" means fabrics formed wholly or partly of textile material by processes comprising operations other than the weaving, knitting, braiding, lacing, or knotting of yarns, threads, or filaments for which provision is made in other subclasses of section D. This expression includes felts, cotton-wool and wadding.

(2) In this subclass:
– some of the non-woven fabrics can also be regarded as "layered products" within the meaning of subclass B32B, and further classification in that subclass should be considered in accordance with the notes thereto;
– in cases where the making of non-woven fabrics involves the use of particular chemical compounds or compositions, e.g. for treating or bonding fibres, filaments, or yarns, further classification in other appropriate subclasses should also be considered.

(3) By varying the proportions of fibres or threads, and the chemical compounds or compositions, the final products may be given the appearance of paper, cardboard, leather, or the like.

Subclass index

Kinds or types of non-woven fabrics; **Apparatus or processes for making such products**

1/00 Non-woven fabrics formed wholly or mainly of staple fibres or like relatively short fibres
1/02 . Cotton-wool; Wadding (carding D01G)
1/04 . from fleeces or layers composed of fibres having existing or potential cohesive properties, e.g. natural fibres, prestretched or fibrillated artificial fibres (felting apparatus D04H 17/00)
1/06 . . by treatment to produce shrinking, swelling, crimping, or curling of fibres (curling or crimpling of fibres, filaments, or yarns D02G 1/00)
1/08 . . and hardened by felting; Felts or felted products
1/10 . . . Felts made from mixtures of fibres
1/12 . . . . and incorporating artificial organic fibres
1/14 . . . . and incorporating inorganic fibres
1/16 . . . Laminated felts in which the separate layers are united by a felting process

1/20 . . . Felts incorporating inserts or attachments, e.g. for ornamental purposes
1/22 . . . Three-dimensional articles formed by felting processes
1/24 . . . Covers felted on to three-dimensional articles
1/40 . from fleeces or layers composed of fibres without existing or potential cohesive properties
1/42 . . characterised by the use of certain kinds of fibres insofar as this use has no preponderant influence on the consolidation of the fleece
1/44 . . the fleeces or layers being consolidated by mechanical means, e.g. by rolling
1/45 . . . by forming intermeshing loops or stitches from some of the fibres (knitting D04B; sewing D05B) **[4]**
1/46 . . . by needling or like operations to cause entanglement of fibres (D04H 1/45 takes precedence; needling machines D04H 18/00) **[4]**
1/48 . . . . in combination with at least one other method of consolidation, e.g. with application of bonding agents
1/50 . . . by treatment to produce shrinking, swelling, crimping, or curling of fibres (curling or crimping of fibres, filaments, or yarns D02G 1/00)
1/52 . . . by applying or inserting filamentary binding elements (knitting D04B; sewing D05B)
1/54 . . by welding together the fibres, e.g. by partially melting or dissolving (in combination with needling D04H 1/48)
1/56 . . . in association with fibre formation, e.g. immediately following extrusion of staple fibres
1/58 . . by applying, incorporating, or activating chemical or thermoplastic bonding agents, e.g. adhesives (in combination with needling D04H 1/48)
1/60 . . . the bonding agent being applied in dry state, e.g. thermo-activatable agents in solid or molten state, and heat being applied subsequently
1/62 . . . . at spaced points or locations
1/64 . . . the bonding agent being applied in wet state, e.g. chemical agents in dispersions or solutions
1/66 . . . . at spaced points or locations (D04H 1/68 takes precedence)
1/68 . . . . the bonding agent being applied in the form of foam
1/70 . characterised by the method of forming fleeces or layers, e.g. reorientation of fibres (lap-forming devices D01G 25/00; paper web-making by wet methods D21F, D21H) **[4]**
1/72 . . the fibres being randomly arranged
1/74 . . the fibres being orientated, e.g. in parallel

3/00 Non-woven fabrics formed wholly or mainly of yarns or like filamentary material of substantial length

3/02 . characterised by the method of forming fleeces or layers, e.g. reorientation of yarns or filaments (lap-forming devices D01G 25/00; paper web-making by wet methods D21F, D21H) **[4]**
3/03 . . at random
3/04 . . in rectilinear paths, e.g. crossing at right angles
3/05 . . in another pattern, e.g. zig-zag, sinusoidal
3/07 . . otherwise than in a plane, e.g. in a tubular way
3/08 . characterised by the method of strengthening or consolidating
3/10 . . with bonds between yarns or filaments made mechanically (needling machines D04H 18/00; knitting D04B; sewing D05B)
3/12 . . with filaments or yarns secured together by chemical or thermo-activatable bonding agents, e.g. adhesives, applied or incorporated in liquid or solid form
3/14 . . with bonds between thermoplastic yarns or filaments produced by welding
3/16 . . . with bonds between thermoplastic filaments produced in association with filament formation, e.g. immediately following extrusion **[4]**

5/00 Non-woven fabrics formed of mixtures of relatively-short fibres and yarns or like filamentary material of substantial length

5/02 . strengthened or consolidated by mechanical methods, e.g. needling (needling machines D04H 18/00; knitting D04B; sewing D05B)
5/04 . strengthened or consolidated by applying or incorporating chemical or thermo-activatable bonding agents in solid or liquid form
5/06 . strengthened or consolidated by welding-together thermoplastic fibres, filaments, or yarns
5/08 . characterised by the method of forming fleeces or layers, e.g. reorientation of fibres or yarns (lap-forming devices D01G 25/00; paper web-making by wet methods D21F, D21H) **[4]**

11/00 Non-woven pile fabrics (layered products forming non-woven pile fabrics B32B; woven pile fabrics D03D; tufting D05C)

11/04 . formed by zig-zag folding of a fleece or layer of staple fibres, filaments, or yarns, strengthened or consolidated at the folds
11/08 . formed by creation of a pile on at least one surface of a non-woven fabric without addition of pile-forming material, e.g. by needling, by differential shrinking (needling machines D04H 18/00)

13/00 Other non-woven fabrics

13/02 . Production of non-woven fabrics by partial defibrillating of oriented thermoplastics films **[4]**

17/00 Felting apparatus

17/10 . for felting between rollers, e.g. heated rollers
17/12 . . Multi-roller apparatus

18/00 Needling machines

D05 SEWING; EMBROIDERING; TUFTING

D05B **SEWING** (appliances for the tailoring trade A41H; sewing tables A47B 29/00; sewing in bookbinding B42B 2/00; sewing machines modified for knitting D04B 39/08)

Note

In this subclass, the groups designating sewing apparatus or machines cover also sewing processes dependent on their use, and the thread seams produced thereby.

Subclass index

1/00 General types of sewing apparatus or machines without mechanism for lateral movement of the needle or the work or both

1/02 . for making single-thread seams

1/04 . . Running-stitch seams

1/06 . . Single chain-stitch seams

1/08 . for making multi-thread seams

1/10 . . Double chain-stitch seams

1/12 . . Lock-stitch seams

1/14 . . Combined or alternative chain-stitch and lock-stitch seams

1/16 . . Pseudo-lock-stitch seams in which the thread loops do not positively interlock (shoe or welt sewing machines D05B 15/02)

1/18 . . Seams for protecting or securing edges (zig-zag sewing machines D05B 3/02, D05B 3/04)

1/20 . . . Overedge seams

1/22 . . . . combined with joining or securing seams

1/24 . for making blind-stitch seams

1/26 . for making fluid-tight seams (sewing machines for concurrently making thread and welded seams D05B 17/00)

Special-purpose or automatic sewing apparatus or machines

3/00 **Sewing apparatus or machines with mechanism for lateral movement of the needle or the work or both for making ornamental pattern seams, for sewing buttonholes, for reinforcing openings, or for fastening articles, e.g. buttons, by sewing** (programme-controlled sewing machines D05B 19/00; with devices for automatically controlling movement of work-carrier D05B 21/00) **[6]**

3/02 . with mechanisms for needle-bar movement

3/04 . with mechanisms for work feed

3/06 . for sewing buttonholes (buttonholes A41F 1/02)

3/08 . . for buttonholes with eyelet ends

3/10 . for making piped openings

3/12 . for fastening articles by sewing

3/14 . . perforated or press buttons

3/16 . . shank buttons

3/18 . . hooks or eyelets

3/20 . . labels (labelling fabrics otherwise than by sewing B65C 5/00; labels or securing means therefor, in general G09F 3/00)

3/22 . . Article-, e.g. button-, feed mechanisms therefor

3/24 . formed by general-purpose sewing machines modified by attachments, e.g. by detachable devices

5/00 **Sewing machines for temporarily connecting articles, e.g. pairs of socks**

7/00 **Linking machines, e.g. for joining knitted fabrics**

9/00 **Hem-stitch sewing machines**

11/00 **Machines for sewing quilts or mattresses** (control of workpiece-holding frames, or of sewing machines, in order to obtain particular seam configuration D05B 21/00)

13/00 **Machines for sewing sacks**

13/02 . for closing filled bags or sacks (combined with bag- or sack-filling apparatus B65B)

15/00 **Machines for sewing leather goods** (making pseudo-lock-stitch seams D05B 1/16)

15/02 . Shoe sewing machines

15/04 . . for lock-stitch work (D05B 15/08 takes precedence)

15/06 . . Welt sewing machines

15/08 . . . for lock-stitch work

15/10 . . Lining sewing machines

17/00 **Sewing machines for concurrently making thread and welded seams** (for making non-welded fluid-tight seams D05B 1/26)

19/00 **Programme-controlled sewing machines** (with devices for automatically controlling movement of work-carrier D05B 21/00; devices for stopping drive when sewing tools have reached a predetermined position D05B 69/22)

19/02 . Sewing machines having electronic memory or micro-processor control unit **[6]**

19/04 . . characterised by memory aspects **[6]**

19/06 . . . Physical exchange of memory **[6]**

19/08 . . . Arrangements for inputting stitch or pattern data to memory **[6]**

19/10 . . . Arrangements for selecting combinations of stitch or pattern data from memory **[6]**

19/12 . . characterised by control of operation of machine **[6]**

19/14 . . . Control of needle movement, e.g. varying amplitude or period of needle movement **[6]**

19/16 . . . Control of workpiece movement, e.g. modulation of travel of feed dog **[6]**

21/00 **Sewing machines with devices for automatically controlling movement of work-carrier relative to stitch-forming mechanism in order to obtain particular configuration of seam, e.g. programme-controlled for sewing collars, for attaching pockets**

23/00 **Sewing apparatus or machines not otherwise provided for** (for making zip closures A44B 19/00)

25/00 **Sewing units consisting of combinations of several sewing machines**

Sewing-machine elements for feeding, positioning, handling, or treating the work

27/00 **Work-feeding means for sewing machines**

27/02 . with feed dogs having horizontal and vertical movements

27/04 . . arranged above the workpieces

27/06 . . arranged above and below the workpieces

27/08 . . with differential feed motions

27/10 . with rotary circular feed members

27/12 . . rotating continuously

27/14 . . rotating discontinuously

27/16 . . with differential feed motions

27/18 . . Feed cups

27/20 . constituted by sewing needles

27/22 . with means for setting length of stitch

27/24 . Feed-dog lifting and lowering devices

27/26 . in machines for sewing leather

29/00 **Pressers or presser feet for sewing machines** (for feeding D05B 27/04)

29/02 . Presser-control devices

29/04 . Pressers in machines for sewing leather

29/06 . Presser feet

29/08 . . comprising relatively-movable parts

29/10 . . with rollers

29/12 . Presser-foot attachment

31/00 **Workpiece holders or hold-downs in machines for sewing leather**

31/02 . Welt guides

33/00 **Devices incorporated in sewing machines for supplying or removing the work**

33/02 . and connected, for synchronous operation, with the work-feeding devices of the sewing machine

35/00 **Work-feeding or work-handling elements for sewing machines, not otherwise provided for**

35/02 . for facilitating seaming; Hem-turning elements; Hemmers

35/04 . . with movable tools

35/06 . for attaching bands, ribbons, strips, or tapes or for binding

35/08 . for ruching, gathering, casing, or filling lace, ribbons, or bindings; Pleating devices; Cuttlers; Gathering feet; Crimpers; Curlers; Rufflers

35/10 . Edge guides

35/12 . Indicators for positioning work, e.g. with graduated scales

37/00 Devices incorporated in sewing machines for slitting, grooving, or cutting (severing sewing-threads D05B 65/00)
37/02 . Slitting or grooving devices
37/04 . Cutting devices
37/06 . . with oscillating tools
37/08 . . with rotatable tools
37/10 . . with heated tools

39/00 Workpiece carriers for sewing machines (for automatically controlling movement of work-carrier to obtain particular configuration of seam D05B 21/00; in general A41H 15/00)

41/00 Work-collecting devices for sewing machines

Sewing-machine elements for supplying, handling, or treating thread material

43/00 Spool-pin assemblies incorporated in sewing machines

45/00 Applications of measuring devices for determining the length of threads used in sewing machines (measuring devices in embroidery machines D05C, in general G01B)

47/00 Needle-thread tensioning devices for sewing machines; **Applications of tensometers in sewing machines**
47/02 . Manually-controlled tensioning devices
47/04 . Automatically-controlled tensioning devices
47/06 . Applications of tensometers (application of tension indicators in handling thin or filamentary material B65H 59/40; for embroidery machines D05C 11/08; tensometers in general G01L)

49/00 Take-up devices, e.g. levers, for the needle thread of sewing machines
49/02 . operated by cams or linkages
49/04 . rotary
49/06 . for machines for sewing leather

51/00 Applications of needle-thread guards in sewing machines; **Thread-break detectors for sewing machines** (for embroidery machines D05C 11/00)

53/00 Thread- or cord-laying mechanisms for sewing machines; **Thread fingers for sewing machines**

55/00 Needle holders for sewing machines; **Needle bars for sewing machines** (needles D05B 85/00)
55/02 . Devices for fastening needles to needle bars
55/04 . Devices for inserting needles
55/06 . Needle guides; Needle protectors (finger-protecting devices D05B 83/00)
55/08 . Driving arrangements for curved needles
55/10 . Needle bars for multiple-needle sewing machines
55/12 . . with provision for varying the distance between the needles
55/14 . Needle-bar drives
55/16 . . with provision for disengaging individual needle bars

57/00 Loop takers, e.g. loopers, for sewing machines
57/02 . for chain-stitch sewing machines, e.g. oscillating
57/04 . . rotary
57/06 . for overedge-stitch sewing machines
57/08 . for lock-stitch sewing machines
57/10 . . Shuttles
57/12 . . . oscillating
57/14 . . . with rotary hooks
57/16 . . . with bobbin casings guided in tracks
57/18 . . . with bobbin casings held by removable caps
57/20 . . . with bobbin casings held by magnetic forces
57/22 . . with spool-size bobbin for lower thread
57/24 . . . with lower-thread packages mounted for controlled sliding movements
57/26 . Bobbin holders or casings; Bobbin holder or case guards; Bobbin discharge devices
57/28 . Applications of bobbins for storing the lower thread
57/30 . Driving-gear for loop takers
57/32 . . in chain-stitch sewing machines
57/34 . . in overedge-stitch sewing machines
57/36 . . in lock-stitch sewing machines
57/38 . . . Shuttle drives

59/00 Applications of bobbin-winding or -changing devices in sewing machines; **Indicating or control devices associated therewith**
59/02 . Devices for determining or indicating the length of thread still on the bobbin
59/04 . Devices for changing the bobbin

61/00 Loop holders; **Loop spreaders for sewing machines**; **Stitch-forming fingers for sewing machines**

63/00 Devices associated with the loop-taker thread of sewing machines, e.g. for tensioning
63/02 . Loop-taker thread take-up levers
63/04 . Loop-taker thread guards

65/00 Devices for severing the needle or lower thread in sewing machines
65/02 . controlled by the sewing mechanisms
65/04 . controlled by the workpieces
65/06 . and for disposing of the severed thread end

67/00 Devices incorporated in sewing machines for lubricating, waxing, or colouring the threads

Driving-gear, control, lubricating, or cooling devices for sewing machines

69/00 Driving-gear or control devices for sewing machines
69/02 . Mechanical drives
69/04 . . Manual drives
69/06 . . Pedal drives
69/08 . Fluid drives, e.g. pneumatic
69/10 . Electrical or electromagnetic drives
69/12 . . using rotary electric motors
69/14 . Devices for changing speed or for reversing direction of rotation
69/16 . . mechanical
69/18 . . electric
69/20 . Control devices responsive to the number of stitches made
69/22 . Devices for stopping drive when sewing tools have reached a predetermined position (electric motor control systems in general H02P)
69/24 . . Applications of devices for indicating or ascertaining sewing-tool position
69/26 . . with automatic means to reduce speed of drive, e.g. in one or more steps
69/28 . Applications of servo devices for tool-positioning purposes
69/30 . Details (work-feeding drives D05B 27/00; needle-bar drives D05B 55/14; loop-taker drives D05B 57/30)

69/32 . . Vibration-minimising devices
69/34 . . Hand-wheel clutches
69/36 . Devices for stopping drive when abnormal conditions occur, e.g. thread breakage

71/00 Lubricating or cooling devices for sewing machines
71/02 . Loop-taker lubricating devices
71/04 . Needle cooling devices

Casings, supports, covers, or accessories for sewing machines; Sewing machines combined with auxiliary devices serving purposes other than sewing

73/00 Casings for sewing machines
73/02 . Upper casings
73/04 . Lower casings
73/06 . . for free-arm sewing machines
73/08 . . for column-type sewing machines
73/10 . . Devices for converting free-arm sewing machines into flat-bed machines
73/12 . . Slides; Needle plates

75/00 Frames, stands, tables, or other furniture adapted to carry sewing machines (furniture aspects A47B, A47C)
75/02 . for drop-head sewing machines
75/04 . with noise-suppressing devices
75/06 . Arrangements, e.g. hinges, for mounting sewing-machine casings to frames, stands, or tables

77/00 Covers, or portable enclosures, for sewing machines

79/00 Incorporations or adaptations of lighting equipment for sewing machines

81/00 Sewing machines incorporating devices serving purposes other than sewing, e.g. for blowing air, for grinding

83/00 Guards or like devices for preventing injury to operator of sewing machines (machine safety devices in general F16P)

Needles; Needle threaders; Seam-ripping devices

85/00 Needles (surgical needles A61B 17/06; manufacture of needles B21G 1/00)
85/02 . with slotted eyes
85/04 . Spring or bearded needles
85/06 . Curved needles
85/08 . Flexible needles
85/10 . Hollow needles
85/12 . Coated needles
85/14 . Latch needles

87/00 Needle-threading devices
87/02 . with mechanical means for moving thread through needle eye
87/04 . with optical devices to assist threading

89/00 Seam-ripping devices

Hand sewing

91/00 Tools, implements, or accessories for hand sewing (needles, needle threaders D05B 85/00, D05B 87/00; appliances for the tailoring trade A41H)
91/02 . Bodkins
91/04 . Thimbles; Finger shields; Palm protectors
91/06 . Work holders or supports
91/08 . . Mushrooms; Darning eggs
91/10 . . Hoops or frames (for embroidery D05C)
91/12 . Tool receptacles
91/14 . Thread-spool pins
91/16 . Thread-spool receptacles

93/00 Stitches; Stitch seams for hand sewing
93/02 . strengthened by auxiliary elements, e.g. rivets, staples

95/00 Preparatory or finishing operations in connection with hand sewing
95/04 . Softening material prior to sewing
95/06 . Flattening, pounding, or pressing stitched seams (in shoemaking A43D 8/44)

97/00 Hand sewing processes or apparatus for special work or not otherwise provided for
97/02 . Hand-guided apparatus
97/04 . for darning
97/06 . . using apparatus with latch or bearded needles
97/08 . using special threads or wires
97/10 . for attaching buttons or fasteners
97/12 . for attaching patches or like small pieces of fabric

D05C EMBROIDERING (programme-controlled sewing machines with embroidering capability D05B 19/00, D05B 21/00); **TUFTING** (making non-woven fabrics D04H; sewing D05B)

Subclass index

1/00 Apparatus, devices, or tools for hand embroidering
1/02 . Work frames
1/04 . . circular
1/06 . Needles specially adapted for hand embroidering (sewing needles D05B 85/00); Holders for needles or threads
1/08 . Patterns for hand embroidering; Manufacture thereof

Embroidering machines

3/00 General types of embroidering machines
3/02 . with vertical needles
3/04 . with horizontal needles

5/00 Embroidering machines with arrangements for automatic control of a series of individual steps
5/02 . by electrical or magnetic control devices
5/04 . by input of recorded information, e.g. on perforated tape
5/06 . . with means for recording the information

7/00 Special-purpose or automatic embroidering machines
7/02 . with accessories for peculiar kinds of embroidery
7/04 . for boring or jogging
7/06 . for embroidering festoons
7/08 . for attaching cords, tapes, bands, or the like
7/10 . for separating and burning-off parts of the base fabric (making patterns or designs on fabrics by singeing or etching D06C 23/02)
7/12 . for making cotton buttons

9/00 Appliances for holding or feeding the base fabric in embroidering machines
9/02 . in machines with vertical needles
9/04 . . Work holders, e.g. frames
9/06 . . . Feeding arrangements therefor, e.g. influenced by patterns, operated by pantographs
9/08 . in machines with horizontal needles
9/10 . . Work holders or carriers
9/12 . . . Holding or stretching arrangements for the base fabric in embroidery work holders
9/14 . . . Suspension or balancing arrangements therefor
9/16 . . . Feeding arrangements therefor
9/18 . Movement of the base fabric in one of the two directions controlled by embroidering needles
9/20 . Movement of the base fabric controlled by the presser feet; Driving arrangements therefor
9/22 . Adjusting or registering devices for the base fabric, e.g. for alignment with respect to the needles

11/00 Devices for guiding, feeding, handling, or treating the threads in embroidering machines; **Machine needles**; **Operating or control mechanisms therefor**
11/02 . Machine needles
11/04 . . Arrangements for fastening or inserting in bars or carriers
11/06 . . Needle-driving or control mechanisms
11/08 . Thread-tensioning arrangements
11/10 . . Guides, e.g. resilient
11/12 . . Rollers
11/14 . . Stop motions responsive to thread tension or breakage
11/16 . Arrangements for repeating thread patterns or for changing threads
11/18 . Shuttles
11/20 . Arrangements for cutting the needle or lower threads
11/22 . Arrangements for cutting-out broken threads
11/24 . incorporating devices for dyeing or impregnating the threads

13/00 Auxiliary devices incorporated in embroidering machines, not otherwise provided for; **Ancillary apparatus for use with embroidering machines**
13/02 . Counting, measuring, indicating, warning, or safety devices
13/04 . Lubricating devices
13/06 . Apparatus for filling or threading shuttles

15/00 Making pile fabrics or articles having similar surface features by inserting loops into a base material (layered products B32B; non-woven pile fabrics D04H 11/00)
15/02 . Rooting of hair in doll heads or wigs (wigs A41G 3/00; hair or wigs for doll heads A63H 3/44)
15/04 . Tufting
15/06 . . Hand tufting needles
15/08 . . Tufting machines
15/10 . . . operating with a plurality of needles, e.g. in one row
15/12 . . . . in more than one row
15/14 . . . Arrangements or devices for holding or feeding the base material (D05C 15/26 takes precedence)
15/16 . . . Arrangements or devices for manipulating threads (D05C 15/26 takes precedence)
15/18 . . . . Thread feeding or tensioning arrangements
15/20 . . . . Arrangements or devices, e.g. needles, for inserting loops; Driving mechanisms therefor
15/22 . . . . Loop-catching arrangements, e.g. loopers; Driving mechanisms therefor
15/24 . . . . Loop cutters; Driving mechanisms therefor
15/26 . . . with provision for producing patterns
15/28 . . . . by moving the base material laterally
15/30 . . . . by moving the tufting tools laterally
15/32 . . . . by altering the loop length
15/34 . . . . by inserting loops of different nature or colour
15/36 . . . . by selective cutting of loops
15/38 . by passing thread material in zig-zag manner through spaced layers of base material and subsequently cutting along a central plane

17/00 Embroidered or tufted products; **Base fabrics specially adapted for embroidered work**; **Inserts for producing surface irregularities in embroidered products** (layered products B32B; non-woven pile fabrics D04H 11/00)
17/02 . Tufted products

D06 TREATMENT OF TEXTILES OR THE LIKE; LAUNDERING; FLEXIBLE MATERIALS NOT OTHERWISE PROVIDED FOR

D06B **TREATING TEXTILE MATERIALS BY LIQUIDS, GASES, OR VAPOURS** (applying liquids to surfaces in general B05; conveying in general, handling webs or filaments in general B65; treating leather C14C; mechanical removal of impurities from animal fibres D01B; laundering D06F; chemical matters, see D06L to D06Q) **[2]**

Note

In this subclass, the following terms or expressions are used with the meaning indicated:
- "fabric" includes yarns in warp or sheet form; **[2]**
- "textile material" includes fabrics, yarns or other fibrous materials; **[2]**
- "indefinite length" means an extent of material having the characteristic that the longitudinal dimension is effectively infinite in so far as the procedure for advancing or moving the material is concerned. **[3]**

Subclass index

1/00 **Applying liquids, gases, or vapours on to textile materials to effect treatment, e.g. washing, dyeing, bleaching, sizing, impregnating** (mercerising D06B 7/00; solvent-treatment D06B 9/00; treatment of selected parts of textile materials D06B 11/00; with aid of vibration D06B 13/00; transfer application of finishing agents D06M 23/00) **[4]**

1/02 . by spraying or projecting (D06B 1/08 takes precedence; spraying in general B05) **[2]**
1/04 . by pouring or allowing to flow on to the surface of the textile material **[2]**
1/06 . . flowing along an inclined surface **[2]**
1/08 . from outlets being in, or almost in, contact with the textile material **[2]**
1/10 . by contact with a member carrying the treating material **[2]**
1/12 . . by rubbing contact, e.g. with brushes or pads **[2]**
1/14 . . with a roller **[2]**
1/16 . . . the treating material being supplied from inside the roller **[2]**

3/00 **Passing of textile materials through liquids, gases, or vapours to effect treatment, e.g. washing, dyeing, bleaching, sizing, impregnating** (mercerising D06B 7/00; solvent-treatment D06B 9/00; treatment of selected parts of textile materials D06B 11/00; with aid of vibration D06B 13/00) **[2]**

3/02 . of fibres, slivers, or rovings **[2]**
3/04 . of yarns, threads, or filaments **[2]**
3/06 . . individually handled **[2]**
3/08 . . as hanks **[2]**
3/09 . . as packages, e.g. cheeses **[3]**
3/10 . of fabrics (D06B 3/24, D06B 3/28, D06B 3/32 take precedence; jiggers D06B 3/32) **[2]**
3/12 . . in zig-zag manner over series of guiding means **[2]**
3/14 . . in wound form **[2]**
3/16 . . in superimposed, i.e. stack-packed, form **[2]**
3/18 . . combined with squeezing, e.g. in padding machines **[2]**
3/20 . . with means to improve the circulation of the treating material on the surface of the fabric **[2]**
3/22 . . only one side of the fabric coming into contact with the guiding means **[2]**
3/24 . of fabrics in roped form **[2]**
3/26 . . in superimposed, i.e. stack-packed, form **[2]**
3/28 . of fabrics propelled by, or with the aid of, jets of the treating material **[2]**
3/30 . of articles, e.g. stockings **[2]**
3/32 . of open-width materials backwards and forwards between beaming rollers during treatment; Jiggers **[2]**
3/34 . Driving arrangements of machines or apparatus **[2]**
3/36 . . Drive control **[2]**

5/00 **Forcing liquids, gases, or vapours through textile materials to effect treatment, e.g. washing, dyeing, bleaching, sizing, impregnating** (mercerising D06B 7/00; solvent-treatment D06B 9/00; treatment of selected parts of textile materials D06B 11/00; with aid of vibration D06B 13/00) **[2]**

5/02 . through moving materials of indefinite length **[2]**
5/04 . . through slivers or rovings **[2]**
5/06 . . through yarns, threads, or filaments **[2]**
5/08 . . through fabrics **[2]**
5/10 . . using centrifugal force **[2]**
5/12 . through materials of definite length **[2]**
5/14 . . through fibres, slivers, or rovings **[2]**
5/16 . . through yarns, threads, or filaments **[2]**
5/18 . . . through beamed warp **[2]**
5/20 . . . through hanks **[2]**
5/22 . . through fabrics **[2]**
5/24 . . through articles, e.g. stockings **[2]**
5/26 . . using centrifugal force **[2]**

7/00 **Mercerising, e.g. lustring by mercerising [2]**

7/02 . of slivers **[2]**
7/04 . of yarns, threads, or filaments **[2]**
7/06 . . of hanks of yarns **[2]**

7/08 . of fabrics of indefinite length **[2]**
7/10 . of tubular fabrics or tubular articles **[2]**

9/00 Solvent-treatment of textile materials (dry-cleaning D06F 43/00) **[2]**
9/02 . solvent-dyeing **[2]**
9/04 . Successively applying two or more different solvent-based treating materials **[2]**
9/06 . with recovery of the solvent **[2]**

11/00 Treatment of selected parts of textile materials, e.g. partial dyeing [2]

13/00 Treatment of textile materials with liquids, gases, or vapours with aid of vibration [2]

15/00 Removing liquids, gases, or vapours from textile materials in association with treatment of the materials by liquids, gases, or vapours (drying F26B) **[2]**

Note

Group D06B 15/12 takes precedence over groups D06B 15/02 to D06B 15/10. **[2]**

15/02 . by squeezing rollers **[2]**
15/04 . by suction **[2]**
15/06 . by vibrating the textile material **[2]**
15/08 . by scraping **[2]**
15/09 . by jets of gases **[3]**
15/10 . by use of centrifugal force **[2]**
15/12 . up to the moisture regain of textile material **[2]**

17/00 Storing of textile materials in association with the treatment of the materials by liquids, gases, or vapours (carriers or supports specially adapted therefor D06B 23/04) **[2]**
17/02 . in superimposed, i.e. stack-packed, form; J-boxes **[2]**
17/04 . in wound form **[2]**
17/06 . in festooned form **[3]**

19/00 Treatment of textile materials by liquids, gases, or vapours, not provided for in groups D06B 1/00 to D06B 17/00 [2]

21/00 Successive treatments of textile materials by liquids, gases, or vapours (successive treatments in which the characteristics of a single treatment are of interest only, or in which all treatments have characteristics provided for in a single main group, see the relevant groups for the single treatment) **[2]**
21/02 . the treatments being performed in a single container **[2]**

23/00 Component parts, details, or accessories of apparatus or machines, specially adapted for the treating of textile materials, not restricted to a particular kind of apparatus, provided for in groups D06B 1/00 to D06B 21/00 [2]
23/02 . Rollers **[2]**
23/04 . Carriers or supports for textile materials to be treated **[2]**
23/06 . Guiding means for preventing filaments, yarns, or threads from sticking together **[2]**
23/08 . Untwisting devices **[2]**
23/10 . Devices for dyeing samples (D06B 23/12 takes precedence) **[2]**
23/12 . Means for taking samples from textile materials during or after treatment **[2]**
23/14 . Containers, e.g. vats **[2]**
23/16 . . with means for introducing or removing textile materials without modifying container pressure **[2]**
23/18 . . Sealing arrangements **[2]**
23/20 . Arrangements of apparatus for treating processing-liquids, -gases, or -vapours, e.g. purification, filtration, distillation (such apparatus per se, see the relevant classes for the apparatus) **[2]**
23/22 . . for heating **[2]**
23/24 . Means for regulating the amount of treating material picked up by the textile material during its treatment **[2]**
23/26 . . in response to a test conducted on the textile material **[2]**
23/28 . . in response to a test conducted on the treating material **[2]**
23/30 . Means for cleaning apparatus or machines, or parts thereof **[2]**

D06C FINISHING, DRESSING, TENTERING, OR STRETCHING TEXTILE FABRICS (chemical matters, see D06L to D06Q; drying F26B) **[2]**

Note

In this subclass, the following term is used with meaning indicated:
– "fabric" includes yarns in warp or sheet form.

Subclass index

FINISHING OR DRESSING NOT OTHERWISE PROVIDED FOR

Compound processes or apparatus; other treatments 27/00; 29/00

3/00 **Stretching, tentering, or spreading textile fabrics**; **Producing elasticity in textile fabrics** (shaping or stretching tubular fabrics upon cores or internal frames D06C 5/00; removing skew or disorientation of weft threads in woven fabrics D06H 3/12)

3/02 . by endless chain or like apparatus (hooks or pin-blocks D06C 3/10)

3/04 . . Tentering clips

3/06 . by rotary disc, roller, or like apparatus

3/08 . by frames or like apparatus

3/10 . Hooks, pin-blocks, or like apparatus

5/00 **Shaping or stretching of tubular fabrics upon cores or internal frames** (supports simply for drying D06F 59/00)

7/00 **Heating or cooling textile fabrics** (hosiery boarding D06C 5/00; singeing D06C 9/00; treating with liquids, gases, or vapours D06B; processes comprising combined chemical and mechanical treatment D06M; during operations provided for elsewhere, see the relevant groups for such operations)

7/02 . Setting

7/04 . Carbonising or oxidising

9/00 **Singeing** (for making patterns or designs D06C 23/02)

9/02 . by flame

9/04 . by contact with heated elements

11/00 **Teasing, napping, or otherwise roughening or raising pile of textile fabrics** (for making patterns or designs D06C 23/00)

13/00 **Shearing, clipping, or cropping surfaces of textile fabrics**; **Pile cutting**; **Trimming seamed edges** (for making patterns or designs D06C 23/00; cutting or severing fabrics D06H)

13/02 . Arrangements for detecting the presence of a seam in the fabric to lift the shearing blade

13/04 . Shearing lace or embroidery, e.g. cutting loose threads

13/06 . Removing floats

13/08 . Cutting pile loops (on the loom D03D 39/24)

13/10 . Splitting double pile fabrics (on the loom D03D 39/16)

13/12 . Trimming hosiery or seamed edges of fabrics

15/00 **Calendering, pressing, ironing, glossing, or glazing textile fabrics** (shrinking by compressing D06C 21/00; for making patterns or designs D06C 23/00; domestic, laundry, or like ironing or pressing D06F)

15/02 . between co-operating press or calender rolls

15/04 . between rollers and co-operating concave surfaces (D06C 15/06 takes precedence)

15/06 . between rollers and co-operating moving surfaces formed of flexible material, e.g. bands

15/08 . Rollers therefor

15/10 . between flat plates of a press

15/12 . . for pressing a pile of fabrics

15/14 . Beetling

17/00 **Fulling**

17/02 . by rollers

17/04 . by hammers or beaters

19/00 **Breaking or softening of fabrics** (by stretching D06C 3/00; by calendering, pressing, or beetling D06C 15/00; by fulling D06C 17/00)

21/00 **Shrinking by compressing**

23/00 **Making patterns or design on fabrics** (by printing B41F; decoration in general B44)

23/02 . by singeing, teasing, shearing, etching, or brushing

23/04 . by shrinking, embossing, moireing, or crêping

25/00 **Treating selvedges or other edges, e.g. stiffening** (trimming edges D06C 13/12; forming selvedges on the loom, e.g. by adhesive, D03D 47/40)

27/00 **Compound processes or apparatus, for finishing or dressing textile fabrics, not otherwise provided for**

29/00 **Finishing or dressing, of textile fabrics, not provided for in the other groups of this subclass**

D06F **LAUNDERING, DRYING, IRONING, PRESSING OR FOLDING TEXTILE ARTICLES** (apparatus for blocking, pressing, steaming, or stretching hats A42C; treating textile materials by liquids, gases or vapors D06B; chemical matters, see D06L, D06M)

(1) This subclass covers:
- domestic or laundry dry-cleaning apparatus using volatile solvents;
- domestic, laundry, or tailors' ironing or other hot-pressing of clothes, linen, or other textile articles.

(2) This subclass does not cover apparatus for wringing, washing, dry-cleaning, ironing, or other hot-pressing of textiles in manufacturing operations, which is covered by subclasses D06B, D06C.

Subclass index

RECEPTACLES; REMOVABLE DEVICES FOR USE WITH DIFFERENT RECEPTACLES 1/00; 7/00

HAND IMPLEMENTS 5/00

IMPLEMENTS FOR WASHING BY HAND

Receptacles; hand rubbing apparatus 1/00; 3/00

WASHING MACHINES

using brushes, rollers 9/00, 11/00

Washing; **Rinsing**; **Dry-cleaning**

1/00 **Washing receptacles** (of washing machines D06F 37/00, D06F 39/00)

1/02 . Wash-tubs, Supports therefor

1/04 . . the tub walls or bottom having corrugations (rubbing boards D06F 3/02)

1/06 . Wash-boiler receptacles

1/08 . . with special means for water circulation by heat, e.g. fountain-washers

1/10 . Covers; Handles

1/12 . Racks or other rigid open containers of skeleton or like apertured construction supporting clothes in washing receptacles

3/00 **Hand rubbing apparatus** (corrugated tub-walls D06F 1/04)

3/02 . Rubbing boards

3/04 . Hand rubbers, e.g. gloves with corrugated surfaces

5/00 **Hand implements for washing purposes, e.g. sticks** (hand rubbing appliances D06F 3/00; brushes A46B)

5/02 . Plungers, dollies, pounders, squeezers, or the like

5/04 . . adapted for removable mounting on receptacles such as wash-tubs

5/06 . Grippers

7/00 **Washing devices adapted to be used independently of any particular receptacle, e.g. for removable mounting on wash-tubs, bath-tubs, or the like**

7/02 . of the rotary-impeller type

7/04 . of the vibrator type

7/06 . agitating the washing liquid by air

9/00 **Brushing-type washing machines**

11/00 **Washing machines using rollers, e.g. of the mangle type**

13/00 **Washing machines having receptacles, stationary for washing purposes, with agitators therein contacting the articles being washed** (plungers or the like adapted for removable mounting on receptacles D06F 5/04; washing devices adapted to be used independently of any particular receptacle D06F 7/00)

13/02 . wherein the agitator has an oscillatory rotary motion only

13/04 . wherein the agitator has an axial motion only

13/06 . wherein the agitator has both rotary, e.g. oscillating rotary, motion and axial motion

13/08 . wherein the agitator has a gyratory or orbital motion

15/00 Washing machines having beating, rubbing, or squeezing means in receptacles stationary for washing purposes (plungers or the like adapted for removable mounting on receptacles D06F 5/04; mangle-type washing machines D06F 11/00)

15/02 . wherein the articles being washed are squeezed by a flexible diaphragm or bag

17/00 Washing machines having receptacles, stationary for washing purposes, wherein the washing action is effected solely by circulation or agitation of the washing liquid (washing devices adapted to be used independently of any particular receptacle D06F 7/00; using vibrations for washing purposes D06F 19/00)

17/02 . by pumps (D06F 17/04 takes precedence)
17/04 . solely by water jets
17/06 . by rotary impellers
17/08 . . Driving arrangements for the impeller
17/10 . . Impellers
17/12 . solely by gases, e.g. air or steam, introduced into the washing liquid

18/00 Washing machines having receptacles, stationary for washing purposes, and having further drying means (details concerning drying only D06F 58/00) **[3]**

19/00 Washing machines using vibrations for washing purposes (devices of the vibrator type adapted to be used independently of any particular receptacle D06F 7/04)

21/00 Washing machines with receptacles, e.g. perforated, having a rotary movement, e.g. oscillatory movement (with receptacles serving both for washing and centrifugally draining D06F 23/00, D06F 25/00; with receptacles moving bodily about an axis D06F 27/00; programme control aspects D06F 33/00)

21/02 . about a horizontal axis
21/04 . . within an enclosing receptacle
21/06 . about a vertical axis
21/08 . . within an enclosing receptacle
21/10 . about an inclined axis
21/12 . the receptacle having a wobbling motion
21/14 . with rubbing or beating means not secured to, or forming part of, the receptacle

23/00 Washing machines with receptacles, e.g. perforated, having a rotary movement, e.g. oscillatory movement, the receptacle serving both for washing and centrifugally draining (with further drying means D06F 25/00; programme control aspects D06F 33/00)

23/02 . and rotating or oscillating about a horizontal axis
23/04 . and rotating or oscillating about a vertical axis
23/06 . and rotating or oscillating about an inclined axis

25/00 Washing machines with receptacles, e.g. perforated, having a rotary movement, e.g. oscillatory movement, the receptacle serving both for washing and centrifugally draining and having further drying means, e.g. using hot air (programme-control aspects D06F 33/00; details concerning drying only D06F 58/00)

27/00 Washing machines with receptacles moving bodily, e.g. reciprocating, swinging

29/00 Combinations of a washing machine with other separate apparatus in a common frame or the like, e.g. with rinsing apparatus

29/02 . with liquid-extracting apparatus (with roller wringer D06F 45/12)

31/00 Washing installations comprising an assembly of several washing machines or washing units, e.g. continuous flow assemblies

33/00 Controlling a series of operations in washing machines, e.g. programme-control arrangements for washing and drying cycles (D06F 31/00 takes precedence)

33/02 . electrically
33/04 . non-electrically
33/06 . . substantially mechanically
33/08 . . substantially hydraulically
33/10 . . substantially pneumatically

35/00 Washing machines, apparatus, or methods not otherwise provided for

37/00 Details of washing machines of kinds covered by groups D06F 21/00 to D06F 25/00, restricted to machines of these kinds (details of more general application D06F 39/00; details concerning drying only D06F 58/00)

37/02 . Rotary receptacles, e.g. drums
37/04 . . adapted for rotation or oscillation about a horizontal or inclined axis
37/06 . . . Ribs, lifters, or rubbing means forming part of the receptacle
37/08 . . . Partitions
37/10 . . . Doors; Securing means therefor
37/12 . . adapted for rotation or oscillation about a vertical axis
37/14 . . . Ribs or rubbing means forming part of the receptacle
37/16 . . . Partitions
37/18 . . . Doors or covers; Securing means therefor
37/20 . Mountings, e.g. resilient mountings, for the rotary receptacle, motor, tub, or casing; preventing or damping vibrations (damping vibrations in general F16F)
37/22 . . in machines with a receptacle rotating or oscillating about a horizontal axis
37/24 . . in machines with a receptacle rotating or oscillating about a vertical axis
37/26 . Casings; Tubs
37/28 . . Doors; Security means therefor
37/30 . Driving arrangements
37/32 . . for rotating the receptacle at one speed only
37/34 . . . in opposite directions, e.g. oscillating
37/36 . . for rotating the receptacle at more than one speed
37/38 . . . in opposite directions
37/40 . . for driving the receptacle and an agitator or impeller, e.g. alternatively
37/42 . Safety arrangements, e.g. for stopping rotation of the receptacle upon opening of the casing door

39/00 Details of washing machines in so far as such details are not special to washing machines of groups D06F 21/00 to D06F 25/00 or to any particular type of washing machine defined in groups D06F 9/00 to D06F 19/00 or D06F 27/00

39/02 . Devices for adding soap or other washing agents
39/04 . Heating arrangements
39/06 . Arrangements for preventing or destroying scum
39/08 . Liquid supply or discharge arrangements (supplying liquid detergent D06F 39/02)
39/10 . Filtering arrangements
39/12 . Casings; Tubs
39/14 . . Doors or covers; Securing means therefor

41/00 Rinsing apparatus

43/00 Dry-cleaning apparatus using volatile solvents (D06F 9/00 to D06F 41/00 take precedence)
43/02 . having one rotary cleaning receptacle only
43/04 . having more than one rotary cleaning receptacle
43/06 . wherein the articles to be cleaned are passed through a cleaning chamber or bath
43/08 . Associated apparatus for handling and recovering the solvents (separate apparatus for purifying dry-cleaning solvents B01D)

Expelling water from the linen; **Smoothing by cold rolling**

45/00 Wringing machines with two or more co-operating rollers; **Similar cold-smoothing apparatus**
45/02 . wherein the pressure is transmitted by spring means
45/04 . . with hand-operated quick-release means
45/06 . . with automatically-operated quick-release means
45/08 . wherein the pressure is applied by fluid means
45/10 . with three or more co-operating rollers
45/12 . combined with washing machines
45/14 . with means for removable attachment to washing machines, tables or other supports (combined with tables A47B)
45/16 . Details
45/18 . . Driving or control arrangements for rotation of the rollers
45/20 . . Toggle or other lever means for transmitting pressure to the rollers
45/22 . . Rollers
45/24 . . Frames guiding or housing the roller shafts; Stands for supporting the roller framework
45/26 . . Draining boards; Feed or discharge boards; Stripping means
45/28 . . Belt arrangements for guiding the linen between the rollers

47/00 Apparatus of the press type for expelling water from the linen
47/02 . by a mechanically-actuated ram
47/04 . by a fluid-actuated ram
47/06 . by a flexible diaphragm
47/08 . Covers; Securing means therefor

49/00 Domestic spin-dryers or similar spin-dryers not suitable for industrial use (centrifuges in general B04B)
49/02 . Bowl construction
49/04 . Bowl drive
49/06 . Mountings, e.g. resilient mountings, for the bowl or casings; Preventing or damping vibrations (damping vibrations in general F16F)
49/08 . Liquid discharge arrangements

51/00 Apparatus for expelling or draining water from the linen, not provided for in groups D06F 45/00 to D06F 49/00
51/02 . by twisting

Drying; **Airing**

53/00 Clothes-lines; **Supports therefor** (drying frames incorporating clothes-lines D06F 57/00; supports or holders specially adapted or mounted for storing and repeatedly paying-out and restoring lengths of lines B65H 75/34; ropes, cables D07B)
53/02 . Clothes-lines
53/04 . Supports, e.g. poles, props for clothes-lines (poles in general E04H)

55/00 Clothes-pegs
55/02 . with pivoted clamping members

57/00 Supporting means, other than simple clothes-lines, for linen or garments to be dried or aired (in combination with means for heating or positive air circulation D06F 58/00, F26B; adapted to retain the shape of particular articles being dried D06F 59/00; clothing hangers, e.g. suit hangers, A47G 25/14)
57/02 . mounted on pillar, e.g. rotatably
57/04 . . and having radial arms, e.g. collapsible
57/06 . comprising vertical members connected by horizontal bars
57/08 . Folding stands (D06F 57/06 takes precedence)
57/10 . . of the lazy-tongs type
57/12 . specially adapted for attachment to walls, ceilings, stoves, or other structures or objects

58/00 Domestic laundry driers (drying in general F26B) **[2]**
58/02 . having drier drums rotating about a horizontal axis **[3]**
58/04 . . Details (controlling or regulating arrangements D06F 58/28) **[3]**
58/06 . . . Mountings for the rotating drums **[3]**
58/08 . . . Driving arrangements **[3]**
58/10 . Drying cabinets or drying chambers having heating or ventilating means **[3]**
58/12 . . having conveying means for moving clothes, e.g. along an endless track **[3]**
58/14 . . Collapsible drying cabinets; Wall mounted collapsible hoods **[3]**
58/16 . having heatable surfaces for contacting the laundry (D06F 59/00 takes precedence) **[3]**
58/18 . Detachable or door-mounted drying arrangements for washing machines **[3]**
58/20 . General details of domestic laundry driers (D06F 59/00 takes precedence) **[3]**
58/22 . . Lint collecting arrangements **[3]**
58/24 . . Condensing arrangements **[3]**
58/26 . . Heating arrangements, e.g. gas heating equipment (D06F 58/18 takes precedence) **[3]**
58/28 . . Controlling or regulating (controlling or regulating in general G05) **[3]**

59/00 Supports adapted to retain the shape of particular articles being dried, e.g. incorporating heating means
59/02 . for garments
59/04 . . for gloves
59/06 . . for stockings
59/08 . for curtains, table cloths, or other articles of sheet form

60/00 Drying not provided for in groups D06F 53/00 to D06F 59/00 [2009.01]

Ironing; **Pressing**

61/00 Ironing machines using two or more co-operating pressing rollers

61/02 . with two rollers
61/04 . with three or more rollers one above the other
61/06 . with successive pairs of rollers
61/08 . with one central roller co-operating with a plurality of circumferential rollers
61/10 . with two or more central rollers co-operating with a plurality of circumferential rollers

63/00 Ironing machines having a roller or rollers coacting with a fixed or moving flat bed or table (coverings or pads D06F 83/00)

63/02 . with two or more rollers co-acting with a fixed or moving flat bed or table

65/00 Ironing machines with rollers rotating against curved surfaces

65/02 . with one roller only
65/04 . . the bed being urged against the roller by hand or foot
65/06 . . the bed being urged against the roller by power
65/08 . . the roller being urged against the bed
65/10 . with two or more rollers co-operating with two or more curved surfaces

67/00 Details of ironing machines provided for in groups D06F 61/00, D06F 63/00, or D06F 65/00 (coverings or pads for ironing or pressing members D06F 83/00)

67/02 . Rollers; Heating arrangements therefor
67/04 . Arrangements for feeding or spreading the linen
67/06 . Means for stripping the linen from the rollers
67/08 . Beds; Heating arrangements therefor **[2]**
67/10 . Driving arrangements **[2]**

69/00 Ironing machines not otherwise provided for

69/02 . using endless or other ironing or pressing belts or aprons
69/04 . with relatively-sliding flat surfaces

71/00 Apparatus for hot-pressing clothes, linen, or other textile articles, i.e. wherein there is substantially no relative movement between pressing element and article while pressure is being applied to the article; **Similar machines for cold-pressing clothes, linen, or other textile articles** (smoothing by cold rolling between two or more co-operating rollers D06F 45/00; devices, for household use, for cold-pressing garments A47G)

71/02 . actuated wholly by hand or foot (D06F 71/08 takes precedence)
71/04 . power-actuated (D06F 71/08 takes precedence)
71/06 . . fluid-actuated
71/08 . wherein one or more of the pressing elements is moved laterally between successive pressing operations (laundry systems or arrangements of apparatus or machines D06F 95/00)
71/10 . . by movement about a vertical axis
71/12 . . by movement about a horizontal axis
71/14 . . by a rectilinear movement
71/16 . having a pressing element or buck adapted to provide interior support for a garment to be pressed (D06F 71/18 takes precedence)
71/18 . specially adapted for pressing particular garments or parts thereof (for pressing seams D06F 71/30)
71/20 . . for pressing shirts
71/22 . . for pressing collars
71/24 . . for pressing cuffs
71/26 . . for pressing shoulders or necks
71/28 . . for pressing sleeves, trousers, or other tubular garments or tubular parts of garments
71/29 . . . Trousers **[4]**
71/30 . specially adapted for pressing seams
71/32 . Details
71/34 . . Heating arrangements; Arrangements for supplying or removing steam or other gases
71/36 . . Pressing elements (for use in pressing particular garments or parts thereof D06F 71/18; coverings or pads therefor D06F 83/00)
71/38 . . Feeding arrangements (feeding by lateral movement of pressing elements D06F 71/08)
71/40 . . Holders or stretchers for the article to be pressed

73/00 Apparatus for smoothing or removing creases from garments or other textile articles by formers, cores, stretchers, or internal frames, with the application of heat or steam (stretchers for drying purposes D06F 59/00; combined with external pressure means D06F 71/00; stretchers for use with presses D06F 71/40; dress forms for the tailoring trade A41H; garment stretchers without the application of heat A47G 25/00)

73/02 . having one or more treatment chambers **[4]**

75/00 Hand irons

75/02 . Externally-heated hand irons; Hand irons internally heated by means other than electricity, e.g. by solid fuel, by steam
75/04 . . by pre-heated block
75/06 . . with means for supplying steam or liquid to the article being ironed (D06F 75/32 takes precedence)
75/08 . Hand irons internally heated by electricity
75/10 . . with means for supplying steam to the article being ironed (D06F 75/32 takes precedence)
75/12 . . . the steam being produced from water supplied to the iron from an external source
75/14 . . . the steam being produced from water in a reservoir carried by the iron
75/16 . . . . the reservoir being heated to produce the steam
75/18 . . . . the water being fed slowly, e.g. drop by drop, from the reservoir to a steam generator
75/20 . . . Arrangements for discharging the steam to the article being ironed
75/22 . . with means for supplying liquid to the article being ironed (D06F 75/10 takes precedence)
75/24 . . Arrangements of the heating means within the iron; Arrangements for distributing, conducting, or storing the heat (electric heating in general H05B)
75/26 . . Temperature control or indicating arrangements (thermally-actuated switches H01H)
75/28 . . Arrangements for attaching, protecting, or supporting the electric supply cable
75/30 . Hand irons of special external shape or form
75/32 . Attachments for converting hand irons to steam irons
75/34 . Handles; Handle mountings
75/36 . Casings
75/38 . Sole plates (D06F 75/20 takes precedence)
75/40 . Stands or supports attached to the iron

77/00 Arrangements for exerting pressure on, lifting, or guiding hand irons

79/00 **Accessories for hand irons**
79/02 . Stands or supports neither attached to, nor forming part of, the iron or ironing board
79/04 . Stoves or other heating means specially adapted for heating irons externally (stoves in general F24)
79/06 . Means, not forming part of the iron, for cooling the iron

81/00 **Ironing boards** (coverings or pads therefor D06F 83/00; combined with tables, mounted in kitchen cabinets A47B; tables in general A47B; combined with ladders E06C)
81/02 . with collapsible underframe
81/04 . . with means for adjusting height
81/06 . attachable to independent supports, e.g. walls
81/08 . incorporating heating, steaming, or forced ventilation means
81/10 . Top board elements
81/12 . Sleeve boards; Attaching means therefor
81/14 . Means for attaching covers

83/00 **Coverings or pads for ironing or pressing members**

85/00 **Independent elements for interposition between the article and the ironing or pressing surface**

Other laundry apparatus or systems

87/00 **Apparatus for moistening or otherwise conditioning the article to be ironed or pressed** (apparatus for smoothing or removing creases from garments or other textile articles by formers, cores, stretchers or internal frames, with the application of heat or steam D06F 73/00)

89/00 **Apparatus for folding textile articles with or without stapling [4]**
89/02 . of textile articles to be worn, e.g. shirts **[4]**

91/00 **Starching apparatus**

93/00 **Counting, sorting, or marking arrangements specially adapted for laundry purposes**

95/00 **Laundry systems or arrangements of apparatus or machines**; **Mobile laundries** (D06F 31/00 takes precedence; laundries as buildings E04H)

D06G **MECHANICAL OR PRESSURE CLEANING OF CARPETS, RUGS, SACKS, HIDES, OR OTHER SKIN OR TEXTILE ARTICLES OR FABRICS**; **TURNING INSIDE-OUT FLEXIBLE TUBULAR OR OTHER HOLLOW ARTICLES** (mechanical preparation or mechanical treatment of bed feathers B68G 3/00)

1/00 **Beating, brushing, or otherwise mechanically cleaning or pressure cleaning carpets, rugs, sacks, hides, or other skin or textile articles or fabrics** (brushes A46B; suction cleaners A47L; domestic cleaning apparatus A47L; cleaning in general B08B; apparatus for cleaning bed feathers B68G 3/00)

3/00 **Turning inside-out flexible tubular or other hollow articles** (in combination with inspecting D06H 3/16)
3/02 . by mechanical means
3/04 . pneumatically

5/00 **Mechanical, vacuum, or pressure cleaning in combination with the turning inside-out of flexible tubular or other hollow articles**

D06H **MARKING, INSPECTING, SEAMING, OR SEVERING TEXTILE MATERIALS** (seaming by sewing D05B; in connection with manufacturing, see the relevant subclasses)

Subclass index

1/00 **Marking textile materials**; **Marking in combination with metering or inspecting**
1/02 . Marking by printing or analogous processes
1/04 . by attaching threads, tags, or the like

3/00 **Inspecting textile materials** (testing physical properties of textile materials G01N, e.g. investigating the presence of flaws, defects or contamination using optical means G01N 21/88)
3/02 . visually (D06H 3/12, D06H 3/14, D06H 3/16 take precedence)
3/04 . . wherein the material is supported on a table
3/06 . . wherein the material is supported on a drum
3/08 . by photo-electric or television means (D06H 3/12, D06H 3/14, D06H 3/16 take precedence)
3/10 . by non-optical apparatus (D06H 3/12, D06H 3/14, D06H 3/16 take precedence)
3/12 . Detecting or automatically correcting errors in the position of weft threads in woven fabrics
3/14 . Detecting and removing metal particles, e.g. broken needles, or card clothing, from fabrics
3/16 . Inspecting hosiery or other tubular fabric; Inspecting in combination with turning inside-out, classifying, or other handling (turning inside-out per se D06G 3/00)

5/00 **Seaming textile materials**

7/00 **Apparatus or processes for cutting, or otherwise severing, specially adapted for the cutting, or otherwise severing, of textile materials** (severing for making buttonholes A41H; hand cutting tools in general B26B; cutting machines in general B26D; severing otherwise than by cutting in general B26F; trimming seamed edges, shearing surfaces of fabrics, shearing lace or embroidery, e.g. cutting loose threads D06C)

7/02 . transversely (D06H 7/14 takes precedence)
7/04 . longitudinally (D06H 7/14 takes precedence)
7/06 . . Removing selvedge edges
7/08 . . for cutting tubular fabric longitudinally
7/10 . obliquely
7/12 . . cutting a tubular fabric helically
7/14 . Cutting fabrics by cutting the weft or warp threads while making special provision to avoid cutting warp or weft threads, respectively, adjacent to the cut
7/16 . specially adapted for cutting lace or embroidery
7/18 . Cutting rolls of material without unwinding
7/20 . Tearing
7/22 . Severing by heat or by chemical agents
7/24 . Devices specially adapted for cutting-out samples

D06J **PLEATING, KILTING, OR GOFFERING TEXTILE FABRICS OR WEARING APPAREL** (corrugating, creasing, or otherwise deforming paper, or material worked in a manner analogous to paper, without removing material B31F; by weaving D03D; by sewing D05B; apparatus for pressing or setting formed pleats D06C)

1/00 **Pleating, kilting, or goffering textile fabrics or wearing apparel**

1/02 . continuously and transversely to the direction of feed
1/04 . . by co-operating ribbed or grooved rollers or belts
1/06 . . by reciprocating blades
1/08 . . . which introduce the folds between rollers or belts
1/10 . continuously and longitudinally to the direction of feed
1/12 . Forms of pleats or the like

D06L **BLEACHING, E.G. OPTICAL BLEACHING, DRY-CLEANING, OR WASHING FIBRES, THREADS, YARNS, FABRICS, FEATHERS, OR MADE-UP FIBROUS GOODS**; **BLEACHING LEATHER OR FURS** (treatment of fibres or filaments of glass, mineral wool, or slag wool C03; chemical treatment of fibrous material to obtain fibres for spinning D01; for mechanical matters, see D06B, D06C, D06F; bleaching paper pulp or cotton linters D21)

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

1/00 **Dry-cleaning or washing fibres, threads, yarns, fabrics, feathers, or made-up fibrous goods**

1/02 . using organic solvents
1/04 . . together with additives (D06L 1/06 takes precedence)
1/06 . . De-sizing
1/08 . . Multi-step processes
1/10 . . Regeneration of used chemical baths
1/12 . using aqueous baths
1/14 . . De-sizing
1/16 . . Multi-step processes
1/18 . . Working under pressure in closed vessels
1/20 . . combined with mechanical means
1/22 . Processes involving successive treatments with aqueous and organic materials

3/00 **Bleaching fibres, threads, yarns, fabrics, feathers, or made-up fibrous goods, leather, or furs**

3/02 . using compounds which develop oxygen (D06L 3/06 takes precedence)
3/04 . by irradiation or ozonisation
3/06 . using compounds which contain halogen
3/08 . . chlorites; chlorine dioxide
3/10 . using reducing agents
3/11 . using enzymes **[7]**
3/12 . Optical bleaching
3/14 . Multi-step processes
3/16 . . combined with cleaning or washing

D06M TREATMENT, NOT PROVIDED FOR ELSEWHERE IN CLASS D06, OF FIBRES, THREADS, YARNS, FABRICS, FEATHERS, OR FIBROUS GOODS MADE FROM SUCH MATERIALS (surface treatment of fibres or filaments from glass, minerals or slags C03C 25/00; treatment of textiles by mechanical means, see D06B to D06J)

(1) In each of the groups D06M 11/00 to D06M 15/00, in the absence of an indication to the contrary, a substance is classified in the last appropriate place. **[5]**

(2) In this subclass:
(a) Within each one of main groups D06M 11/00 to D06M 15/00, a mixture of substances is classified at least according to the essential ingredient. If more than one ingredient is essential, the mixture is classified, in the absence of an indication to the contrary, according to the essential ingredient which belongs to the last appropriate place in the sequence of substance.
(b) Treatment by mixtures of substances covered by two or more of main groups D06M 11/00 to D06M 15/00 is classified in each appropriate main group. **[5]**

(3) In this subclass, the treatment of textiles, not provided for elsewhere in class D06, is classified according to the following principles:
(a) Treatment of textiles characterised by the treating agent in groups D06M 11/00 to D06M 16/00.
(b) Treatment of textiles characterised by the process in group D06M 23/00. **[5]**

(4) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

(5) Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**

Subclass index

10/00 Physical treatment of fibres, threads, yarns, fabrics, or fibrous goods made from such materials, e.g. ultrasonic, corona discharge, irradiation, electric currents, magnetic fields; Physical treatment combined with treatment with chemical compounds or elements [2,5]

10/02 . ultrasonic or sonic; Corona discharge **[5]**

10/04 . Physical treatment combined with treatment with chemical compounds or elements (graft polymerisation using wave energy or particle radiation D06M 14/18) **[5]**

10/06 . . Inorganic compounds or elements **[5]**

10/08 . . Organic compounds **[5]**

10/10 . . . Macromolecular compounds **[5]**

11/00 Treating fibres, threads, yarns, fabrics, or fibrous goods made from such materials, with inorganic substances or complexes thereof; Such treatment combined with mechanical treatment, e.g. mercerising (D06M 10/00 takes precedence; decorating textiles by local treatment D06Q 1/00) **[5]**

(1) In this group, the following term is used with the meaning indicated:
– "treatment" means, in the absence of an indication to the contrary, the treatment which leads to the end product, e.g. treatment with barium sulfate can mean treatment with barium chloride and with sulfuric acid in two separate steps. **[5]**

(2) If a compound used in the treatment is characterised by its cation, classification for this aspect is made in main group D06M 11/00only and not in groups D06M 11/01 to D06M 11/80; metallisation by treatment with a metal salt, followed by reduction, is classified in group D06M 11/83. **[5]**

(3) In this group, it is desirable to add the indexing codes of group D06M 101/00. **[5]**

11/01 . with hydrogen, water or heavy water; with hydrides of metals or complexes thereof; with boranes, diboranes, silanes, disilanes, phosphines, diphosphines, stibines, distibines, arsines, or diarsines or complexes thereof **[5]**

11/05 . . with water, e.g. steam; with heavy water **[5]**

11/07 . with halogens; with halogen acids or salts thereof; with oxides or oxyacids of halogens or salts thereof **[5]**

11/09 . . with free halogens or interhalogen compounds **[5]**

11/11 . . with halogen acids or salts thereof **[5]**

11/13 . . . Ammonium halides or halides of elements of the first Group of the Periodic System **[5]**

11/155 . . . Halides of elements of the second Group of the Periodic System **[5]**

11/17 . . . Halides of elements of the third Group of the Periodic System **[5]**

11/20 . . . Halides of elements of the fourth Group of the Periodic System, e.g. zirconyl chloride **[5]**

11/22 . . . Halides of elements of the fifth Group of the Periodic System **[5]**

11/24 . . . Halides of elements of the sixth Group of the Periodic System, e.g. chromyl chloride **[5]**

11/26 . . . Halides of elements of the seventh Group of the Periodic System (interhalogen compounds D06M 11/09) **[5]**

11/28 . . . Halides of elements of the eighth Group of the Periodic System **[5]**

11/30 . . with oxides of halogens, oxyacids of halogens or their salts, e.g. with perchlorates **[5]**

11/32 . with oxygen, ozone, ozonides, oxides, hydroxides or percompounds; Salts derived from anions with an amphoteric element-oxygen bond (with water or heavy water D06M 11/05; with oxides or oxyacids of halogens D06M 11/30; bleaching D06L) **[5]**

11/34 . . with oxygen, ozone or ozonides **[5]**

11/36 . . with oxides, hydroxides or mixed oxides; with salts derived from anions with an amphoteric element-oxygen bond **[5]**

11/38 . . . Oxides or hydroxides of elements of the first Group of the Periodic System (producing patterns by locally destroying or modifying the fibres by chemical action D06Q 1/02) **[5]**

11/40 . . . . combined with, or in absence of, mechanical tension, e.g. slack mercerising **[5]**

11/42 . . . . Oxides or hydroxides of copper, silver or gold **[5]**

11/44 . . . Oxides or hydroxides of elements of the second Group of the Periodic System; Zincates; Cadmates **[5]**

11/45 . . . Oxides or hydroxides of elements of the third Group of the Periodic System; Aluminates **[5]**

11/46 . . . Oxides or hydroxides of elements of the fourth Group of the Periodic System; Titanates; Zirconates; Stannates; Plumbates **[5]**

11/47 . . . Oxides or hydroxides of elements of the fifth Group of the Periodic System; Vanadates; Niobates; Tantalates; Arsenates; Antimonates; Bismuthates **[5]**

11/48 . . . Oxides or hydroxides of chromium, molybdenum or tungsten; Chromates; Dichromates; Molybdates; Tungstates **[5]**

11/49 . . . Oxides or hydroxides of elements of the eight Group of the Periodic System; Ferrates; Cobaltates; Nickelates; Ruthenates; Osmates; Rhodates; Iridates; Palladates; Platinates **[5]**

11/50 . . with hydrogen peroxide or peroxides of metals; with persulfuric, permanganic, pernitric, percarbonic acids or their salts **[5]**

11/51 . with sulfur, selenium, tellurium, polonium or compounds thereof (with persulfuric acids or their salts D06M 11/50) **[5]**

11/52 . . with selenium, tellurium, polonium or their compounds; with sulfur, dithionites or compounds containing sulfur and halogens, with or without oxygen; by sulfohalogenation with chlorosulfonic acid; by sulfohalogenation with a mixture of sulfur dioxide and free halogens **[5]**

11/53 . . with hydrogen sulfide or its salts; with polysulfides **[5]**

11/54 . . with sulfur dioxide; with sulfurous acid or its salts (D06M 11/52 takes precedence) **[5]**

11/55 . . with sulfur trioxide; with sulfuric acid or thiosulfuric acid or their salts **[5]**

11/56 . . . Sulfates or thiosulfates other than of elements of the third Group of the Periodic System **[5]**

11/57 . . . Sulfates or thiosulfates of elements of the third Group of the Periodic System, e.g. alums **[5]**

11/58 . with nitrogen or compounds thereof, e.g. with nitrides (with ammonium halides D06M 11/13) **[5]**

11/59 . . with ammonia; with complexes of organic amines with inorganic substances **[5]**

11/60 . . . Ammonia as a gas or in solution **[5]**

11/61 . . . Liquid ammonia **[5]**

11/62 . . . Complexes of metal oxides or complexes of metal salts with ammonia or with organic amines **[5]**

11/63 . . with hydroxylamine or hydrazine **[5]**

11/64 . . with nitrogen oxides; with oxyacids of nitrogen or their salts (with pernitric acids or their salts D06M 11/50) **[5]**

11/65 . . . Salts of oxyacids of nitrogen **[5]**

11/66 . . with sulfamic acid or its salts **[5]**

11/67 . . with cyanogen or compounds thereof, e.g. with cyanhydric acid, cyanic acid, isocyanic acid, thiocyanic acid, isothiocyanic acid or their salts, or with cyanamides; with carbamic acid or its salts (with dicyanamides D06M 13/432) **[5]**

11/68 . with phosphorus or compounds thereof, e.g. with chlorophosphonic acid or salts thereof (with phosphines or diphosphines D06M 11/01; with selenium or tellurium compounds D06M 11/52; with polyphosphazene or derivatives thereof D06M 15/673) **[5]**

11/69 . . with phosphorus; with halides or oxyhalides of phosphorus; with chlorophosphonic acid or its salts **[5]**

11/70 . . with oxides of phosphorus; with hypophosphorous, phosphorous or phosphoric acids or their salts **[5]**

11/71 . . . Salts of phosphoric acids **[5]**

11/72 . . with metaphosphoric acids or their salts; with polyphosphoric acids or their salts; with perphosphoric acids or their salts **[5]**

11/73 . with carbon or compounds thereof (D06M 11/67 takes precedence) **[5]**

11/74 . . with carbon or graphite; with carbides; with graphitic acids or their salts **[5]**

11/75 . . with phosgene; with compounds containing both carbon and sulfur, e.g. thiophosgene (with thiocyanic acid D06M 11/67; with thiocarbamic acid D06M 13/425; with thiourea D06M 13/432) **[5]**

11/76 . . with carbon oxides or carbonates (D06M 11/75 takes precedence; with percarbonic acids or their salts D06M 11/50; with urea D06M 13/432) **[5]**

11/77 . with silicon or compounds thereof (with silanes or disilanes D06M 11/01) **[5]**

11/78 . . with silicon; with halides or oxyhalides of silicon; with fluorosilicates **[5]**

11/79 . . with silicon dioxide, silicic acids or their salts **[5]**

11/80 . with boron or compounds thereof, e.g. borides (with boranes or diboranes D06M 11/01; with boron carbides D06M 11/74) **[5]**

11/81 . . with boron; with boron halides; with fluoroborates **[5]**

11/82 . . with boron oxides; with boric, meta- or perboric acids or their salts, e.g. with borax **[5]**

11/83 . with metals; with metal-generating compounds, e.g. metal carbonyls; Reduction of metal compounds on textiles (decorating textiles by locally metallising D06Q 1/04) **[5]**

11/84 . combined with mechanical treatment (combined with mechanical tension, e.g. mercerising, D06M 11/40) **[5]**

13/00 **Treating fibres, threads, yarns, fabrics or fibrous goods made from such materials with non-macromolecular organic compounds** (D06M 10/00, D06M 14/00 take precedence; treatment with complexes of organic amines with inorganic substances D06M 11/59); **Such treatment combined with mechanical treatment [4,5]**

(1) In this group, the following term is used with the meaning indicated:
– "treatment" means, in the absence of an indication to the contrary, the treatment which leads to the end product, e.g. treatment with chloroacetic acid can mean treatment with chloroacetylchloride and saponification in two separate steps. **[5]**

(2) In this group, it is desirable to add the indexing codes of group D06M 101/00. **[5]**

13/02 . with hydrocarbons
13/03 . . with unsaturated hydrocarbons, e.g. alkenes, alkynes **[5]**
13/07 . . . Aromatic hydrocarbons **[5]**
13/08 . with halogenated hydrocarbons
13/10 . with compounds containing oxygen
13/11 . . Compounds containing epoxy groups or precursors thereof **[5]**
13/12 . . Aldehydes; Ketones
13/123 . . . Polyaldehydes; Polyketones **[5]**
13/127 . . . Mono-aldehydes, e.g. formaldehyde; Monoketones **[5]**
13/13 . . . Unsaturated aldehydes, e.g. acrolein; Unsaturated ketones; Ketenes **[5]**
13/133 . . . Halogenated aldehydes; Halogenated ketones **[5]**
13/137 . . Acetals, e.g. formals, ketals **[5]**
13/144 . . Alcohols; Metal alcoholates (D06M 13/11 takes precedence) **[5]**
13/148 . . . Polyalcohols, e.g. glycerol **[5]**
13/152 . . having a hydroxy group bound to a carbon atom of a six-membered aromatic ring **[5]**
13/156 . . . containing halogen atoms **[5]**
13/165 . . Ethers (D06M 13/11 takes precedence) **[5]**
13/17 . . . Polyoxyalkyleneglycol ethers **[5]**
13/175 . . . Unsaturated ethers, e.g. vinylethers **[5]**
13/184 . . Carboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/188 . . . Monocarboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/192 . . . Polycarboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/196 . . . Percarboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/203 . . . Unsaturated carboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/207 . . . Substituted carboxylic acids, e.g. by hydroxy or keto groups; Anhydrides, halides or salts thereof **[5]**
13/21 . . . . Halogenated carboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/213 . . . . . Perfluoroalkyl carboxylic acids; Anhydrides, halides or salts thereof **[5]**
13/217 . . . . Polyoxyalkyleneglycol ethers with a terminal carboxyl group; Anhydrides, halides or salts thereof **[5]**
13/224 . . Esters of carboxylic acids; Esters of carbonic acid **[5]**
13/228 . . . Cyclic esters, e.g. lactones **[5]**
13/232 . . . Organic carbonates **[5]**
13/236 . . . containing halogen atoms **[5]**
13/238 . . . Tannins, e.g. gallotannic acids **[5]**
13/244 . with compounds containing sulfur or phosphorus **[5]**
13/248 . . with compounds containing sulfur **[5]**
13/252 . . . Mercaptans, thiophenols, sulfides or polysulfides, e.g. mercapto acetic acid; Sulfonium compounds **[5]**
13/256 . . . Sulfonated compounds **[5]**
13/262 . . . Sulfated compounds **[5]**
13/265 . . . containing halogen atoms **[5]**
13/268 . . . Sulfones **[5]**
13/272 . . . Unsaturated compounds containing sulfur atoms **[5]**
13/275 . . . . Vinylthioethers **[5]**
13/278 . . . . Vinylsulfonium compounds; Vinylsulfone or vinylsulfoxide compounds **[5]**
13/282 . . with compounds containing phosphorus **[5]**
13/285 . . . Phosphines; Phosphine oxides; Phosphine sulfides; Phosphinic or phosphinous acids or derivatives thereof **[5]**
13/288 . . . Phosphonic or phosphonous acids or derivatives thereof **[5]**
13/29 . . . . containing halogen atoms **[5]**
13/292 . . . Mono-, di- or triesters of phosphoric or phosphorous acids; Salts thereof **[5]**
13/295 . . . . containing polyglycol moieties; containing neopentyl moieties **[5]**
13/298 . . . . containing halogen atoms **[5]**
13/313 . . . Unsaturated compounds containing phosphorus atoms, e.g. vinylphosphonium compounds **[5]**
13/322 . with compounds containing nitrogen **[5]**
13/325 . . Amines **[5]**
13/328 . . . the amino group being bound to an acyclic or cycloaliphatic carbon atom **[5]**
13/33 . . . . containing halogen atoms **[5]**
13/332 . . . Di- or polyamines **[5]**
13/335 . . . having an amino group bound to a carbon atom of a six-membered aromatic ring **[5]**
13/338 . . . Organic hydrazines; Hydrazinium compounds **[5]**
13/342 . . . Amino-carboxylic acids; Betaines; Aminosulfonic acids; Sulfo-betaines **[5]**
13/345 . . Nitriles **[5]**
13/348 . . . unsaturated, e.g. acrylonitrile **[5]**
13/35 . . Heterocyclic compounds **[5]**
13/352 . . . having five-membered heterocyclic rings **[5]**
13/355 . . . having six-membered heterocyclic rings **[5]**
13/358 . . . . Triazines **[5]**
13/364 . . . . . Cyanuric acid; Isocyanuric acid; Derivatives thereof **[5]**
13/368 . . Hydroxyalkylamines; Derivatives thereof, e.g. Kritchevsky bases **[5]**
13/372 . . containing etherified or esterified hydroxy groups **[5]**
13/376 . . Oximes **[5]**
13/382 . . Aminoaldehydes **[5]**
13/385 . . containing epoxy groups **[5]**
13/388 . . Amine oxides **[5]**
13/392 . . Nitroso compounds; Nitro compounds **[5]**
13/395 . . Isocyanates **[5]**
13/398 . . . containing fluorine atoms **[5]**

13/402 . . Amides **[5]**
13/405 . . . Acylated polyalkylene polyamines **[5]**
13/408 . . . Acylated amines containing fluorine atoms; Amides of perfluoro carboxylic acids **[5]**
13/41 . . . Amides derived from unsaturated carboxylic acids, e.g. acrylamide **[5]**
13/412 . . . . N-methylolacrylamides **[5]**
13/415 . . . Amides of aromatic carboxylic acids; Acylated aromatic amines **[5]**
13/418 . . . Cyclic amides, e.g. lactams; Amides of oxalic acid **[5]**
13/419 . . . Amides having nitrogen atoms of amide groups substituted by hydroxyalkyl or by etherified or esterified hydroxyalkyl groups **[5]**
13/422 . . . Hydrazides **[5]**
13/425 . . . Carbamic or thiocarbamic acids or derivatives thereof, e.g. urethanes (unsubstituted carbamic acid D06M 11/67) **[5]**
13/428 . . . . containing fluorine atoms **[5]**
13/432 . . . Urea, thiourea or derivatives thereof, e.g. biurets; Urea-inclusion compounds; Dicyanamides; Guanidines, e.g. dicyandiamides **[5]**
13/435 . . . Semicarbazides **[5]**
13/438 . . . Sulfonamides **[5]**
13/44 . . containing nitrogen and phosphorus
13/447 . . . Phosphonates or phosphinates containing nitrogen atoms **[5]**
13/453 . . . Phosphates or phosphites containing nitrogen atoms **[5]**
13/46 . . Compounds containing quaternary nitrogen atoms (hydrazinium compounds D06M 13/338; betaines, sulfo-betaines D06M 13/342) **[5]**
13/463 . . . derived from monoamines **[5]**
13/467 . . . derived from polyamines **[5]**
13/47 . . . derived from heterocyclic compounds **[5]**
13/473 . . . . having five-membered heterocyclic rings **[5]**
13/477 . . . . having six-membered heterocyclic rings **[5]**
13/48 . . containing the ethylene imine ring
13/487 . . Aziridinylphosphines; Aziridinylphosphine-oxides or sulfides; Carbonylaziridinyl or carbonylbisaziridinyl compounds; Sulfonylaziridinyl or sulfonylbisaziridinyl compounds **[5]**
13/493 . . . perfluorinated **[5]**
13/50 . with organometallic compounds; with organic compounds containing boron, silicon, selenium or tellurium atoms **[5]**
13/503 . . without bond between a carbon atom and a metal or a boron, silicon, selenium or tellurium atom **[5]**
13/507 . . . Organic silicon compounds without carbon-silicon bond **[5]**
13/51 . . Compounds with at least one carbon-metal or carbon-boron, carbon-silicon, carbon-selenium, or carbon-tellurium bond **[5]**
13/513 . . . with at least one carbon-silicon bond **[5]**
13/517 . . . . containing silicon-halogen bonds **[5]**
13/52 . combined with mechanical treatment (decorating textiles D06Q)
13/525 . . Embossing; Calendering; Pressing (moulding D06M 23/14) **[5]**
13/53 . . Cooling; Steaming or heating, e.g. in fluidised beds; with molten metals **[5]**
13/535 . . Suction; Vacuum treatment; Degassing; Blowing **[5]**

14/00 **Graft polymerisation of monomers containing carbon-to-carbon unsaturated bonds on to fibres, threads, yarns, fabrics, or fibrous goods made from such materials** (on to unshaped polymers C08F 251/00 to C08F 292/00) **[4]**
14/02 . on to materials of natural origin (D06M 14/18 takes precedence) **[4]**
14/04 . . of vegetal origin, e.g. cellulose or derivatives thereof **[4]**
14/06 . . of animal origin, e.g. wool, silk **[4]**
14/08 . on to materials of synthetic origin (D06M 14/18 takes precedence) **[4]**
14/10 . . of macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
14/12 . . of macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
14/14 . . . Polyesters **[4]**
14/16 . . . Polyamides **[4]**
14/18 . using wave energy or particle radiation **[4]**
14/20 . . on to materials of natural origin **[4]**
14/22 . . . of vegetal origin, e.g. cellulose or derivatives thereof **[4]**
14/24 . . . of animal origin, e.g. wool, silk **[4]**
14/26 . . on to materials of synthetic origin **[4]**
14/28 . . . of macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
14/30 . . . of macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
14/32 . . . . Polyesters **[4]**
14/34 . . . . Polyamides **[4]**
14/36 . on to carbon fibres **[5]**

15/00 **Treating fibres, threads, yarns, fabrics or fibrous goods made from such materials with macromolecular compounds**; **Such treatment combined with mechanical treatment** (D06M 10/00, D06M 14/00 take precedence) **[5]**

(1) In this group, the following term is used with the meaning indicated:
– "treatment" means, in the absence of an indication to the contrary, the treatment which leads to the end product, e.g.:
(a) treatment with polyvinylalcohol can mean treatment with polyvinylacetate and subsequent saponification in a separate step;
(b) treatment with aminoplast can mean the delayed cure process or the treatment with precondensation products, or with e.g. urea and with formaldehyde in two separate steps. **[5]**
(2) In this group, it is desirable to add the indexing codes of group D06M 101/00. **[5]**

15/01 . with natural macromolecular compounds or derivatives thereof (with natural rubber or derivatives thereof D06M 15/693) **[4]**
15/03 . . Polysaccharides or derivatives thereof **[4]**
15/05 . . . Cellulose or derivatives thereof **[4]**
15/055 . . . . with the residual liquors derived of the sulfatic process for the preparation of cellulose **[5]**
15/07 . . . . Cellulose esters **[4]**

15/09 . . . . Cellulose ethers **[4]**
15/11 . . . Starch or derivatives thereof **[4]**
15/13 . . . Alginic acid or derivatives thereof **[4]**
15/15 . . Proteins or derivatives thereof **[4]**
15/17 . . Natural resins, resinous alcohols, resinous acids, or derivatives thereof **[4,5]**
15/19 . with synthetic macromolecular compounds (with synthetic rubber D06M 15/693) **[4]**
15/21 . . Macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
15/227 . . . of hydrocarbons, or reaction products thereof, e.g. afterhalogenated or sulfochlorinated **[4]**
15/233 . . . . aromatic, e.g. styrene **[4]**
15/244 . . . of halogenated hydrocarbons (afterhalogenated hydrocarbons D06M 15/227) **[4]**
15/248 . . . . containing chlorine **[4]**
15/252 . . . . containing bromine **[4]**
15/256 . . . . containing fluorine **[4]**
15/263 . . . of unsaturated carboxylic acids; Salts or esters thereof **[4]**
15/267 . . . . of unsaturated carboxylic esters having amino or quaternary ammonium groups **[4]**
15/27 . . . . of alkylpolyalkylene glycol esters of unsaturated carboxylic acids **[4]**
15/273 . . . . of unsaturated carboxylic esters having epoxy groups **[4]**
15/277 . . . . containing fluorine **[4]**
15/285 . . . of unsaturated carboxylic acid amides or imides **[4]**
15/29 . . . . containing a N-methylol group or an etherified N-methylol group; containing a N-aminomethylene group; containing a N-sulfido-methylene group **[4,5]**
15/295 . . . . containing fluorine **[4]**
15/31 . . . of unsaturated nitriles **[4]**
15/327 . . . of unsaturated alcohols or esters thereof **[4]**
15/33 . . . . Esters containing fluorine **[5]**
15/333 . . . . of vinyl acetate; Polyvinylalcohol **[4]**
15/347 . . . of unsaturated ethers, acetals, hemiacetals, ketones or aldehydes **[4,5]**
15/353 . . . . containing fluorine **[4]**
15/356 . . . of other unsaturated compounds containing nitrogen, sulfur, silicon or phosphorus atoms **[5]**
15/37 . . Macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[4]**
15/39 . . . Aldehyde resins; Ketone resins; Polyacetals **[4]**
15/41 . . . . Phenol-aldehyde or phenol-ketone resins **[4,5]**
15/415 . . . . . modified by compounds containing phosphorus **[5]**
15/423 . . . . Amino-aldehyde resins **[4,5]**
15/427 . . . . . modified by alkoxylated compounds or alkylene oxides **[4]**
15/429 . . . . . modified by compounds containing sulfur **[5]**
15/43 . . . . . modified by phosphorus compounds **[4]**
15/431 . . . . . by phosphines or phosphine oxides; by oxides or salts of the phosphonium radical **[5]**
15/432 . . . . . by phosphonic acids or derivatives thereof **[5]**
15/433 . . . . . by phosphoric acids **[4]**
15/437 . . . . . containing fluorine **[4]**
15/45 . . . . . Use of special catalysts **[4]**
15/507 . . . Polyesters **[4]**
15/51 . . . . Unsaturated polymerisable polyesters **[5]**
15/513 . . . . Polycarbonates **[4]**
15/53 . . . Polyethers (polyacetals D06M 15/39) **[4]**
15/55 . . . Epoxy resins **[4]**
15/555 . . . . modified by compounds containing phosphorus **[5]**
15/564 . . . Polyureas, polyurethanes or other polymers having ureide or urethane links; Precondensation products forming them **[4]**
15/568 . . . . Reaction products of isocyanates with polyethers **[4]**
15/572 . . . . Reaction products of isocyanates with polyesters or polyesteramides **[4]**
15/576 . . . . containing fluorine **[4]**
15/579 . . . . modified by compounds containing phosphorus **[5]**
15/59 . . . Polyamides; Polyimides **[4,5]**
15/592 . . . . made of polymerised unsaturated fatty acids and polyamines **[5]**
15/595 . . . . Derivatives obtained by substitution of a hydrogen atom of the carboxamide radical **[5]**
15/598 . . . . modified by compounds containing phosphorus **[5]**
15/61 . . . Polyamines **[4]**
15/63 . . . containing sulfur in the main chain, e.g. polysulfones **[4]**
15/643 . . . containing silicon in the main chain **[4]**
15/647 . . . . containing polyether sequences **[4]**
15/65 . . . . containing epoxy groups **[4]**
15/653 . . . . modified by isocyanate compounds **[4]**
15/657 . . . . containing fluorine **[4]**
15/667 . . . containing phosphorus in the main chain **[4]**
15/673 . . . . containing phosphorus and nitrogen in the main chain **[4]**
15/687 . . . containing atoms other than phosphorus, silicon, sulfur, nitrogen, oxygen or carbon in the main chain **[4]**
15/693 . with natural or synthetic rubber, or derivatives thereof **[4]**
15/70 . combined with mechanical treatment (decorating textiles D06Q)
15/705 . . Embossing; Calendering; Pressing (moulding D06M 23/14) **[5]**
15/71 . . Cooling; Steaming or heating, e.g. in fluidised beds; with molten metals **[5]**
15/715 . . Suction; Vacuum treatment; Degassing; Blowing **[5]**

16/00 Biochemical treatment of fibres, threads, yarns, fabrics, or fibrous goods made from such materials, e.g. enzymatic [2]

Note

In this group, it is desirable to add the indexing codes of group D06M 101/00. **[5]**

17/00 Producing multi-layer textile fabrics
17/02 . by applying cellulose derivatives as adhesives **[5]**
17/04 . by applying synthetic resins as adhesives **[5]**
17/06 . . Polymers of vinyl compounds **[5]**
17/08 . . Polyamides **[5]**
17/10 . . Polyurethanes **[5]**

19/00 Treatment of feathers [2]

23/00 Treatment of fibres, threads, yarns, fabrics or fibrous goods made from such materials, characterised by the process [5]

Note

In this group, it is desirable to add the indexing codes of group D06M 101/00. **[5]**

23/02 . Processes in which the treating agent is releasably affixed or incorporated into a dispensing means **[5]**

23/04 . Processes in which the treating agent is applied in the form of a foam **[5]**

23/06 . Processes in which the treating agent is dispersed in a gas, e.g. aerosols (aerosol compositions C09K 3/30) **[5]**

23/08 . Processes in which the treating agent is applied in powder or granular form (adhesives for multi-layer textile fabrics D06M 17/00; decorating textiles D06Q) **[5]**

23/10 . Processes in which the treating agent is dissolved or dispersed in organic solvents; Processes for the recovery of organic solvents thereof **[5]**

23/12 . Processes in which the treating agent is incorporated in microcapsules (making microcapsules B01J 13/02) **[5]**

23/14 . Processes for the fixation or treatment of textile materials in three-dimensional forms **[5]**

23/16 . Processes for the non-uniform application of treating agents, e.g. one-sided treatment; Differential treatment (decorating textiles D06Q) **[5]**

23/18 . . for the chemical treatment of borders of fabrics or knittings; for the thermal or chemical fixation of cuttings, seams or fibre ends **[5]**

Indexing scheme, associated with groups D06M 11/00, D06M 13/00, D06M 15/00, D06M 16/00 and D06M 23/00, relating to the fibres to be treated. [5]

101/00 Chemical constitution of the fibres, threads, yarns, fabrics or fibrous goods made from such materials, to be treated [5]

(1) Examples:
- the swelling of cellulose with alkaline hydroxides is classified in group D06M 11/38 and indexed in group D06M 101/06;
- the treatment of cellulose with amines is classified in group D06M 13/325 and indexed in group D06M 101/06;
- the treatment of polyester fibres with polyesters is classified in group D06M 15/507 and indexed in group D06M 101/32;
- the treatment of wool with pepsin is classified in group D06M 16/00 and indexed in group D06M 101/12;
- the treatment of cellulose with silicon tetrachloride in the form of a foam is classified in groups D06M 11/78, D06M 23/04 and indexed in group D06M 101/06. **[5]**

(2) Blends of fibres are indexed according to each constituent fibre. **[5]**

101/02 . Natural fibres, other than mineral fibres **[5]**

101/04 . . Vegetal fibres **[5]**

101/06 . . . cellulosic **[5]**

101/08 . . . . Esters or ethers of cellulose **[5]**

101/10 . . Animal fibres **[5]**

101/12 . . . Keratin fibres or silk **[5]**

101/14 . . . Collagen fibres **[5]**

101/16 . Synthetic fibres, other than mineral fibres **[5]**

101/18 . . Synthetic fibres consisting of macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

101/20 . . . Polyalkenes, polymers or copolymers of compounds with alkenyl groups bonded to aromatic groups **[5]**

101/22 . . . Polymers or copolymers of halogenated mono-olefins **[5]**

101/24 . . . Polymers or copolymers of alkenylalcohols or esters thereof; Polymers or copolymers of alkenylethers, acetals or ketones **[5]**

101/26 . . . Polymers or copolymers of unsaturated carboxylic acids or derivatives thereof **[5]**

101/28 . . . . Acrylonitrile; Methacrylonitrile **[5]**

101/30 . . Synthetic polymers consisting of macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

101/32 . . . Polyesters **[5]**

101/34 . . . Polyamides **[5]**

101/36 . . . . Aromatic polyamides **[5]**

101/38 . . . Polyurethanes **[5]**

101/40 . Fibres of carbon **[5]**

D06N WALL, FLOOR, OR LIKE COVERING MATERIALS, E.G. LINOLEUM, OILCLOTH, ARTIFICIAL LEATHER, ROOFING FELT, CONSISTING OF A FIBROUS WEB COATED WITH A LAYER OF MACROMOLECULAR MATERIAL; FLEXIBLE SHEET MATERIAL NOT OTHERWISE PROVIDED FOR (laminates in general B32B; coated webs which retain the character of paper or cardboard D21)

Note

Layered products classified in this subclass are also classified in subclass B32B.

1/00 Linoleum

3/00 Artificial leather, oilcloth, or like material obtained by covering fibrous webs with macromolecular material, e.g. resins, rubber or derivatives thereof [4]

3/02 . with cellulose derivatives

3/04 . with macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds

3/06 . . with polyvinyl chloride or its copolymerisation products

3/08 . . . with a finishing layer consisting of polyacrylates, polyamides, or polyurethanes
3/10 . . with styrene-butadiene copolymerisation products
3/12 . with macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds
3/14 . . with polyurethanes
3/16 . with oil varnishes
3/18 . with two layers of different macromolecular materials (D06N 3/08 takes precedence)

5/00 Roofing felt, i.e. fibrous webs coated with bitumen

7/00 Flexible sheet materials not otherwise provided for, e.g. textile threads, filaments, yarns or tow, glued on macromolecular material
7/02 . composed of mixtures of substances
7/04 . characterised by their surface properties
7/06 . impregnated

D06P DYEING OR PRINTING TEXTILES; **DYEING LEATHER, FURS, OR SOLID MACROMOLECULAR SUBSTANCES IN ANY FORM** (for mechanical matters, see B41F, B41J, D06B, D06C; printing on surfaces of materials other than textiles B41M; surface treatment of fibres or filaments from glass, minerals, or slags C03C 25/00; mordanting D06M; dyeing paper D21H)

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 General processes of dyeing or printing textiles, or general processes of dyeing leather, furs, or solid macromolecular substances in any form, classified according to the dyes, pigments, or auxiliary substances employed
1/02 . using azo dyes (D06P 1/18, D06P 1/38, D06P 1/39, D06P 1/41 take precedence) **[2]**
1/04 . . not containing metal
1/06 . . . containing acid groups
1/08 . . . cationic azo dyes
1/10 . . containing metal
1/12 . . prepared in situ
1/13 . using azomethine dyes **[2]**
1/14 . using phthalocyanine dyes without vatting (D06P 1/38, D06P 1/40 take precedence)
1/16 . using dispersed, e.g. acetate, dyestuffs
1/18 . . Azo dyes
1/19 . . Nitro dyes **[2]**
1/20 . . Anthraquinone dyes
1/22 . using vat dyestuffs
1/24 . . Anthraquinone dyes
1/26 . . Phthalocyanine dyes
1/28 . . Esters of vat dyestuffs
1/30 . using sulfur dyes
1/32 . using oxidation dyes
1/34 . using natural dyestuffs
1/36 . using mordant dyes
1/38 . using reactive dyes
1/382 . . with a reactive group directly attached to the heterocyclic group **[2]**
1/384 . . with a reactive group not directly attached to the heterocyclic group **[2]**
1/39 . using acid dyes **[2]**
1/40 . . using acid dyes without azo groups
1/41 . using basic dyes **[2]**
1/42 . . using basic dyes without azo groups
1/44 . using insoluble pigments or auxiliary substances, e.g. binders **[2]**
1/46 . . using compositions containing natural macromolecular substances or derivatives thereof
1/48 . . . Derivatives of carbohydrates
1/50 . . . . Derivatives of cellulose
1/52 . . using compositions containing synthetic macromolecular substances (D06P 1/60 takes precedence)
1/54 . . . Substances with reactive groups together with crosslinking agents
1/56 . . . Condensation products or precondensation products prepared with aldehydes
1/58 . . . . together with other synthetic macromolecular substances
1/60 . . using compositions containing polyethers
1/607 . . . Nitrogen-containing polyethers **[2]**
1/613 . . . Polyethers without nitrogen **[2]**
1/62 . . using compositions containing low-molecular-weight organic compounds with sulfate or sulfonate groups
1/64 . . using compositions containing low-molecular-weight organic compounds without sulfate or sulfonate groups
1/642 . . . Compounds containing nitrogen **[2]**
1/645 . . . . Aliphatic, araliphatic or cycloaliphatic compounds containing amino groups **[2]**
1/647 . . . . Nitrogen-containing carboxylic acids or their salts **[2]**

1/649 . . . . Compounds containing carbonamide, thiocarbonamide or guanyl groups **[2]**
1/651 . . . Compounds without nitrogen **[2]**
1/653 . . Nitrogen-free carboxylic acids or their salts **[2]**
1/655 . . Compounds containing ammonium groups **[2,6]**
1/66 . . . containing quaternary ammonium groups **[6]**
1/667 . . Organo-phosphorus compounds **[2]**
1/673 . . Inorganic compounds **[2]**
1/81 . using dyes dissolved in inorganic solvents **[7]**
1/90 . using dyes dissolved in organic solvents or aqueous emulsions thereof **[2]**
1/92 . . in organic solvents **[7]**
1/94 . using dyes dissolved in solvents which are in the supercritical state **[7]**
1/96 . Dyeing characterised by a short bath ratio **[7]**

3/00 Special processes of dyeing or printing textiles, or dyeing leather, furs, or solid macromolecular substances in any form, classified according to the material treated

3/02 . Material containing basic nitrogen
3/04 . . containing amide groups
3/06 . . . using acid dyes
3/08 . . . using oxidation dyes
3/10 . . . using reactive dyes
3/12 . . . Preparing azo dyes on the material
3/14 . . . Wool
3/16 . . . . using acid dyes
3/18 . . . . using basic dyes
3/20 . . . . using mordant dyes
3/22 . . . . Preparing azo dyes on the fibre
3/24 . . . Polyamides; Polyurethanes
3/26 . . . . using dispersed dyestuffs
3/28 . . . . Preparing azo dyes on the material
3/30 . . . Furs
3/32 . . . Leather
3/34 . Material containing ester groups (D06P 3/04 takes precedence)
3/36 . . using dispersed dyestuffs
3/38 . . Preparing azo dyes on the material
3/40 . . Cellulose acetate
3/42 . . . using dispersed dyestuffs
3/44 . . . Preparing azo dyes on the material
3/46 . . . Cellulose triacetate
3/48 . . . . using dispersed dyestuffs
3/50 . . . . Preparing azo dyes on the material
3/52 . . Polyesters
3/54 . . . using dispersed dyestuffs
3/56 . . . Preparing azo dyes on the material
3/58 . Material containing hydroxyl groups
3/60 . . Natural or regenerated cellulose
3/62 . . . using direct dyes
3/64 . . . using mordant dyes
3/66 . . . using reactive dyes
3/68 . . . Preparing azo dyes on the material
3/70 . Material containing nitrile groups
3/72 . . using dispersed dyestuffs
3/74 . . using acid dyes
3/76 . . using basic dyes
3/78 . . Preparing azo dyes on the material
3/79 . Polyolefins **[2]**
3/80 . Inorganic fibres (surface treatment of fibres or filaments from glass, minerals or slags C03C 25/00)
3/82 . Textiles which contain different kinds of fibres
3/84 . . in the same shade
3/85 . . dyed with one dye **[2]**
3/852 . . . containing half-wool or cellulose-polyamide mixture **[2]**
3/854 . . . containing modified or unmodified fibres **[2]**
3/86 . . in different shades
3/87 . . dyed with two or more dyes **[2]**
3/872 . . . dyed with dispersed and reactive dyes **[2]**
3/874 . . . with non-reactive anionic and non-reactive dispersed or cationic dyes **[2]**

5/00 Other features in dyeing or printing textiles, or dyeing leather, furs, or solid macromolecular substances in any form

5/02 . After-treatment

Note

In groups D06P 5/04 to D06P 5/10, in the absence of an indication to the contrary, a compound is classified in the last appropriate place.

5/04 . . with organic compounds
5/06 . . . containing nitrogen
5/08 . . . macromolecular
5/10 . . with compounds containing metal
5/12 . Reserving parts of the material before dyeing or printing
5/13 . Fugitive dyeing or stripping dyes **[2]**
5/15 . Locally discharging the dyes **[2]**
5/17 . . Azo dyes **[2]**
5/20 . Physical treatments affecting dyeing, e.g. ultrasonic, electric **[2]**
5/22 . Effecting variation of dye affinity on textile material by chemical means that react with the fibre **[2]**
5/24 . Transfer printing (transfer printing apparatus for textile material B41F 16/02) **[7]**
5/26 . . Heat transfer printing **[7]**
5/28 . . . using subliming dyes **[7]**
5/30 . Ink jet printing (ink jet printing apparatus B41J 2/00) **[7]**

7/00 Dyeing or printing processes combined with mechanical treatment

D06Q **DECORATING TEXTILES** (for treatment of textiles by mechanical means, see D06B to D06J; metallising the entire surface of textiles D06M 11/83; textile threads, filaments, yarns or tow, glued on macromolecular material D06N 7/00; dyeing or printing D06P) **[5]**

Note

In this subclass, the following term is used with the meaning indicated:
– "decorating" means "local treatment" or "local effects produced" as to change, e.g. optically, the appearance or the properties of textile materials. **[5]**

1/00 **Decorating textiles** (partial dyeing D06B 11/00; reserving parts of the material before dyeing or printing textiles D06P 5/12)

1/02 **.** Producing patterns by locally destroying or modifying the fibres of a web by chemical actions, e.g. making translucent

1/04 **.** by metallising (transfer of metal particles D06Q 1/12) **[5]**

1/06 **.** by local treatment of pile fabrics with chemical means **[5]**

1/08 **.** by fixation of mechanical effects, e.g. calendering, embossing or Chintz effects, using chemical means **[5]**

1/10 **.** by treatment with, or fixation of, a particulate material, e.g. mica, glass beads (by metallising D06Q 1/04; by transferring D06Q 1/12) **[5]**

1/12 **.** by transferring a chemical agent or a metallic or non-metallic material in particulate or other form, from a solid temporary carrier to the textile **[5]**

1/14 **. .** by transferring fibres, or adhesives for fibres, to the textile **[5]**

D07 ROPES; CABLES OTHER THAN ELECTRIC

D07B **ROPES OR CABLES IN GENERAL** (joining ropes or cables to one another or to other objects B65H 69/00, F16G 11/00; mechanical finishing or dressing of ropes D02J; decorative ropes or cords D04D; suspension cables for bridges E01D 19/16; specially adapted for driving, or for being driven by, pulleys or other gearing elements F16G 9/00; electric cables or joints insofar as electrical aspects are essential H01B, H01R)

Subclass index

1/00 Constructional features of ropes or cables

1/02 . Ropes built-up from fibrous or filamentary material, e.g. of vegetable origin, of animal origin, regenerated cellulose, plastics

1/04 . . with a core of fibres or filaments arranged parallel to the centre line

1/06 . Ropes or cables built-up from metal wires, e.g. of section wires around a hemp core

1/08 . . the layers of which are formed of profiled interlocking wires, i.e. the strands forming concentric layers

1/10 . . . with a core of wires arranged parallel to the centre line

1/12 . Ropes or cables with a hollow core

1/14 . Ropes or cables with incorporated auxiliary elements, e.g. for making, extending throughout the length of the rope or cable

1/16 . Ropes or cables with an enveloping sheathing or inlays of rubber or plastics (D07B 1/04, D07B 1/10 take precedence)

1/18 . Grommets

1/20 . Buoyant ropes, e.g. with air-filled cellular cores; Accessories therefor

1/22 . Flat or flat-sided ropes; Sets of ropes consisting of a series of parallel ropes

Manufacture of ropes or cables

3/00 General-purpose machines or apparatus for producing twisted ropes or cables from component strands of the same or different material

3/02 . in which the supply reels rotate about the axis of the rope or cable

3/04 . . and are arranged in tandem along the axis of the machine

3/06 . . and are spaced radially from the axis of the machine

3/08 . in which the take-up reel rotates about the axis of the rope or cable and the supply reels are fixed in position

3/10 . . with provision for imparting more than one complete twist to the ropes or cables for each revolution of the take-up reel

3/12 . operating with rotating loops of filaments

3/14 . hand-operated

5/00 Making ropes or cables from special materials or of particular form

5/02 . from straw or like vegetable material

5/04 . Rope bands

5/06 . from natural or artificial staple fibres

5/08 . . agglutinated by adhesives

5/10 . from strands of non-circular cross-section

5/12 . of low twist or low tension by processes comprising setting or straightening treatments

7/00 Details of, or auxiliary devices incorporated in, rope- or cable-making machines; Auxiliary apparatus associated with such machines

7/02 . Machine details; Auxiliary devices

7/04 . . Devices for imparting reverse rotation to bobbin- or reel cages

7/06 . . Bearing supports or brakes for supply bobbins or reels

7/08 . . Alarms or stop motions responsive to exhaustion or breakage of filamentary material fed from supply reels or bobbins

7/10 . . Devices for taking-up or winding the finished rope or cable

7/12 . . for softening, lubricating, or impregnating ropes, cables, or component strands thereof

7/14 . . for coating or wrapping ropes, cables, or component strands thereof (applying liquids or other fluent materials to surfaces in general B05; wrapping elongated cores in general B65H 81/06)

7/16 . Auxiliary apparatus

7/18 . . for spreading or untwisting ropes or cables into constituent parts for treatment or splicing purposes

9/00 Binding or sealing ends, e.g. to prevent unravelling

PAPER

D21 PAPER-MAKING; PRODUCTION OF CELLULOSE

D21B FIBROUS RAW MATERIALS OR THEIR MECHANICAL TREATMENT

1/00 **Fibrous raw materials or their mechanical treatment** (beaters D21D 1/00)

1/02 . Pretreatment of the raw materials by physical or chemical means (removal of bark B27L)

1/04 . by dividing raw materials into small particles, e.g. fibres (breaking-up or cutting wood or the like by dry methods B27L; disintegrating peat C10F 7/02; obtaining fibres mechanically for spinning from rags, peat, or the like D01B)

1/06 . . by dry methods

1/08 . . . the raw material being waste paper (chemical part D21C 5/02); the raw material being rags

1/10 . . . . by cutting actions

1/12 . . by wet methods, by the use of steam

1/14 . . . Disintegrating in mills (in general B02C)

1/16 . . . . in the presence of chemical agents

1/18 . . . . in magazine-type machines

1/20 . . . . . with chain feed

1/22 . . . . . with screw feed

1/24 . . . . . of the pocket type

1/26 . . . . Driving or feeding arrangements

1/28 . . . . Dressers for mill stones, combined with the mill

1/30 . . . Defibrating by other means

1/32 . . . . of waste paper

1/34 . . . . Kneading or mixing; Pulpers

1/36 . . . . Explosive disintegration by sudden pressure reduction

1/38 . Conserving the finely-divided cellulosic material

D21C PRODUCTION OF CELLULOSE BY REMOVING NON-CELLULOSE SUBSTANCES FROM CELLULOSE-CONTAINING MATERIALS; REGENERATION OF PULPING LIQUORS; APPARATUS THEREFOR

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

1/00 **Pretreatment of the finely-divided materials before digesting** (of waste paper D21C 5/02)

1/02 . with water or steam

1/04 . with acid reacting compounds

1/06 . with alkaline reacting compounds

1/08 . with oxygen-generating compounds

1/10 . Physical methods for facilitating impregnation

3/00 **Pulping cellulose-containing materials** (digesters D21C 7/00)

3/02 . with inorganic bases or alkaline reacting compounds, e.g. sulfate processes

3/04 . with acids, acid salts, or acid anhydrides

3/06 . . sulfur dioxide; sulfurous acid; bisulfites

3/08 . . . calcium bisulfite

3/10 . . . magnesium bisulfite

3/12 . . . sodium bisulfite

3/14 . . . ammonium bisulfite

3/16 . . nitrogen oxides; nitric acid

3/18 . with halogens or halogen-generating compounds (bleaching cellulose pulp D21C 9/12)

3/20 . with organic solvents

3/22 . Other features of pulping processes

3/24 . . Continuous processes

3/26 . . Multi-stage processes

3/28 . . Prevention of foam

5/00 **Other processes for obtaining cellulose, e.g. cooking cotton linters** (obtaining fibres for spinning D01C)

5/02 . Working-up waste paper (mechanical part D21B 1/08, D21B 1/32)

7/00 **Digesters**

7/02 . Rotary digesters

7/04 . Linings

7/06 . Feeding devices

7/08 . Discharge devices

7/10 . Heating devices
7/12 . Devices for regulating or controlling
7/14 . Means for circulating the lye
7/16 . Safety devices

9/00 After-treatment of cellulose pulp, e.g. of wood pulp, or cotton linters
9/02 . Washing
9/04 . . in diffusers
9/06 . . in filters
9/08 . Removal of fats, resins, pitch, or waxes
9/10 . Bleaching
9/12 . . with halogens or halogen-containing compounds (D21C 9/16 takes precedence) **[4]**
9/14 . . . with ClO_2 or chlorites
9/147 . . with oxygen or its allotropic modifications (D21C 9/16 takes precedence) **[4]**
9/153 . . . with ozone **[4]**
9/16 . . with per compounds
9/18 . De-watering (de-watering in general F26B)

11/00 Regeneration of pulp liquors
11/02 . of sulfite lye
11/04 . of alkali lye
11/06 . Treatment of pulp gases; Recovery of the heat content of the gases
11/08 . . Deodorisation
11/10 . Concentrating spent liquor by evaporation (evaporators B01D)
11/12 . Combustion of pulp liquors
11/14 . . Wet combustion

D21D TREATMENT OF THE MATERIALS BEFORE PASSING TO THE PAPER-MAKING MACHINE [5]

1/00 Methods of beating or refining; **Beaters of the Hollander type** (knotter screens D21F)
1/02 . Methods of beating; Beaters of the Hollander type
1/04 . . Beater rolls or bars
1/06 . . Bed plates
1/08 . . Beaters with means for driving the pulp quickly
1/10 . . Beaters with means for regulating the pressure between the beater roll and the bed plate
1/12 . . Beaters with means for continuous pulp discharge
1/14 . . Beaters with one beater roll and with vertical stuff circulation canal
1/16 . . Beaters with means for returning the pulp over the head of the beater roll
1/18 . . Beaters with two or more beater rolls
1/20 . Methods of refining
1/22 . . Jordans
1/24 . . . Jordan rolls
1/26 . . . Jordan bed plates
1/28 . . Ball or rod mills
1/30 . . Disc mills
1/32 . . Hammer mills
1/34 . . Other mills or refiners
1/36 . . . with vertical shaft
1/38 . . . with horizontal shaft
1/40 . . Washing the fibres

5/00 Purification of the pulp suspension by mechanical means; **Apparatus therefor** (centrifuges, cyclones B04)
5/02 . Straining or screening the pulp
5/04 . . Flat screens
5/06 . . Rotary screen-drums
5/08 . . . combined with a rocking movement
5/10 . . . . of the tank
5/12 . . . . of the screen
5/14 . . . . of the tank and the screen
5/16 . . Cylinders and plates for screens
5/18 . with the aid of centrifugal force
5/20 . . in apparatus with a horizontal axis
5/22 . . in apparatus with a vertical axis
5/24 . . in cyclones
5/26 . De-aeration of paper stock
5/28 . Tanks for storing or agitating pulp

99/00 Subject matter not provided for in other groups of this subclass [8]

D21F PAPER-MAKING MACHINES; METHODS OF PRODUCING PAPER THEREON

Subclass index

1/00 Wet end of machines for making continuous webs of paper
1/02 . Head boxes of Fourdrinier machines
1/04 . Head boxes of cylinder machines
1/06 . Regulating pulp flow
1/08 . Regulating consistency
1/10 . Wire-cloths
1/12 . . Seams thereof

1/14 . . . welded
1/16 . . . sewn
1/18 . Shaking-apparatus for wire-cloths and associated parts
1/20 . . in Fourdrinier machines
1/22 . . in cylinder machines
1/24 . Tilting, raising, or lowering mechanisms for wire-cloths
1/26 . . in Fourdrinier machines
1/28 . . in cylinder machines
1/30 . Protecting wire-cloths from mechanical damage
1/32 . Washing wire-cloths or felts
1/34 . Construction or arrangement of spraying pipes
1/36 . Guiding mechanisms
1/38 . . Pads
1/40 . . Rolls
1/42 . . Jets
1/44 . Watermarking devices
1/46 . . Dandy rolls
1/48 . Suction apparatus (suction rolls D21F 3/10)
1/50 . . Suction boxes with rolls
1/52 . . Suction boxes without rolls
1/54 . Skimming devices, e.g. froth ledges
1/56 . Deckle frame arrangements
1/58 . Deckle straps
1/60 . Cylinder moulds
1/62 . Sand traps
1/64 . Magnetic separators
1/66 . Pulp catching, de-watering, or recovering; Re-use of pulp-water
1/68 . . using hydrocyclones
1/70 . . by flotation
1/72 . . using funnels
1/74 . . using cylinders
1/76 . . . with suction
1/78 . . . with pressure
1/80 . . using endless screening belts
1/82 . . adding fibre agglomeration compositions

2/00 Transferring continuous webs from wet ends to press sections

3/00 Press section of machines for making continuous webs of paper

3/02 . Wet presses
3/04 . . Arrangements thereof
3/06 . . Means for regulating the pressure
3/08 . . Pressure rolls
3/10 . . Suction rolls, e.g. couch rolls

5/00 Dryer section of machines for making continuous webs of paper

5/02 . Drying on cylinders
5/04 . . on two or more drying cylinders
5/06 . . Regulating temperature
5/08 . . Arrangement of steam points in the cylinders
5/10 . . Removing condensate from the interior of the cylinders
5/12 . Festoon drying
5/14 . Drying webs by applying vacuum
5/16 . Drying webs by electrical heating
5/18 . Drying webs by hot air
5/20 . Waste heat recovery

7/00 Other details of machines for making continuous webs of paper

7/02 . Mechanical driving arrangements
7/04 . Paper-break control devices
7/06 . Indicating or regulating the thickness of the layer; Signal devices
7/08 . Felts
7/10 . . Seams thereof
7/12 . . Drying

9/00 Complete machines for making continuous webs of paper

9/02 . of the Fourdrinier type
9/04 . of the cylinder type

11/00 Processes for making continuous lengths of paper, or of cardboard, or of wet web for fibreboard production, on paper-making machines

11/02 . of the Fourdrinier type
11/04 . . paper or board consisting of two or more layers
11/06 . of the cylinder type
11/08 . . paper or board consisting of two or more layers
11/10 . Making imitation mould-made paper
11/12 . Making corrugated paper or board
11/14 . Making cellulose wadding, filter- or blotting paper
11/16 . Making paper strips for spinning or twisting

13/00 Methods or apparatus for making discontinuous sheets of paper, pulpboard, or cardboard, or of wet web, for fibreboard production (making discontinuous sheets of board in moulds D21J; drying paper, pulpboard, or cardboard, in discontinuous-sheet form F26B)

13/02 . Making hand-made paper
13/04 . on cylinder board machines
13/06 . . Format rolls
13/08 . . . Automatic cut-off rolls
13/10 . using board presses
13/12 . . Platen presses

D21G CALENDERS; ACCESSORIES FOR PAPER-MAKING MACHINES (winders or rewinders for finished products, means for adjustment of wrinkles or lateral extensions B65H)

1/00 Calenders (if restricted to the treatment of particular materials, see the relevant place, e.g. B29C 43/24, D06); **Smoothing apparatus**

1/02 . Rolls; Their bearings (in general F16C 13/00)

3/00 Doctors

3/02 . for calenders
3/04 . for drying cylinders

5/00 Safety devices

7/00 Damping devices

9/00 Other accessories for paper-making machines

D21H PULP COMPOSITIONS; PREPARATION THEREOF NOT COVERED BY SUBCLASSES D21C, D21D; IMPREGNATING OR COATING OF PAPER; TREATMENT OF FINISHED PAPER NOT COVERED BY CLASS B31 OR SUBCLASS D21G; PAPER NOT OTHERWISE PROVIDED FOR [5]

(1) This subclass covers also pulp compositions for the preparation of fibreboard or other fibrous articles by wet processes. **[5]**

(2) In this subclass, the following terms are used with the meaning indicated:
- "pulp" means a dispersion comprising paper-making fibres and optional additives, which is to be processed, and covers the term "stock"; it also means dry paper-making fibres which are to be made into paper by either wet or dry processes; **[5]**
- "paper" means paper, cardboard or wet-laid non-woven fabrics.

(3) If a pulp composition or a paper, or a constituent thereof, is characterised by more than one feature provided for in this subclass, for example, by both the fibrous material and a coating or by both a colorant and a water-repelling agent, classification is made in all places providing for these features. **[8]**

(4) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

Note

In groups D21H 11/00 to D21H 15/00, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

11/00 Pulp or paper, comprising cellulose or lignocellulose fibres of natural origin only [5]

11/02 . Chemical or chemomechanical pulp **[5]**
11/04 . . Kraft or sulfate pulp **[5]**
11/06 . . Sulfite or bisulfite pulp **[5]**
11/08 . Mechanical or thermomechanical pulp **[5]**
11/10 . Mixtures of chemical and mechanical pulp **[5]**
11/12 . Pulp from non-woody plants or crops, e.g. cotton, flax, straw, bagasse **[5]**
11/14 . Secondary fibres (working-up waste paper D21C 5/02) **[5]**
11/16 . modified by a particular after-treatment **[5]**
11/18 . . Highly hydrated, swollen or fibrillatable fibres **[5]**
11/20 . . Chemically or biochemically modified fibres **[5]**
11/22 . . . cationised **[5]**

13/00 Pulp or paper, comprising synthetic cellulose or non-cellulose fibres or web-forming material (chemical features in the manufacture of artificial fibres D01F) **[5]**

13/02 . Synthetic cellulose fibres **[5]**
13/04 . . Cellulose ethers **[5]**
13/06 . . Cellulose esters **[5]**
13/08 . . from regenerated cellulose **[5]**
13/10 . Organic non-cellulose fibres **[5]**
13/12 . . from macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
13/14 . . . Polyalkenes, e.g. polystyrene **[5]**
13/16 . . . Polyalkenylalcohols; Polyalkenylethers; Polyalkenylesters **[5]**
13/18 . . . Polymers of unsaturated acids or derivatives thereof, e.g. polyacrylonitriles **[5]**
13/20 . . from macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
13/22 . . . Condensation polymers of aldehydes or ketones **[5]**
13/24 . . . Polyesters **[5]**
13/26 . . . Polyamides; Polyimides **[5]**
13/28 . . from natural polymers **[5]**
13/30 . . . Non-cellulose polysaccharides **[5]**
13/32 . . . . Alginate fibres **[5]**
13/34 . . . Protein fibres **[5]**
13/36 . Inorganic fibres or flakes **[5]**
13/38 . . siliceous **[5]**
13/40 . . . vitreous, e.g. mineral wool, glass fibres **[5]**
13/42 . . . Asbestos **[5]**
13/44 . . . Flakes, e.g. mica, vermiculite **[5]**
13/46 . . Non-siliceous fibres, e.g. from metal oxides **[5]**
13/48 . . . Metal or metallised fibres **[5]**
13/50 . . . Carbon fibres **[5]**

15/00 Pulp or paper, comprising fibres or web-forming material characterised by features other than their chemical constitution [5]

15/02 . characterised by configuration **[5]**
15/04 . . crimped, kinked, curled or twisted fibres **[5]**
15/06 . . Long fibres, i.e. fibres exceeding the upper length limit of conventional paper-making fibres; Filaments **[5]**
15/08 . . Flakes (D21H 13/44 takes precedence) **[5]**
15/10 . . Composite fibres **[5]**
15/12 . . . partly organic, partly inorganic **[5]**

17/00 Non-fibrous material added to the pulp, characterised by its constitution; Paper-impregnating material characterised by its constitution [5]

(1) In groups D21H 17/01 to D21H 17/63, in the absence of an indication to the contrary, a material is classified in the last appropriate place. **[8]**

(2) A mixture of two or more materials is classified in the last appropriate place in groups D21H 17/01 to D21H 17/63 that provides for at least one of these materials. **[8]**

(3) Any part of a mixture which is not identified by the classification according to note (2), and which itself is determined to be novel and non-obvious, must also be classified in the last appropriate place in groups D21H 17/01 to D21H 17/63. The part can be either a single material or a mixture in itself. **[8]**

(4) A part of a mixture which is not identified by the classification according to note (2) or (3), and which is considered to represent information of interest for search, may also be classified in the last appropriate place in groups D21H 17/01 to D21H 17/63. This can for example be the case when it is considered of interest to enable searching of mixtures using a combination of classification symbols. Such non-obligatory classification should be given as "additional information". **[8]**

17/01 . Waste products, e.g. sludge **[5]**
17/02 . Material of vegetable origin (proteins D21H 17/22; lignins D21H 17/23; polysaccharides D21H 17/24; rosin D21H 17/62) **[5]**
17/03 . Non-macromolecular organic compounds **[5]**
17/04 . . Hydrocarbons **[5]**
17/05 . . containing elements other than carbon and hydrogen only **[5]**
17/06 . . . Alcohols; Phenols; Ethers; Aldehydes; Ketones; Acetals; Ketals **[5]**
17/07 . . . Nitrogen-containing compounds **[5]**
17/08 . . . . Isocyanates **[5]**
17/09 . . . Sulfur-containing compounds **[5]**
17/10 . . . Phosphorus-containing compounds **[5]**
17/11 . . . Halides **[5]**
17/12 . . . Organo-metallic compounds **[5]**
17/13 . . . Silicon-containing compounds **[5]**
17/14 . . . Carboxylic acids; Derivatives thereof **[5]**
17/15 . . . . Polycarboxylic acids, e.g. maleic acid **[5]**
17/16 . . . . . Addition products thereof with hydrocarbons **[5]**
17/17 . . . Ketenes, e.g. ketene dimers **[5]**
17/18 . . . forming new compounds in situ, e.g. within the pulp or paper, by chemical reaction with itself, or other added substances **[5]**
17/19 . . . . by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
17/20 . Macromolecular organic compounds **[5]**
17/21 . . of natural origin; Derivatives thereof **[5]**
17/22 . . . Proteins **[5]**
17/23 . . . Lignins **[5]**
17/24 . . . Polysaccharides **[5]**
17/25 . . . . Cellulose **[5]**
17/26 . . . . . Ethers thereof **[5]**
17/27 . . . . . Esters thereof **[5]**
17/28 . . . . Starch **[5]**
17/29 . . . . . cationic **[5]**
17/30 . . . . Alginic acid or alginates **[5]**
17/31 . . . . Gums **[5]**
17/32 . . . . . Guar gum **[5]**
17/33 . . Synthetic macromolecular compounds **[5]**
17/34 . . . obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
17/35 . . . . Polyalkenes, e.g. polystyrene **[5]**
17/36 . . . . Polyalkenylalcohols; Polyalkenylethers; Polyalkenylesters **[5]**
17/37 . . . . Polymers of unsaturated acids or derivatives thereof, e.g. polyacrylates **[5]**
17/38 . . . . containing crosslinkable groups **[5]**
17/39 . . . . . forming ether crosslinkages, e.g. alkylol groups **[5]**
17/40 . . . . . unsaturated **[5]**
17/41 . . . . containing ionic groups **[5]**
17/42 . . . . . anionic **[5]**
17/43 . . . . . Carboxyl groups or derivatives thereof **[5]**
17/44 . . . . . cationic **[5]**
17/45 . . . . . Nitrogen-containing groups **[5]**
17/46 . . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**
17/47 . . . . Condensation polymers of aldehydes or ketones **[5]**
17/48 . . . . . with phenols **[5]**
17/49 . . . . . with compounds containing hydrogen bound to nitrogen **[5]**
17/50 . . . . . Acyclic compounds **[5]**
17/51 . . . . . Triazines, e.g. melamine **[5]**
17/52 . . . . Epoxy resins **[5]**
17/53 . . . . Polyethers; Polyesters **[5]**
17/54 . . . . obtained by reactions forming in the main chain of the macromolecule a linkage containing nitrogen **[5]**
17/55 . . . . . Polyamides; Polyaminoamides; Polyester-amides **[5]**
17/56 . . . . . Polyamines; Polyimines; Polyester-imides **[5]**
17/57 . . . . . Polyureas; Polyurethanes **[5]**
17/58 . . . . obtained by reactions forming in the main chain of the macromolecule a linkage containing sulfur **[5]**
17/59 . . . . obtained by reactions forming in the main chain of the macromolecule a linkage containing silicon **[5]**
17/60 . Waxes **[5]**
17/61 . Bitumen **[5]**
17/62 . Rosin; Derivatives thereof **[5]**
17/63 . Inorganic compounds **[5]**
17/64 . . Alkaline compounds **[5]**
17/65 . . Acid compounds **[5]**
17/66 . . Salts, e.g. alums **[5]**
17/67 . . Water-insoluble compounds, e.g. fillers, pigments **[5]**
17/68 . . . siliceous, e.g. clays **[5]**
17/69 . . . modified, e.g. by association with other compositions prior to incorporation in the pulp or paper **[5]**
17/70 . . forming new compounds in situ, e.g. within the pulp or paper, by chemical reaction with other substances added separately **[5]**

19/00 **Coated paper** (coated fibreboard D21J 1/08); **Coating material** (recording sheets characterised by the coating used to improve ink, dye or pigment receptivity B41M 5/50) **[5]**

19/02 . Metal coatings (D21H 19/66 takes precedence) **[5]**

19/04 . . applied as foil **[5]**

19/06 . . applied as liquid or powder **[5]**

19/08 . . applied as vapour, e.g. in vacuum **[5]**

19/10 . Coatings without pigments (D21H 19/66 takes precedence) **[5]**

19/12 . . applied as a solution using water as the only solvent, e.g. in the presence of acid or alkaline compounds **[5]**

19/14 . . applied in a form other than the aqueous solution defined in group D21H 19/12 **[5]**

19/16 . . . comprising curable or polymerisable compounds (D21H 19/24 takes precedence) **[5]**

19/18 . . . comprising waxes **[5]**

19/20 . . . comprising macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

19/22 . . . . Polyalkenes, e.g. polystyrene **[5]**

19/24 . . . comprising macromolecular compounds obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

19/26 . . . . Aminoplasts **[5]**

19/28 . . . . Polyesters **[5]**

19/30 . . . . Polyamides; Polyimides **[5]**

19/32 . . . . obtained by reactions forming a linkage containing silicon in the main chain of the macromolecule **[5]**

19/34 . . . comprising cellulose or derivatives thereof **[5]**

19/36 . Coatings with pigments (D21H 19/66 takes precedence; metal powder D21H 19/06) **[5]**

19/38 . . characterised by the pigments **[5]**

19/40 . . . siliceous, e.g. clays **[5]**

19/42 . . . at least partly organic **[5]**

19/44 . . characterised by the other ingredients, e.g. the binder or dispersing agent **[5]**

19/46 . . . Non-macromolecular organic compounds **[5]**

19/48 . . . . Diolefins, e.g. butadiene; Aromatic vinyl monomers, e.g. styrene; Polymerisable unsaturated acids or derivatives thereof, e.g. acrylic acid **[5]**

19/50 . . . Proteins **[5]**

19/52 . . . Cellulose; Derivatives thereof **[5]**

19/54 . . . Starch **[5]**

19/56 . . . Macromolecular organic compounds or oligomers thereof obtained by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

19/58 . . . . Polymers or oligomers of diolefins, aromatic vinyl monomers or unsaturated acids or derivatives thereof **[5]**

19/60 . . . . Polyalkenylalcohols; Polyalkenylethers; Polyalkenylesters **[5]**

19/62 . . . Macromolecular organic compounds or oligomers thereof obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[5]**

19/64 . . . Inorganic compounds **[5]**

19/66 . Coatings characterised by a special visual effect, e.g. patterned, textured (marbled paper D21H 27/04) **[5]**

19/68 . . uneven, broken, discontinuous **[5]**

19/70 . . with internal voids, e.g. bubble coatings **[5]**

19/72 . Coated paper characterised by the paper substrate **[5]**

19/74 . . the substrate having an uneven surface, e.g. crêped or corrugated paper **[5]**

19/76 . . the substrate having specific absorbent properties **[5]**

19/78 . . . being substantially impervious to the coating **[5]**

19/80 . Paper comprising more than one coating (D21H 19/02 takes precedence) **[5]**

19/82 . . superposed **[5]**

19/84 . . on both sides of the substrate **[5]**

21/00 **Non-fibrous material added to the pulp, characterised by its function, form or properties**; **Paper impregnating or coating material, characterised by its function, form or properties [5]**

21/02 . Agents for preventing deposition on the paper mill equipment, e.g. pitch or slime control (removal of fats, resins, pitch, or waxes D21C 9/08) **[5]**

21/04 . . Slime-control agents **[5]**

21/06 . Paper forming aids **[5]**

21/08 . . Dispersing agents for fibres **[5]**

21/10 . . Retention agents or drainage improvers **[5]**

21/12 . . Defoamers **[5]**

21/14 . characterised by function or properties in or on the paper (D21H 19/66, D21H 27/02 take precedence) **[5]**

21/16 . . Sizing or water-repelling agents **[5]**

21/18 . . Reinforcing agents **[5]**

21/20 . . . Wet strength agents **[5]**

21/22 . . Agents rendering paper porous, absorbent or bulky **[5]**

21/24 . . . Surfactants **[5]**

21/26 . . Agents rendering paper transparent or translucent **[5]**

21/28 . . Colorants **[5]**

21/30 . . Luminescent or fluorescent substances, e.g. for optical bleaching (D21H 21/40 takes precedence) **[5]**

21/32 . . Bleaching agents (bleaching cellulose pulp D21C 9/10) **[5]**

21/34 . . Ignifugeants **[5]**

21/36 . . Biocidal agents, e.g. fungicidal, bactericidal, insecticidal agents **[5]**

21/38 . . Corrosion-inhibiting agents or anti-oxidants **[5]**

21/40 . . Agents facilitating proof of genuineness or preventing fraudulent alteration, e.g. for security paper (watermarking B41M 3/10, D21F 1/44; security printing B41M 3/14; securities or banknotes characterised by colour effects B44F 1/12; testing paper currency or valuable papers for genuineness G07D 7/00) **[5]**

21/42 . . . Ribbons or strips (filaments D21H 15/06) **[5]**

21/44 . . . Latent security elements, i.e. detectable or becoming apparent only by use of special verification or tampering devices or methods **[5]**

21/46 . . . . Elements suited for chemical verification or impeding chemical tampering, e.g. by use of eradicators **[5]**

21/48 . . . . Elements suited for physical verification, e.g. by irradiation **[5]**

21/50 . characterised by form (D21H 19/66, D21H 21/42, D21H 27/02 take precedence) **[5]**

21/52 . . Additives of definite length or shape **[5]**

21/54 . . . being spherical, e.g. microcapsules, beads **[5]**
21/56 . . Foam **[5]**

23/00 Processes or apparatus for adding material to the pulp or to the paper (applying liquids or other fluent material to surfaces, in general B05; processes for making continuous lengths of paper D21F 11/00) **[5]**
23/02 . characterised by the manner in which substances are added **[5]**
23/04 . . Addition to the pulp; After-treatment of added substances in the pulp **[5]**
23/06 . . . Controlling the addition **[5]**
23/08 . . . . by measuring pulp properties, e.g. zeta potential, pH **[5]**
23/10 . . . . . at least two kinds of compounds being added **[5]**
23/12 . . . . by measuring properties of the formed web **[5]**
23/14 . . . . by selecting point of addition or time of contact between components **[5]**
23/16 . . . . . Addition before or during pulp beating or refining (disintegrating fibrous raw materials in mills in the presence of chemical agents D21B 1/16; methods of beating D21D 1/02; methods of refining D21D 1/20) **[5]**
23/18 . . . . . Addition at a location where shear forces are avoided before sheet-forming, e.g. after pulp beating or refining **[5]**
23/20 . . . Apparatus therefor **[5]**
23/22 . . Addition to the formed paper **[5]**
23/24 . . . during paper manufacture **[5]**

Note

Processes or apparatus used for addition to the paper during its manufacture, i.e. on-machine, are classified in group D21H 23/24 if they are specially influenced by, or specially adapted to, the paper-making process. **[5]**

23/26 . . . . by selecting point of addition or moisture content of the paper **[5]**
23/28 . . . . . Addition before the dryer section, e.g. at the wet end or press section **[5]**
23/30 . . . Pretreatment of the paper (D21H 23/70, D21H 23/76 take precedence) **[5]**
23/32 . . . by contacting paper with an excess of material, e.g. from a reservoir or in a manner necessitating removal of applied excess material from the paper (D21H 23/66 takes precedence; removing excess material D21H 25/08) **[5]**
23/34 . . . . Knife or blade type coaters **[5]**
23/36 . . . . . Knife or blade forming part of the fluid reservoir, e.g. puddle-type trailing blade **[5]**
23/38 . . . . . the fluid material being applied with a special device, e.g. with a roll in a flooded-nip inverted blade coater **[5]**
23/40 . . . . only one side of the paper being in contact with the material (D21H 23/34 takes precedence) **[5]**
23/42 . . . . Paper being at least partly surrounded by the material on both sides (D21H 23/34 takes precedence) **[5]**
23/44 . . . . . Treatment with a gas or vapour **[5]**
23/46 . . . Pouring or allowing the fluid to flow in a continuous stream on to the surface, the entire stream being carried away by the paper (D21H 23/66 takes precedence) **[5]**
23/48 . . . . Curtain coaters **[5]**
23/50 . . . Spraying or projecting (D21H 23/44, D21H 23/66 take precedence) **[5]**
23/52 . . . by contacting paper with a device carrying the material (D21H 23/32, D21H 23/46, D21H 23/66 take precedence) **[5]**
23/54 . . . . Rubbing devices, e.g. brush, pad, felt **[5]**
23/56 . . . . Rolls (D21H 23/38 takes precedence) **[5]**
23/58 . . . . . Details thereof, e.g. surface characteristics, peripheral speed **[5]**
23/60 . . . . . the material on the applicator roll being subjected to a particular treatment before applying to the paper (D21H 23/64 takes precedence) **[5]**
23/62 . . . . . Reverse roll coating, i.e. applicator roll surface moving in direction opposite to that of the paper **[5]**
23/64 . . . . the material being non-fluent at the moment of transfer, e.g. in form of preformed, at least partially hardened coating **[5]**
23/66 . . . Treating discontinuous paper, e.g. sheets, blanks, rolls **[5]**
23/68 . . . . whereby the paper moves continuously **[5]**
23/70 . . . Multistep processes; Apparatus for adding one or several substances in portions or in various ways to the paper, not covered by another single group of this main group **[5]**
23/72 . . . . Plural serial stages only **[5]**
23/74 . . . . Apparatus permitting switching from one technique to another **[5]**
23/76 . characterised by choice of auxiliary compounds which are added separately from at least one other compound, e.g. to improve the incorporation of the latter or to obtain an enhanced combined effect (D21H 17/18, D21H 17/70, D21H 23/10 take precedence) **[5]**
23/78 . Controlling or regulating not limited to any particular process or apparatus **[5]**

25/00 After-treatment of paper not provided for in groups D21H 17/00 to D21H 23/00 [5]
25/02 . Chemical or biochemical treatment (D21H 25/18 takes precedence) **[5]**
25/04 . Physical treatment, e.g. heating, irradiating (D21H 25/18 takes precedence; dryer section of machines for making continuous webs of paper D21F 5/00) **[5]**
25/06 . . of impregnated or coated paper (D21H 25/08 takes precedence) **[5]**
25/08 . Rearranging applied substances, e.g. metering, smoothing; Removing excess material **[5]**
25/10 . . with blades **[5]**
25/12 . . with an essentially cylindrical body, e.g. roll or rod **[5]**
25/14 . . . the body being a casting drum **[5]**
25/16 . . with a blast of vapour or gas, e.g. air knife **[5]**
25/18 . of old paper as in books, documents, e.g. restoring **[5]**

27/00 Special paper not otherwise provided for, e.g. made by multi-step processes [5]

Note

This group provides for the classification of paper with special properties or applications which are only partially or not at all provided for elsewhere in the classification. Whenever possible, however, these papers are classified according to the criteria used in the other groups of this subclass. **[5]**

27/02 . Patterned paper (patterned coatings D21H 19/66; embossing B31F 1/07; prepared on the paper-making machines D21F 11/00) **[5]**
27/04 . . marbled **[5]**
27/06 . Vegetable or imitation parchment; Glassine paper **[5]**
27/08 . Filter paper (self-supporting filtering material B01D 39/14; making on paper-making machines D21F 11/14) **[5]**
27/10 . Packing paper (packaging materials of special type or form B65D 65/38) **[5]**
27/12 . Electrically-insulating paper **[5]**
27/14 . Paper having stable form or dimension; Curl-resistant paper (anticoil photographic support G03C 1/81) **[5]**
27/16 . Pure paper, i.e. paper lacking or having low content of contaminants (after-treatment of cellulose pulp D21C 9/00) **[5]**
27/18 . Paper- or board-based structures for surface covering **[5]**
27/20 . . Flexible structures being applied by the user, e.g. wallpaper (printed wallpapers B41M 3/18; paperhanging B44C 7/00; pregummed wallpaper C09J 7/04) **[5]**
27/22 . . Structures being applied on the surface by special manufacturing processes, e.g. in presses **[5]**
27/24 . . . characterised by the surface to be covered being phenolic-resin paper laminates, vulcan fibre or similar cellulosic fibreboards **[5]**
27/26 . . . characterised by the overlay sheet or the top layers of the structures (decorative panels B44C 5/04; wood grain effects B44F 9/02) **[5]**
27/28 . . . . treated to obtain specific resistance properties, e.g. against wear or weather (water-repelling agents D21H 21/16) **[5]**
27/30 . Multi-ply (for surface covering D21H 27/18; making on paper-making machines D21F 9/00, D21F 11/00) **[5]**

Note

Layered products classified in this group are also classified in subclass B32B. **[5]**

27/32 . . with materials applied between the sheets (attaching together paper or cardboard sheets B31F 5/00; adhesives C09J) **[5]**
27/34 . . . Continuous materials, e.g. filaments, sheets, nets **[5]**
27/36 . . . . Films made from synthetic macromolecular compounds **[5]**
27/38 . . at least one of the sheets having a fibrous composition differing from that of other sheets **[5]**
27/40 . . at least one of the sheets being non-planar, e.g. crêped (creping or corrugating paper B31F) **[5]**
27/42 . . comprising dry-laid paper **[5]**

D21J FIBREBOARD; **MANUFACTURE OF ARTICLES FROM CELLULOSIC FIBROUS SUSPENSIONS OR FROM PAPIER-MÂCHÉ** (manufacture of articles by dry processes B27N)

1/00 Fibreboard (preparation of pulp compositions or addition of chemical agents D21B, D21C, D21H; formation of the wet web D21F)
1/02 . Cutting, e.g. using wet saws
1/04 . Pressing
1/06 . Drying
1/08 . Impregnated or coated fibreboard
1/10 . After-treatment
1/12 . . Hardening
1/14 . . Conditioning
1/16 . Special fibreboard
1/18 . . Hardboard
1/20 . . Insulating board

3/00 Manufacture of articles by pressing wet fibre pulp, or papier-mâché, between moulds
3/02 . of rings
3/04 . of tubes
3/06 . of stoppers
3/08 . of bobbins
3/10 . of hollow bodies
3/12 . of sheets; of diaphragms

5/00 Manufacture of hollow articles by transferring sheets, produced from fibres suspensions or papier-mâché by suction on wire-net moulds, to couch moulds

7/00 Manufacture of hollow articles from fibre suspensions or papier-mâché by deposition of fibres in or on a wire-net mould

D99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

D99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION E – FIXED CONSTRUCTIONS

BUILDING

E01 CONSTRUCTION OF ROADS, RAILWAYS, OR BRIDGES

E01B **PERMANENT WAY**; **PERMANENT-WAY TOOLS**; **MACHINES FOR MAKING RAILWAYS OF ALL KINDS** (derailing or rerailing blocks on track, track brakes or retarders B61K; removal of foreign matter from the permanent way, vegetation control, applying liquids E01H)

Subclass index

Structure of the permanent way for railways or tramways

1/00 **Ballastway**; **Other means for supporting the sleepers or the track**; **Drainage of the ballastway** (draining by trenches, culverts, or conduits E01F 5/00)

2/00 **General structure of permanent way** (railway networks B61B 1/00; foundations for pavings E01C 3/00; foundations in general E02D)

3/00 **Transverse or longitudinal sleepers** (for switches or crossings E01B 7/22); **Other means resting directly on the ballastway for supporting rails**

3/02 . made from wood (drying or impregnating B27K)

3/04 . . Means for preventing cleaving

3/06 . . . Anti-cracking dogs

3/08 . . . Straps or bands for hooping or encircling sleepers (apparatus for hooping wooden railway sleepers on the spot E01B 31/28)

3/10 . . Composite sleepers

3/12 . . Longitudinal sleepers; Longitudinal sleepers integral or combined with tie-rods; Combined longitudinal and transverse sleepers

3/14 . . Slabs; Blocks; Fastening tie-rods to them

3/16 . made from steel

3/18 . . Composite sleepers

3/20 . . Sleeper construction for special purposes, e.g. with openings for ballast working (sleepers for shiftable track for heavy loads E01B 23/12)

3/22 . . Longitudinal sleepers; Longitudinal sleepers integral or combined with tie-rods; Combined longitudinal and transverse sleepers

3/24 . . Slabs; Blocks; Pot sleepers; Fastening tie-rods to them

3/26 . . combined with inserts of wood, artificial stone, or other material

3/28 . made from concrete or from natural or artificial stone (manufacture B28)

3/30 . . Hollow sleepers

3/32 . . with armouring or reinforcement (hollow sleepers E01B 3/30)

3/34 . . . with pre-tensioned armouring or reinforcement (pre-tensioned armouring or reinforcing elements E04C 5/00)

3/36 . . Composite sleepers

3/38 . . Longitudinal sleepers; Longitudinal sleepers integral or combined with tie-rods; Combined longitudinal and transverse sleepers; Layers of concrete supporting both rails

3/40 . . Slabs; Blocks; Pot sleepers; Fastening tie-rods to them

3/42 . . combined with inserts of wood or other material

3/44 . made from other materials only if the material is essential

3/46 . made from different materials (E01B 3/26, E01B 3/42 take precedence)

3/48 . Distance keepers or tie-rods for sleepers

5/00 **Rails**; **Guard rails** (manufacture of rails B21B); **Distance-keeping means for them**

5/02 . Rails

5/04 . . Grooved rails

5/06 . . Reversible or invertible rails

5/08 . . Composite rails; Compound rails with dismountable or non-dismountable parts

5/10 . . . Composite grooved rails; Inserts for grooved rails

5/12 . . Rails with a foot serving as a sleeper

5/14 . . Rails for special parts of the track, e.g. for curves

5/16 . Distance keepers

5/18 . Guard rails; Connecting, fastening or adjusting means therefor

7/00 **Switches**; **Crossings** (operating mechanisms B61L)

7/02 . Tongues; Associated constructions

7/04 . . Constructions with tongues turning about a vertical pivot at the end

7/06 . . Constructions with flexible tongues or flexible fishplates

7/08 . . Other constructions of tongues, e.g. tilting about an axis parallel to the rail, movable tongue blocks or rails

7/10 . Frogs
7/12 . . Fixed frogs made of one part or composite
7/14 . . with movable parts
7/16 . . Jump-over frogs
7/18 . Combinations of switches and crossings
7/20 . Safety means for switches, e.g. switch point protectors, auxiliary or guiding rail members
7/22 . Special sleepers for switches or crossings; Fastening means therefor
7/24 . Heating of switches
7/26 . Lubricating of switches (lubricating of rails B61K 3/00)
7/28 . Crossings
7/30 . . Jump-over crossings

9/00 **Fastening rails on sleepers, or the like** (fastening rails to bridges E01D 19/12)
9/02 . Fastening rails, tie-plates, or chairs directly on sleepers or foundations; Means therefor
9/04 . . Fastening on wooden or concrete sleepers or on masonry without clamp members
9/06 . . . Railways spikes (nails in general F16B)
9/08 . . . . Elastic spikes
9/10 . . . Screws or bolts for sleepers (screws or bolts in general F16B)
9/12 . . . Retaining or locking devices for spikes or screws
9/14 . . . Plugs, sleeves, thread linings, or other inserts for holes in sleepers (inserting plugs or sleeves E01B 31/26)
9/16 . . . . for wooden sleepers
9/18 . . . . for concrete sleepers
9/20 . . . by keys
9/22 . . Fastening on steel sleepers without clamp members
9/24 . . . by keys
9/26 . . . Welded fastenings
9/28 . . Fastening on wooden or concrete sleepers or on masonry with clamp members
9/30 . . . by resilient steel clips
9/32 . . Fastening on steel sleepers with clamp members
9/34 . . . by resilient steel clips
9/36 . . Metal sole-plates for rails which rails are directly fastened to sleepers
9/38 . Indirect fastening of rails by using tie-plates or chairs; Fastening of rails on the tie-plates or in the chairs
9/40 . . Tie-plates for flat-bottom rails (manufacture thereof B21)
9/42 . . . of two or more parts
9/44 . . Fastening the rail on the tie-plate
9/46 . . . by clamps
9/48 . . . . by resilient steel clips
9/50 . . . by keys
9/52 . . . . by resilient keys
9/54 . . Rail chairs
9/56 . . . for rails with two or more treads
9/58 . . Fastening the rail in the chair
9/60 . Rail fastenings making use of clamps or braces supporting the side or head of the rail
9/62 . Rail fastenings incorporating resilient supports
9/64 . Rail fastenings gripping or encircling the sleeper
9/66 . Rail fastenings allowing the adjustment of the position of the rails, so far as not covered by the preceding groups
9/68 . Pads or the like, e.g. of wood, rubber, placed under the rail, tie-plate, or chair

11/00 **Rail joints** (electrical connection of rails B60M 5/00)
11/02 . Dismountable rail joints
11/04 . . Flat fishplates
11/06 . . . with keys or pins
11/08 . . Angle fishplates
11/10 . . Fishplates with parts supporting or surrounding the rail foot
11/12 . . Fishplates engaging only the rail foot
11/14 . . Rail foot flange clips in one piece
11/16 . . Fishplates for joining rails of different sections
11/18 . . Fishplates for temporarily repairing broken rails
11/20 . . with gap-bridging
11/22 . . . by parts of the rails
11/24 . . . . with oblique or overlapping rail ends
11/26 . . . . with interlocking rail ends
11/28 . . . by parts of the joining members
11/30 . . . . Fishplates with integral tread parts lying in the cross-section of the rail head
11/32 . . . by separate parts; Inserts bridging both rail heads
11/34 . . . . Auxiliary rail beside the gap
11/36 . . Fastening means for fishplates
11/38 . . . Locking arrangements for fastening means (locking means for nuts or bolts in general F16B)
11/40 . . Dismountable rail joints combined with welded parts
11/42 . Joint constructions for relatively movable rails, e.g. rails on turntables, traversers, or swing bridges
11/44 . Non-dismountable rail joints; Welded joints (welding methods B23K)
11/46 . . General methods for making gapless tracks
11/48 . . Joints made by flame welding
11/50 . . Joints made by electric welding
11/52 . . Joints made by alumino-thermal welding
11/54 . Electrically-insulating rail joints
11/56 . Special arrangements for supporting rail ends (foot supports E01B 11/08 to E01B 11/14)
11/58 . . Bridge plates
11/60 . . . with wedges
11/62 . . Bridge chairs (chairs E01B 9/54 to E01B 9/58)

13/00 **Arrangements preventing shifting of the track**
13/02 . Rail anchors

15/00 **Guards for preventing a person's foot being trapped in grooved rails**

17/00 **Cattle guards connected to the permanent way** (grids in general for preventing cattle from straying A01K 3/00)

19/00 **Protection of permanent way against development of dust or against the effect of wind, sun, frost, or corrosion**; **Means to reduce development of noise** (snow fences E01F 7/02; snow-ploughs E01H 8/02; watering E01H 11/00)

21/00 **Track superstructure specially adapted for tramways in paved streets** (paving E01C 9/04, E01C 9/06)
21/02 . Special supporting means; Draining of rails
21/04 . Special fastenings, joint constructions, or tie-rods

23/00 **Easily dismountable or movable tracks, e.g. temporary railways**; **Details specially adapted therefor**

23/02 . Tracks for light railways, e.g. for field, colliery, or mine use

23/04 . . Fastening or joining means

23/06 . . Switches (turntables B60S, B61J); Portable switches; Turnouts

23/08 . Temporary tracks for use while repairing tramways

23/10 . Shiftable tracks for heavy loads, e.g. carrying excavators

23/12 . . Sleepers

23/14 . . Fastening or joining means (fastening of rails by keys E01B 9/24)

23/16 . . Switches

25/00 **Tracks for special kinds of railways** (systems B61B; wheel tracks on roads E01C 9/02)

Note

In this group, the following term is used with the meaning indicated:
– "track" includes non-load-carrying guide rails.

25/02 . Tracks for rack railways

25/04 . . Rack rails; Supports or connections for rack rails

25/06 . . Switches; Frogs; Crossings

25/08 . Tracks for mono-rails with centre of gravity of vehicle above the load-bearing rail (E01B 25/30 takes precedence) **[1,7]**

25/10 . . Mono-rails; Auxiliary balancing rails; Supports or connections for rails

25/12 . . Switches; Crossings

25/14 . Tracks for cable-drawn railway vehicles

25/15 . . Switches; Crossings

25/16 . Tracks for aerial rope railways with a stationary rope

25/18 . . Ropes; Supports, fastening or straining means for ropes (ropes in general D07B; masts E04H 12/00; rope sockets F16G)

25/20 . . Switches; Crossings

25/22 . Tracks for railways with the vehicle suspended from rigid supporting rails

25/24 . . Supporting rails; Auxiliary balancing rails; Supports or connections for rails

25/26 . . Switches; Crossings

25/28 . Rail tracks for guiding vehicles when running on road or similar surface (wheel tracks on roads E01C 9/02)

25/30 . Tracks for magnetic suspension or levitation vehicles **[7]**

25/32 . . Stators, guide rails or slide rails **[7]**

25/34 . . Switches; Frogs; Crossings **[7]**

26/00 **Tracks or track components not covered by any one of main groups E01B 1/00 to E01B 25/00**

Making, maintaining, renewing, or taking-up the ballastway or the track; **Tools or machines specially designed therefor**

27/00 **Placing, renewing, working, cleaning, or taking-up the ballast, with or without concurrent work on the track**; **Devices therefor**; **Packing sleepers**

27/02 . Placing the ballast; Making the ballastway; Redistributing ballasting material; Machines or devices therefor; Levelling means

27/04 . Removing the ballast; Machines therefor, whether or not additionally adapted for taking-up ballast (E01B 27/06, E01B 27/12 take precedence; redistributing ballasting material E01B 27/02)

27/06 . Renewing or cleaning the ballast in situ, with or without concurrent work on the track

27/08 . . the track having been taken-up (E01B 27/11 takes precedence)

27/10 . . without taking-up the track (E01B 27/11 takes precedence)

27/11 . . combined with concurrent renewal of track components

27/12 . Packing sleepers, with or without concurrent work on the track; Compacting track-carrying ballast

27/13 . . Packing sleepers, with or without concurrent work on the track (preforming ballast cores or seats for sleepers E01B 27/02)

27/14 . . . Manual tools or hand-held power tools therefor

27/16 . . . Machines therefor, e.g. so-called sleeper-tamping machines

27/17 . . . . combined with means for lifting, levelling, or slewing the track

27/18 . . . by introducing additional fresh material under the sleepers, e.g. by the measured-shovel method, by the blowing method

27/20 . . Compacting the material of the track-carrying ballastway, e.g. by vibrating the track, by surface vibrators (of trackless ballastway E01B 27/02; for packing sleepers E01B 27/12)

29/00 **Laying, rebuilding, or taking-up tracks**; **Tools or machines therefor** (E01B 27/00, E01B 31/00 take precedence)

29/02 . Transporting, laying, removing, or renewing lengths of assembled track, assembled switches, or assembled crossings (E01B 29/04 takes precedence)

29/04 . Lifting or levelling of tracks (lifting devices in general B66F)

29/05 . Transporting, laying, removing, or renewing both rails and sleepers (as assembled units E01B 29/02)

29/06 . Transporting, laying, removing, or renewing sleepers (E01B 29/05 takes precedence; carrying devices B65G 7/12)

29/09 . . under, or from under, installed rails

29/10 . . . for inserting or removing sleepers

29/11 . . . . Removal involving destruction of the sleeper, e.g. the sectioning thereof

29/13 . . . for moving sleepers in a direction parallel to the rails, e.g. for spacing or aligning them (E01B 29/10 takes precedence)

29/14 . . . for lifting sleepers up to the rails (lifting devices in general B66F)

29/16 . Transporting, laying, removing, or replacing rails; Moving rails placed on sleepers in the track (E01B 29/05 takes precedence; moving or tilting heavy loads in general B65G 7/00)

29/17 . . Lengths of rails assembled into strings, e.g. welded together

29/20 . . Moving rails placed on installed sleepers in the plane of the track

29/22 . . Raising rails from sleepers, e.g. for inserting sole-plates (lifting devices in general B66F)

29/24 . Fixing or removing detachable fastening means or accessories thereof; Pre-assembling track components by detachable fastening means (E01B 29/02, E01B 31/26 take precedence)

29/26 . . the fastening means being spikes (E01B 29/16 takes precedence; hand-held tools for nail or staple driving or extracting B25C)

29/28 . . the fastening means being of screw-and-nut type (portable apparatus for fixing or removing screws or the like B25B); Apparatus therefor, adapted to additionally drilling holes

29/29 . . . for horizontally-arranged fastening elements, e.g. fish-bolts

29/32 . Installing or removing track components, not covered by the preceding groups, e.g. sole-plates, rail anchors (E01B 31/26 takes precedence)

29/40 . Means or arrangements for temporarily supporting laid tracks, or rails or sleepers in the track (temporary fishplates E01B 11/18)

29/42 . Undetachably joining or fastening track components in or on the track, e.g. by welding, by gluing; Pre-assembling track components by gluing; Sealing joints with filling components (E01B 31/26 takes precedence; independent heating means E01B 31/18; welding in general B23K; gluing metal parts in general F16B 11/00)

29/44 . . Methods for effecting joining of rails in the track, e.g. taking account of ambient temperature

29/46 . . Devices for holding, positioning, or urging together the rail ends (adjusting the joint by moving rails E01B 29/20)

31/00 Working rails, sleepers, baseplates, or the like, in or on the line; **Machines, tools, or auxiliary devices specially designed therefor** (characterised by features independent of use on assembled track B21, B23 to B25, B27)

31/02 . Working rail or other metal track components on the spot

31/04 . . Sectioning or slitting, e.g. by sawing, shearing, flame-cutting

31/06 . . Making holes, e.g. by drilling, punching, flame-cutting

31/08 . . Bending, e.g. for straightening rails or rail joints (for aligning rail ends to be welded E01B 29/46)

31/12 . . Removing metal from rails, rail joints, or baseplates, e.g. for deburring welds, reconditioning worn rails

31/13 . . . by milling

31/15 . . . by planing or filing

31/17 . . . by grinding

31/18 . . Reconditioning or repairing worn or damaged parts on the spot, e.g. applying inlays, building-up rails by welding (E01B 31/04 to E01B 31/12 take precedence); Heating or cooling of parts on the spot, e.g. for reducing joint gaps, for hardening rails

31/20 . Working or treating non-metal sleepers in or on the line, e.g. marking, creosoting (working metal sleepers E01B 31/02)

31/22 . . Cutting or grinding wooden sleepers, e.g. for forming rail seats (E01B 31/24 takes precedence)

31/23 . . . Sectioning (combined with removal of segments from track E01B 29/11)

31/24 . . Forming, treating, reconditioning, or cleaning holes in sleepers; Drilling-templates (E01B 29/28, E01B 31/26 take precedence)

31/26 . . Inserting or removing inserts or fillings for holes in sleepers, e.g. plugs, sleeves

31/28 . . Applying or removing anti-splitting or like reinforcing means (E01B 31/26 takes precedence; straps or bands therefor E01B 3/08)

33/00 Machines or devices for shifting tracks, with or without lifting, e.g. for aligning track, for shifting excavator track (combined with sleeper packing machines E01B 27/17)

33/02 . for slewing, i.e. transversely shifting, in steps

33/04 . . Manual tools; Devices not mounted on vehicles

33/06 . for slewing in a continuous operation, e.g. for tracks which carry excavators

33/08 . . Boom track-slewing machines

33/10 . . Bridge track-slewing machines

33/12 . . Combined boom and bridge track-slewing machines

33/18 . . Details not peculiar to a particular type of machine

33/21 . . . Arrangement or construction of rollers moving the rails

35/00 Applications of measuring apparatus or devices for track-building purposes (apparatus on locomotives or cars to indicate or record bad track sections B61K 9/00; measuring angles, linear dimensions, or irregularities in general G01B, G01C)

35/02 . for spacing; for cross levelling; for laying-out curves

35/04 . . Wheeled apparatus

35/06 . for measuring irregularities in longitudinal direction

35/08 . . for levelling

35/10 . . for aligning

35/12 . for measuring movement of the track or of components thereof under rolling loads, e.g. depression of sleepers, increase of gauge

37/00 Making, maintaining, renewing, or taking-up the ballastway or the track, not provided for in a single one of groups E01B 27/00 to E01B 35/00

E01C CONSTRUCTION OF, OR SURFACES FOR, ROADS, SPORTS GROUNDS, OR THE LIKE; **MACHINES OR AUXILIARY TOOLS FOR CONSTRUCTION OR REPAIR** (forming road or like surfaces by compacting or grading snow or ice E01H)

Subclass index

1/00 **Design or layout of roads, e.g. for noise abatement, for gas absorption** (design or layout of sports grounds A63C 19/00; design or layout of airfields B64F)

1/02 . Crossings, junctions, or interconnections between roads on the same level

1/04 . Road crossings on different levels; Interconnections between roads on different levels

Structure of roads, playgrounds, sports grounds, airfields

3/00 **Foundations for pavings** (specially adapted for playgrounds or sports grounds E01C 13/02; foundations in general E02D)

3/02 . Concrete base for bituminous paving

3/04 . Foundations produced by soil stabilisation

3/06 . Methods or arrangements for protecting foundations from destructive influences of moisture, frost or vibration

5/00 **Pavings made of prefabricated single units** (specially adapted for playgrounds or sports grounds E01C 13/04, for footpaths, sidewalks or cycle tracks E01C 15/00; making artificial stones C04B; building stones E04C; flooring E04F)

5/02 . made of natural stones, e.g. sett stones

5/04 . made of bricks

5/06 . made of units with cement or like binders

5/08 . . Reinforced units

5/10 . . . Prestressed reinforced units

5/12 . made of units with bituminous binders

5/14 . made of wooden units

5/16 . made of metallic units (steel gratings E01C 9/10)

5/18 . made of rubber units

5/20 . made of units of plastics (E01C 5/18 takes precedence)

5/22 . made of units composed of a mixture of materials covered by two or more of groups E01C 5/02 to E01C 5/20

7/00 **Coherent pavings made <u>in situ</u>** (specially adapted for playgrounds or sports grounds E01C 13/06, for footpaths, sidewalks or cycle tracks E01C 15/00)

7/02 . made of road-metal without binders

7/04 . . of broken stones, gravel, or like materials

7/06 . . by melting, burning, or vitrifying road-metal <u>in situ</u>

7/08 . made of road-metal and binders

7/10 . . of road-metal and cement or like binders (cement or like binders, composition of mortars C04B)

7/12 . . . Mortar-bound paving

7/14 . . . Concrete paving

7/16 . . . . Prestressed concrete paving

7/18 . . of road-metal and bituminous binders

7/20 . . . Binder incorporated in cold state, e.g. natural asphalt

7/22 . . . Binder incorporated in hot state, e.g. heated bitumen

7/24 . . . Binder incorporated as an emulsion or solution (making dispersions or emulsions for road building C04B)

7/26 . . . mixed with other materials, e.g. cement, rubber, leather, fibre

7/30 . . of road-metal and other binders, e.g. synthetic material

7/32 . . of courses of different kind made <u>in situ</u>

7/34 . . . made of several courses which are not bound to each other

7/35 . . Topping or surface dressings; Methods of mixing, impregnating, or spreading them

7/36 . by subjecting soil to stabilisation

9/00 **Special pavings** (specially adapted for playgrounds or sports grounds E01C 13/00, for footpaths, sidewalks or cycle tracks E01C 15/00); **Pavings for special parts of roads or airfields** (pavement lights E01C 17/00; manholes or like covers or frames E02D 29/14)

9/02 . Wheel tracks (rail tracks for guiding vehicles E01B 25/28)

9/04 . Pavings for railroad level-crossings

9/06 . Pavings adjacent tramways rails

9/08 . Temporary pavings (steel gratings E01C 9/10)

9/10 . Steel gratings (gully gratings E03F 5/06; as building elements in general E04C)

11/00 **Details of pavings**

11/02 . Arrangement or construction of joints; Methods of making joints; Packing for joints (sealing joints not restricted to road or airfield paving E04B 1/68)

11/04 . . for cement concrete paving

11/06 . . . Methods of making joints

11/08 . . . Packing of metal

11/10 . . . Packing of plastic or elastic materials

11/12 . . . Packing of metal and plastic or elastic materials

11/14 . . . Dowel assembly

11/16 . Reinforcements (for building in general E04C)

11/18 . . for cement concrete pavings

11/20 . . . for prestressed concrete pavings

11/22 . Gutters; Kerbs (kerbs specially adapted for informing road users E01F 9/053)

11/24 . Methods or arrangements for preventing slipperiness or protecting against influences of the weather

11/26 . . Permanently-installed heating or blowing devices

13/00 **Pavings or foundations specially adapted for playgrounds or sports grounds** (general layout A63C 19/00)

13/02 . Foundations, e.g. with drainage or heating arrangements **[6]**

13/04 . Pavings made of prefabricated single units (E01C 13/08, E01C 13/10 take precedence) **[6]**

13/06 . Pavings made <u>in situ</u> (E01C 13/08, E01C 13/10 take precedence) **[6]**

13/08 . Surfaces simulating grass **[6]**

13/10 . for artificial surfaces for outdoor or indoor practice of snow or ice sports (E01C 13/08 takes precedence; production of snow or ice for winter sports or similar recreational purposes F25C 3/00) **[6]**

13/12 . . for snow sports **[6]**

15/00 **Pavings specially adapted for footpaths, sidewalks, or cycle tracks**

17/00 **Pavement lights, i.e. translucent constructions forming part of the surface** (blocks specially designed for marking roads E01F 9/04)

Machines, tools or auxiliary devices for constructing or repairing the surfacing of roads or like structures

19/00 **Machines, tools, or auxiliary devices for preparing or distributing paving materials, for working the placed materials, or for forming, consolidating, or finishing the paving** (surface stabilisation E01C 21/00; apparatus specially adapted for reconditioning or repairing paving E01C 23/00)

19/02 . for preparing the materials

19/05 . . Crushing, pulverising, or disintegrating apparatus (in general B02C); Aggregate screening, cleaning, or heating apparatus

19/08 . . Apparatus for transporting and melting asphalt, bitumen, tar, or the like (stationarily-arranged melting boilers for tar, asphalt, or the like, in general C10C 3/12)

19/10 . . Apparatus or plants for premixing or precoating aggregate or fillers with non-hydraulic binders, e.g. with bitumen, with resins; Apparatus for premixing non-hydraulic mixtures prior to placing or for reconditioning salvaged non-hydraulic compositions

19/12 . for distributing granular or liquid materials (E01C 23/07 takes precedence; for filling joints or grooves E01C 23/02, E01C 23/09)

19/15 . . for laying-down uncoated stone or similar materials, or for striking-off or spreading same without compacting, e.g. for crushed rock base courses, sand cushions for paving (E01C 19/52 takes precedence; distributing E01C 19/20)

19/16 . . for applying or spreading liquid materials, e.g. bitumen slurries (E01C 19/45, E01C 23/02, E01C 23/03, E01C 23/16 take precedence; spraying or spreading liquids or other fluent materials to surfaces in general B05)

19/17 . . . Application by spraying

19/18 . . Devices for distributing road-metals mixed with binders, e.g. cement, bitumen, without consolidating or ironing effect (E01C 19/20, E01C 19/47 take precedence; conveying installations for concrete or the like B65G)

19/20 . . Apparatus for distributing, e.g. spreading, granular or pulverulent materials, e.g. sand, gravel, salt, dry binders (fertiliser distributors A01C 15/00)

19/21 . . for simultaneously but separately applying liquid material and granular or pulverulent material, e.g. bitumen and grit, with or without spreading

19/22 . for consolidating or finishing laid-down unset materials (E01C 23/02 takes precedence; apparatus for generating vibrations in general B06B)

19/23 . . Rollers therefor; Such rollers usable also for compacting soil (E01C 19/43 takes precedence; specially adapted for agricultural purposes A01B 29/00; garden rollers A01G 1/12; making or maintaining surfaces of snow or ice E01H 4/00; solely for soil compaction E02D 3/026)

19/24 . . . hand propelled (E01C 19/27 to E01C 19/29 take precedence)

19/25 . . . propelled by animals or vehicles (E01C 19/26 to E01C 19/29 take precedence)

19/26 . . . self-propelled or fitted to road vehicles (E01C 19/27 to E01C 19/29 take precedence)

19/27 . . . with elastically-deformable rolling elements, e.g. pneumatic tyres (vibrating or impacting E01C 19/28)

19/28 . . . Vibrated rollers or rollers subjected to impacts, e.g. hammering blows (E01C 19/29 takes precedence)

19/29 . . . Rolling apparatus adapted to apply a rolling pressure less than its weight, e.g. roller finishers travelling on formrails

19/30 . . Tamping or vibrating apparatus other than rollers (E01C 23/02, E01C 23/04 take precedence; vibrated depositing devices E01C 19/12; tamping or vibrating rollers E01C 19/28; portable percussion tools in general B25D; tamping or vibrating soil in general E02D 3/046)

19/32 . . . Hand-held hand-actuated rammers or tampers

19/34 . . . Power-driven rammers or tampers

19/35 . . . . Hand-held or hand-guided tools (E01C 19/36 to E01C 19/40 take precedence)

19/36 . . . . with direct-acting explosion chambers

19/38 . . . . with means specifically for generating vibrations

19/40 . . . . adapted to impart a smooth finish to the paving, e.g. tamping or vibrating finishers

19/41 . . Apparatus having both rolling tools and ramming, tamping, or vibrating tools

19/42 . . Machines for imparting a smooth finish to freshly-laid paving courses other than by rolling, tamping, or vibrating (for distributing only E01C 19/12)

19/43 . . Machines or arrangements for roughening or patterning freshly-laid paving courses, e.g. indenting rollers

19/44 . . Hand-actuated tools other than rollers, dampers, or vibrators, specially adapted for imparting a required surface finish to freshly-laid paving courses (E01C 19/43 takes precedence)

19/45 . Portable apparatus for preparing, or for preparing and applying to the road, compound liquid binders, e.g. emulsified bitumen, fluxed asphalt (applying only E01C 19/16)

19/46 . for preparing and placing the materials (E01C 19/45 takes precedence; making surfaces by mixing borrowed aggregate with binders E01C 21/00)

19/47 . . Hydraulic cement concrete mixers combined with distributing means specially adapted for road building (concrete mixers per se B28C)

19/48 . for laying-down the materials and consolidating them, or finishing the surface

19/50 . Removable forms or shutterings for road-building purposes (E01C 23/02, E01C 23/04 take precedence; permanent forms E01C 3/00 to E01C 7/00; slip forms E01C 19/48); Devices or arrangements for forming individual paving elements, e.g. kerbs, in situ

19/52 . Apparatus for laying individual preformed surface elements, e.g. kerbs (preforming and placing continuous strip E01C 19/46; forming paving elements in situ E01C 19/50)

21/00 **Apparatus or processes for surface stabilisation for road building or like purposes, e.g. mixing borrowed aggregate with binder** (stabilising soil under existing surfacing E01C 23/10; soil-conditioning or soil-stabilising materials C09K 17/00; soil-consolidation in general E02D 3/12)

21/02 . Fusing, calcining, or burning soil in situ

23/00 **Auxiliary devices or arrangements for constructing, repairing, reconditioning, or taking-up road or like surfaces** (apparatus for reconditioning of salvaged non-hydraulic compositions E01C 19/10)

23/01 . Devices or auxiliary means for setting-out or checking the configuration of new surfacing, e.g. templates, screed supports (form rails E01C 19/50); Applications of apparatus for measuring, indicating, or recording the surface configuration of existing surfacing, e.g. profilographs (E01C 23/07 takes precedence; measuring roughness or irregularity in general G01B)

23/02 . Devices for making, treating, or filling grooves or like channels in not-yet-hardened paving, e.g. for joints or markings (surface patterning E01C 19/43); Removable forms therefor (non-removable forms E01C 11/02); Devices for introducing inserts or removable insert-supports in not-yet-hardened paving (E01C 23/04 takes precedence; non-removable insert supports E01C 11/02)

23/03 . Arrangements for curing paving; Devices for applying curing means; Devices for laying prefabricated underlay, e.g. sheets, membranes (reinforcing elements E01C 23/04); Protecting paving under construction or while curing, e.g. use of tents (road barriers E01F 13/00)

23/04 . Devices for laying reinforcing elements or dowel bars; Removable supports for reinforcing elements (non-removable supports therefor E01C 11/16; side forms adapted to supporting reinforcement E01C 19/50); Devices, e.g. removable forms, for making essentially horizontal ducts in paving, e.g. for prestressed reinforcement

23/05 . Devices for installing or removing forms

23/06 . Devices or arrangements for working the finished surface (working freshly-laid paving E01C 19/42 to E01C 19/44, E01C 23/02; mining picks E21C 35/18); Devices for repairing the surface of damaged paving **[6]**

23/07 . . Apparatus combining measurement of the surface configuration of paving with application of material in proportion to the measured irregularities (measuring means only E01C 23/01)

23/08 . . for roughening or patterning; for removing high spots or material bonded to the surface, e.g. markings (removing matter not bonded to the surface E01H 1/00; roughening or detaching ice E01H 5/12)

23/082 . . . using non-powered tools **[6]**

23/085 . . . using power-driven tools, e.g. vibratory tools **[6]**

23/088 . . . . Rotary tools, e.g. milling drums **[6]**

23/09 . . for forming cuts, grooves, or recesses, e.g. for making joints or channels for markings, for cutting-out sections to be removed; for cleaning, treating, or filling cuts, grooves, recesses, or fissures; for trimming paving edges

23/10 . . for raising or levelling sunken paving; for filling voids under paving; for introducing material into substructure (consolidating soil in general E02D 3/12)

23/12 . . for taking-up, tearing-up, or breaking-up paving (adapted to both placing and removing paving E01C 19/52)

23/14 . for heating or drying foundation, paving, or materials thereon, e.g. paint (E01C 23/03 takes precedence; heating or drying devices incorporated in the paving E01C 11/26; surface stabilisation by fusing, calcining, or burning soil <u>in situ</u> E01C 21/02; for street cleaning E01H 1/08; melting snow or ice on surfacing E01H 5/10)

23/16 . Devices for marking-out, applying, or forming traffic or like markings on finished paving (E01C 23/14 takes precedence; inserting or forming in not-yet-hardened paving E01C 23/02, in recesses formed in fully-set paving E01C 23/09; marking-out playing courts or playgrounds A63C 19/06; applying liquids or other fluent materials to surfaces in general B05; road surface markings <u>per se</u> E01F 9/04); Protecting fresh markings

23/18 . . for applying prefabricated markings **[6]**

23/20 . . for forming markings <u>in situ</u> **[6]**

23/22 . . . by spraying **[6]**

23/24 . . . by pouring **[6]**

E01D **BRIDGES** (bridges extending between terminal buildings and aircraft for embarking or disembarking passengers B64F 1/305)

<u>Note</u>

In this subclass, it is desirable to add the indexing codes of group E01D 101/00. **[6]**

<u>Subclass index</u>

1/00 **Bridges in general** (characterised by their structural type E01D 4/00 to E01D 15/00) **[6]**

2/00 **Bridges characterised by the cross-section of their bearing spanning structure [6]**

2/02 . of the I-girder type **[6]**

2/04 . of the box-girder type **[6]**

4/00 Arch-type bridges [6]

6/00 Truss-type bridges [6]
6/02 . of bowstring type **[6]**

11/00 Suspension or cable-stayed bridges [6]
11/02 . Suspension bridges **[6]**
11/04 . Cable-stayed bridges **[6]**

12/00 Bridges characterised by a combination of structures not covered as a whole by a single one of groups E01D 2/00 to E01D 11/00 [6]

15/00 Movable or portable bridges (arrangement of ship-based outboard ramps or gangways B63B 27/14; loading ramps B65G 69/28); **Floating bridges**
15/02 . Vertical lift bridges
15/04 . Swing bridges
15/06 . Bascule bridges; Roller bascule bridges, e.g. of Scherzer type
15/08 . . Drawbridges
15/10 . Travelling bridges; Sliding bridges; Rotary cylinder bridges, i.e. rotating about longitudinal axis to invert and raise the road
15/12 . Portable or sectional bridges (floating bridges E01D 15/14)
15/127 . . combined with ground-supported vehicles for the transport, handling or placing of such bridges or of sections thereof **[6]**
15/133 . . built-up from readily separable standardised sections or elements, e.g. Bailey bridges (E01D 15/127 takes precedence) **[6]**
15/14 . Floating bridges, e.g. pontoon bridges (landing bridges E01D 15/24; floating bodies or pontoons B63B) **[6]**
15/20 . . collapsible, expandable, inflatable or the like (E01D 15/22 takes precedence) **[6]**
15/22 . . designed as, or mounted on, vehicles **[6]**
15/24 . Bridges or similar structures, based on land or on a fixed structure and designed to give access to ships or other floating structures **[6]**

18/00 Bridges specially adapted for particular applications or functions not provided for elsewhere, e.g. aqueducts, bridges for supporting pipe-lines [6]

19/00 Details of bridges
19/02 . Piers; Abutments (foundations E02D)
19/04 . Bearings; Hinges
19/06 . Arrangement, construction, or bridging of expansion joints
19/08 . Damp-proof or other insulating layers; Drainage arrangements or devices
19/10 . Railings; Protectors against smoke or gases, e.g. of locomotives; Maintenance travellers; Fastening of pipes or cables to bridges
19/12 . Grating or flooring for bridges; Fastening railway sleepers or tracks to bridges
19/14 . Towers; Anchors; Saddle supports **[6]**
19/16 . Suspension cables; Cable clamps for suspension cables **[6]**

21/00 Methods or apparatus specially adapted for erecting or assembling bridges [6]
21/06 . by translational movement of the bridge or bridge sections **[6]**
21/08 . by rotational movement of the bridge or bridge sections **[6]**
21/10 . Cantilevered erection **[6]**

22/00 Methods or apparatus for repairing or strengthening existing bridges [6]

24/00 Methods or apparatus for dismantling bridges [8]

Indexing scheme associated with groups E01D 1/00 to E01D 22/00, relating to the material constitution of bridges. [6]

101/00 Material constitution of bridges [6]
101/10 . Wood **[6]**
101/20 . Concrete, stone or stone-like material **[6]**
101/22 . . Masonry; Bricks **[6]**
101/24 . . Concrete **[6]**
101/26 . . . reinforced **[6]**
101/28 . . . . prestressed **[6]**
101/30 . Metal (E01D 101/26 takes precedence) **[6]**
101/32 . . prestressed **[6]**
101/34 . . non-ferrous, e.g. aluminium **[6]**
101/40 . Plastics **[6]**

E01F ADDITIONAL WORK, SUCH AS EQUIPPING ROADS OR THE CONSTRUCTION OF PLATFORMS, HELICOPTER LANDING STAGES, SIGNS, SNOW FENCES, OR THE LIKE

Subclass index

Arrangement or construction of additional equipment for roads or railways; **Landing stages for helicopters**

1/00 Construction of platforms or refuge islands (general arrangement of railway platforms B61B)

3/00 Landing stages for helicopters, e.g. located above buildings (layout of airfields B64F; buildings or like structures for special purposes E04H)

5/00 Draining the sub-base of roads or ballastway of railways by trenches, culverts, or conduits (underground drainage E02D; conduits for sewerage E03F)

7/00 **Devices affording protection against snow, sand drifts, side-wind effects, snowslides, avalanches or falling rocks** (permanently installed heating or blowing devices for roads E01C 11/26); **Anti-dazzle arrangements**

7/02 . Snow fences or similar devices, e.g. devices affording protection against sand drifts or side-wind effects (fences in general E04H 17/00)

7/04 . Devices affording protection against snowslides, avalanches or falling rocks, e.g. avalanche preventing structures, galleries (securing of slopes E02D 17/20; roof snow-traps E04D 13/10)

7/06 . Anti-dazzle arrangements (E01F 8/00 takes precedence) **[3]**

8/00 **Arrangements for absorbing or reflecting air transmitted noise from road or railway traffic** (ground installations for reducing aircraft noise B64F 1/26; general building constructions for absorbing or reflecting noise, noise absorption or reflection for buildings E04B 1/74) **[3]**

8/02 . specially adapted for sustaining vegetation or for accommodating plants (receptacles for cultivation of plants A01G 9/02; securing slopes or inclines E02D 17/20; retaining or protecting walls E02D 29/02) **[6]**

Arrangements for facilitating the use of roads

9/00 **Arrangement of road signs or traffic signals** (signals, signalling systems G08; signs, attachment thereof to supports G09F); **Arrangements for enforcing caution, e.g. speed bumps [6]**

9/011 . Upright bodies, e.g. marker posts or bollards; Supports for road signs (posts or poles in general E04H 12/00; means for attaching signs to a supporting structure in general G09F 7/18) **[6]**

9/012 . . free-standing, e.g. traffic cones, foldable or inflatable devices **[6]**

9/013 . . intended to be readily removable, e.g. for insertion into road-stud sockets (E01F 9/012 takes precedence) **[6]**

9/014 . . Storing, transporting, placing or retrieving portable devices **[6]**

9/015 . . with reflectors, e.g. with means for keeping clean **[6]**

9/016 . . illuminated (for obstructing or restricting traffic E01F 13/00) **[6]**

9/017 . . self-righting after deflection or displacement **[6]**

9/018 . . specially adapted for breaking, disengaging, collapsing or permanent deformation upon deflection or displacement, e.g. upon vehicle impact **[6]**

9/019 . . extensible, collapsible or pivotable (E01F 9/017, E01F 9/018 take precedence) **[6]**

9/03 . . Arrangements for fastening signs or signals to safety barriers or the like **[6]**

9/04 . Road surface markings; Kerbs or road edgings, specially adapted for informing road users, e.g. illuminated (for redirecting vehicles E01F 15/00) **[6]**

9/047 . . specially adapted for audible or vibrational signalling, e.g. rumble strips, or for enforcing reduced speed, e.g. speed bumps **[6]**

9/053 . . Kerbs or road edgings, specially adapted for informing road users, e.g. illuminated **[6]**

9/06 . . Traffic studs; Marking blocks

9/07 . . . having deflectable or displaceable parts, with or without return to original position, e.g. flexible flaps **[6]**

9/08 . . Traffic lines

9/087 . . . Lane delineators for physically separating traffic lanes and discouraging but not preventing crossing **[6]**

9/093 . . . movable for repeated use at different locations **[6]**

11/00 **Embedding pads or other sensitive devices in paving or other road surfaces** (pressure-sensitive elements G01L; traffic control systems G08G)

13/00 **Arrangements for obstructing or restricting traffic, e.g. gates, barricades** (for railway crossings B61L)

13/02 . free-standing **[6]**

13/04 . movable to allow or prevent passage **[6]**

13/06 . . by swinging into open position about a horizontal axis parallel to the road direction, i.e. swinging gates **[6]**

13/08 . . by swinging into closed position about a transverse axis situated in the road surface, e.g. tiltable sections of the road surface, tiltable parking posts **[6]**

13/10 . Vehicle barriers specially adapted for allowing passage in one direction only **[6]**

13/12 . for forcibly arresting or disabling vehicles, e.g. spiked mats **[6]**

15/00 **Safety arrangements for slowing, redirecting or stopping errant vehicles, e.g. guard posts or bollards**; **Arrangements for reducing damage to roadside structures due to vehicular impact** (arrangements for fastening signs or signals to safety barriers or the like E01F 9/03; for forcibly arresting vehicles E01F 13/00) **[6]**

15/02 . Continuous barriers extending along roads or between traffic lanes (crossable-lane separators E01F 9/087) **[6]**

15/04 . . essentially made of longitudinal beams or rigid strips (E01F 15/10, E01F 15/12 take precedence) **[6]**

15/06 . . essentially made of cables, nettings or the like (E01F 15/10, E01F 15/12 take precedence; protection against falling rocks E01F 7/04; arresting gear for aircraft B64F 1/02) **[6]**

15/08 . . essentially made of walls or wall-like elements (E01F 15/10, E01F 15/12 take precedence) **[6]**

15/10 . . portable, e.g. for temporary use **[6]**

15/12 . . and having means for providing occasional passage, e.g. for emergency vehicles **[6]**

15/14 . specially adapted for local protection, e.g. for bridge piers, for traffic islands **[6]**

E01H **STREET CLEANING**; **CLEANING OF PERMANENT WAYS**; **CLEANING BEACHES**; **CLEANING LAND**; **DISPERSING FOG IN GENERAL** (mowers convertible to apparatus for sweeping or cleaning lawns or other surfaces, e.g. to remove snow, or capable of sweeping or cleaning lawns or other surfaces A01D 42/06; cleaning in general B08B) **[4]**

Subclass index

1/00 **Removing undesirable matter from roads or like surfaces, with or without moistening of the surface** (for snow or ice E01H 5/00; cleaning tramway rails E01H 8/00; obstruction-removers on vehicles B60R 19/00; in combination with application of bitumen or the like E01C 19/16; in combination with application of traffic lines E01C 23/16)

1/02 . Brushing apparatus (E01H 1/08 to E01H 1/14 take precedence; brushes in general A46B)

1/04 . . taking-up the sweepings, e.g. for collecting, for loading

1/05 . . with driven brushes (E01H 1/04 takes precedence)

1/08 . Pneumatically dislodging or taking-up undesirable matter (suction cleaners in general A47L 5/00 to A47L 9/00); Drying by heat only, or by streams of gas (permanently-installed heating or blowing devices E01C 11/26; heating or drying for road building or repairing E01C 23/14); Cleaning by projecting abrasive particles (sand-blasting in general B24C)

1/10 . Hydraulically loosening or dislodging undesirable matter (stationary flushing devices E01H 3/04); Raking or scraping apparatus (hand implements E01H 1/12)

1/12 . Hand implements, e.g. litter pickers (rakes A01D 7/00)

1/14 . Removing by magnetic effect

3/00 **Applying liquids to roads or like surfaces, e.g. for dust control**; **Stationary flushing devices** (combined with removal of undesirable matter E01H 1/00; spray heads, other outlets B05B)

3/02 . Mobile apparatus, e.g. watering-vehicles (vehicle features B60P 3/22; applying liquid materials for road paving E01C 19/16)

3/04 . Fixed devices, e.g. permanently-installed flushing means (hydrants E03B 9/02)

4/00 **Working on surfaces of snow or ice in order to make them suitable for traffic or sporting purposes, e.g. by compacting snow** (production of artificial snow F25C 3/04) **[4]**

4/02 . for sporting purposes, e.g. preparation of ski trails (production of snow or ice for winter sports or similar recreational purposes F25C 3/00) **[4]**

5/00 **Removing snow or ice from roads or like surfaces**; **Grading or roughening snow or ice** (by applying de-icing agents E01H 10/00; obstruction removers on vehicles B60R 19/00; sand, gravel or salt spreaders E01C 19/20) **[4]**

5/02 . Hand implements (E01H 5/04, E01H 5/10, E01H 5/12 take precedence)

5/04 . Apparatus propelled by animal or engine power; Apparatus propelled by hand with driven dislodging or conveying elements, e.g. conveying pneumatically (E01H 5/10, E01H 5/12 take precedence)

5/06 . . dislodging essentially by non-driven elements, e.g. scraper blades

5/07 . . . and conveying dislodged material by driven or pneumatic means

5/08 . . dislodging essentially by driven elements

5/09 . . . the elements being rotary or moving along a closed circular path, e.g. rotary cutter, digging wheels

5/10 . by application of heat (stationary blowing or paving-heating means E01C 11/26)

5/12 . Apparatus or implements specially adapted for breaking, disintegrating, or loosening layers of ice or hard snow

6/00 **Apparatus equipped with, or having provisions for equipping with, both elements for removal of refuse or the like and elements for removal of snow or ice** (E01H 8/10 takes precedence)

8/00 **Removing undesirable matter from the permanent way of railways**; **Removing undesirable matter from tramway rails** (E01H 1/00 to E01H 6/00 take precedence)

8/02 . Methods or apparatus for removing ice or snow from railway tracks, e.g. using snow-ploughs (operating only on rails or flange grooves E01H 8/10)

8/04 . . essentially by non-driven elements

8/06 . . essentially by driven tools

8/08 . . by application of heat (heated track E01B 19/00)

8/10 . Removing undesirable matter from rails, flange grooves, or the like, e.g. removing ice from contact rails, removing mud from flange grooves (heating, blowing, or fluid-applying devices installed in the track E01B 19/00; built-in draining devices for rails E01B 21/02; removing ballast from rails E01B 27/04)

8/12 . . specially adapted to grooved rails, flangeways, or the like

10/00 **Improving gripping of ice-bound or other slippery traffic surfaces, e.g. using gritting or thawing materials** (roughening ice by means of tools E01H 5/12; applying de-icing agents to rails E01H 8/10; thawing materials C09K 3/18; by constructional features E01C 11/24)

11/00 **Control of undesirable vegetation on roads or permanent ways of railways** (destruction of undesirable vegetation in general A01M 7/00 to A01M 15/00, A01M 21/00; weeding involving working the ballast E01B 27/00); **Applying liquids, e.g. water, weed-killer, bitumen, to permanent ways** (specially to rails E01H 8/10; for preserving sleepers E01B 31/20)

12/00 Cleaning beaches

13/00 Dispersing fog in general, e.g. on roads, on airfields

15/00 Removing undesirable matter, e.g. rubbish, from the land, not otherwise provided for (gatherers for removing stones, roots or the like from the soil A01B 43/00) **[4]**

E02 HYDRAULIC ENGINEERING; FOUNDATIONS; SOIL-SHIFTING

E02B HYDRAULIC ENGINEERING (ship-lifting E02C; dredging E02F)

Subclass index

1/00 Equipment or apparatus for, or methods of, general hydraulic engineering

1/02 . Hydraulic models

3/00 Engineering work in connection with control or use of streams, rivers, coasts, or other marine sites (barrages or weirs E02B 7/00); **Sealings or joints for engineering work in general**

3/02 . Stream regulation, e.g. breaking up subaqueous rock, cleaning the beds of waterways, directing the water flow (dredging or scraping devices E02F)

3/04 . Structures or apparatus for, or methods of, protecting banks, coasts, or harbours (sealings or joints E02B 3/16)

3/06 . . Moles; Piers; Quays; Quay walls; Groynes; Breakwaters

3/08 . . . Structures of loose stones with or without piles (piles E02D 5/00)

3/10 . . Dams; Dykes; Sluice ways or other structures for dykes, dams, or the like (making embankments or dams in general E02D 17/18)

3/12 . . Revetment of banks, dams, watercourses, or the like (of slopes in general E02D 17/20)

3/14 . . . Preformed blocks; Arrangements thereof

3/16 . Sealings or joints (joints for foundation structures E02D 29/16; sealing joints not restricted to hydraulic engineering work E04B 1/68)

3/18 . Reclamation of land from water (drainage of soil E02B 11/00)

3/20 . Equipment for shipping on coasts, in harbours or on other fixed marine structures, e.g. bollards (tying-up, anchoring B63B 21/00, e.g. bollards for shipping B63B 21/06; buoys B63B 22/00) **[5]**

3/24 . . Mooring posts **[5]**

3/26 . . Fenders (fenders integral with waterborne vessels or specially adapted therefor B63B 59/02) **[5]**

3/28 . . Fender piles **[5]**

5/00 Artificial water canals (for water-power plants E02B 9/02; irrigation of soil E02B 13/00)

5/02 . Making or lining canals

5/04 . Navigable canals

5/06 . . Operating equipment in connection with canals (ship-lifting devices E02C)

5/08 . Details, e.g. gates, screens

7/00 Barrages or weirs; **Layout, construction, methods of, or devices for, making same** (for protecting banks, coasts, or harbours E02B 3/04; sealings or joints E02B 3/16; handling building or like materials for hydraulic engineering E02D 15/00; foundations in general E02D 27/00)

7/02 . Fixed barrages

7/04 . . Dams across valleys

7/06 . . . Earth-fill dams; Rock-fill dams

7/08 . . . Wall dams

7/10 . . . . Gravity dams, i.e. those in which the weight of the structure prevents overturning

7/12 . . . . Arch dams

7/14 . . . . Buttress dams

7/16 . Fixed weirs; Superstructures or flash-boards therefor

7/18 . . Siphon weirs

7/20 . Movable barrages; Lock gates

7/22 . . Stop log dams; Emergency gates

7/24 . . Needle weirs

7/26 . . Vertical-lift gates

7/28 . . . with sliding gates

7/30 . . . with guide wheels or rollers for the gates

7/32 . . . Cylindrical or tubular gates

7/34 . . . Flash-boards for vertical-lift gates

7/36 . . . Elevating mechanisms for vertical-lift gates

7/38 . . Rolling gates

7/40 . . Swinging or turning gates

7/42 . . . Gates of segmental or sector-like shape with horizontal axis

7/44 . . . Hinged-leaf gates

7/46 . . . Gates turning round a horizontal axis arranged midway of the flap

7/48 . . . Roof or double shutter gates

7/50 . . Floating gates

7/52 . . Equipment preventing vibration of gates

7/54 . . Sealings for gates

8/00 Details of barrages or weirs (cleaning or keeping clear the surface of open water E02B 15/00)

8/02 . Sediment base gates; Sand sluices; Structures for arresting waterborne material

8/04 . Valves, slides, or the like; Submerged sluice gates

8/06 . Spillways; Devices for dissipation of energy, e.g. for reducing eddies

8/08 . Fish passes; Passages for rafts or boats

9/00 Water-power plants; **Layout, construction or equipment, methods of, or apparatus for, making same** (hydraulic motors F03B)

9/02 . Water-ways

9/04 . . Free-flow canals or flumes; Intakes (gratings or screens therefor E02B 5/08)

9/06 . . Pressure galleries or pressure conduits; Galleries specially adapted to house pressure conduits; Means specially adapted for use therewith, e.g. housings, valves, gates (driving inclined galleries E21D 9/02; valves in general F16K; conduits in general F16L) **[6]**

9/08 . Tide or wave power plants (water-pressure machines, tide or wave motors F03B)

11/00 Drainage of soil, e.g. for agricultural purposes

11/02 . Drainage-device-laying apparatus, e.g. drainage ploughs

13/00 Irrigation ditches, i.e. gravity flow, open channel water distribution systems (other distribution systems for watering or spraying gardens, fields, sports grounds, or the like A01G 25/00) **[2]**

13/02 . Closures for irrigation conduits

15/00 Cleaning or keeping clear the surface of open water; **Apparatus therefor** (construction of ships or other waterborne vessels B63B, e.g. vessels specially adapted for collecting pollution from open water B63B 35/32; in swimming or splash baths or pools E04H 4/16) **[5]**

15/02 . from ice **[5]**

15/04 . Devices for cleaning or keeping clear the surface of open water from oil or like floating materials by separating or removing these materials (other treatment of water, waste water or sewage C02F; materials for treating liquid pollutants, e.g. oil, gasoline, fat, C09K 3/32)

15/06 . . Barriers therefor (E02B 15/08 takes precedence) **[5]**

15/08 . . Devices for reducing the polluted area without removing the material **[5]**

15/10 . . Devices for removing the material from the surface **[5]**

17/00 Artificial islands mounted on piles or like supports, e.g. platforms on raisable legs; **Construction methods therefor** (fenders E02B 3/26; anchoring floating platforms B63B 21/00; floating platforms, e.g. anchored, B63B 35/44; independent underwater structures E02D 29/00) **[5]**

17/02 . placed by lowering the supporting construction to the bottom, e.g. with subsequent fixing thereto

17/04 . Equipment specially adapted for raising, lowering, or immobilising the working platform relative to the supporting construction (platform lifts in general B66F 7/00)

17/06 . . for immobilising, e.g. using wedges or clamping rings

17/08 . . for raising or lowering

E02C SHIP-LIFTING DEVICES OR MECHANISMS

1/00 Locks; **Shaft locks, i.e. locks of which one front side is formed by a solid wall with an opening in the lower part through which the ships pass** (lock gates E02B 7/20)

1/02 . with auxiliary basins

1/04 . with floating troughs

1/06 . Devices for filling or emptying locks (in lock gates E02B 7/20)

1/08 . Arrangements for dissipating the energy of the water (carried by lock gates E02B 8/06)

1/10 . Equipment for use in connection with the navigation of ships in locks; Mooring equipment (tying-up, anchoring waterborne vessels B63B 21/00; equipment for shipping on coasts, in harbours or on other fixed marine structures E02B 3/20)

3/00 Inclined-plane ship-lifting mechanisms

5/00 Mechanisms for lifting ships vertically (salvaging sunken vessels B63C 7/00)

5/02 . with floating chambers

E02D FOUNDATIONS; EXCAVATIONS; EMBANKMENTS (specially adapted for hydraulic engineering E02B); UNDERGROUND OR UNDERWATER STRUCTURES [6]

(1) This subclass covers underground structures made by foundation engineering, i.e. involving disturbance of the ground surface. **[6]**

(2) This subclass does not cover underground spaces, made by underground mining methods only, i.e. not involving disturbance of the ground surface, which are covered by subclass E21D. **[6]**

Subclass index

1/00 **Investigation of foundation soil <u>in situ</u>** (investigation involving boring or specially adapted to earth drilling E21B 25/00, E21B 49/00; investigating or analysing materials by determining their chemical or physical properties, in general G01N, e.g. sampling G01N 1/00)

1/02 . before construction work

1/04 . . Sampling of soil

1/06 . . Sampling of ground water

1/08 . after finishing the foundation structure

3/00 **Improving or preserving soil or rock, e.g. preserving permafrost soil** (securing of slopes or inclines E02D 17/20; damming or interrupting passage of underground water E02D 19/12; improving soil for agricultural purposes A01; soil stabilisation for road building or like purposes E01C 21/00, E01C 23/10; setting rock anchoring bolts E21D)

3/02 . Improving by compacting (E02D 3/11 takes precedence; compacting soil locally before or while forming foundations E02D 27/26, E02D 27/28) **[3]**

3/026 . . by rolling with rollers usable only for or specially adapted for soil compaction, e.g. sheepsfoot rollers (rollers for soil working in agriculture A01B 29/00; rollers for road paving, such rollers usable also for compacting soil E01C 19/23) **[3]**

3/032 . . . Trench rollers **[3]**

3/039 . . . Slope rollers **[3]**

3/046 . . by tamping or vibrating, e.g. with auxiliary watering of the soil (E02D 3/026, E02D 3/08 take precedence; tamping or vibrating apparatus for working ballast on railways E01B 27/00, for consolidating paving materials E01C 19/30, for consolidating concrete in general E04G 21/06) **[3]**

3/054 . . . involving penetration of the soil, e.g. vibroflotation **[3]**

3/061 . . . Tampers with directly acting explosion chambers (pile drivers with explosion chambers E02D 7/12) **[3]**

3/068 . . . Vibrating apparatus operating with systems involving reciprocating masses (E02D 3/054, E02D 3/061 take precedence) **[3]**

3/074 . . . Vibrating apparatus operating with systems involving rotary unbalanced masses (E02D 3/054 takes precedence) **[3]**

3/08 . . by inserting stones or lost bodies, e.g. compaction piles (sand drains for soil compaction E02D 3/10; stressing soil while forming foundations E02D 27/28)

3/10 . . by watering, draining, de-aerating or blasting, e.g. by installing sand or wick drains (E02D 3/11 takes precedence; soil-penetrating vibrators with auxiliary watering E02D 3/054; drainage of soil in general E02B 11/00) **[3]**

3/11 . by thermal, electrical or electro-chemical means (freezing soil for interrupting passage of underground water E02D 19/14) **[3]**

3/115 . . by freezing **[3]**

3/12 . Consolidating by placing solidifying or pore-filling substances in the soil (making piles E02D 5/46; soil-conditioning or soil-stabilising materials C09K 17/00)

5/00 **Bulkheads, piles, or other structural elements specially adapted to foundation engineering** (engineering elements in general F16)

5/02 . Sheet piles or sheet pile bulkheads

5/03 . . Prefabricated parts

5/04 . . . made of steel

5/06 . . . . Fitted piles or other elements specially adapted for closing gaps between two sheet piles or between two walls of sheet piles

5/08 . . . . Locking forms; Edge joints; Pile crossings; Branch pieces

5/10 . . . made of concrete or reinforced concrete

5/12 . . . . Locking forms; Edge joints; Pile crossings; Branch pieces

5/14 . . Sealing joints between adjacent piles (sealing joints not restricted to foundation piles E04B 1/68)

5/16 . . Auxiliary devices rigidly or detachably arranged on sheet piles for facilitating assembly

5/18 . Bulkheads or similar walls made solely of concrete <u>in situ</u>

5/20 . Bulkheads or similar walls made of prefabricated parts and concrete, including reinforced concrete, <u>in situ</u>

5/22 . Piles (sheet piles E02D 5/02)

5/24 . . Prefabricated piles

5/26 . . . made of timber with or without reinforcement; Means affording protection against spoiling of the wood (cases E02D 5/60; impregnating agents B27K 3/16); Self-cleaning of piles placed in water

5/28 . . . made of steel

5/30 . . . made of concrete or reinforced concrete or made of steel and concrete

5/32 . . . with arrangements for setting in position by fluid jets

5/34 . . Concrete or concrete-like piles cast in position

5/36 . . . making without use of mould-pipes or other moulds

5/38 . . . making by use of mould-pipes or other moulds

5/40 . . . . in open water

5/42 . . . . by making use of pressure liquid or pressure gas for compacting the concrete

5/44 . . . . with enlarged footing or enlargements at the bottom of the pile

5/46 . . . making <u>in situ</u> by forcing bonding agents into gravel fillings or the soil (consolidating soil in general E02D 3/12)

5/48 . . Piles varying in construction along their length

5/50 . . Piles comprising both precast concrete portions and concrete portions cast <u>in situ</u>

5/52 . . Piles composed of separable parts, e.g. telescopic tubes

5/54 . . Piles with prefabricated supports or anchoring parts; Anchoring piles

5/56 . . Screw piles

5/58 . . Prestressed concrete piles

5/60 . . Piles with protecting cases

5/62 . . Compacting the soil at the footing or in a casing by forcing cement or like material through tubes

5/64 . . Repairing piles

5/66 . Mould-pipes or other moulds

5/68 . . for making bulkheads
5/70 . . for making sheet piles
5/72 . Pile shoes
5/74 . Means for anchoring structural elements or bulkheads (anchoring piles E02D 5/54)
5/76 . . Anchorings for bulkheads or sections thereof
5/80 . . Ground anchors

7/00 Methods or apparatus for placing sheet pile bulkheads, piles, mould-pipes, or other moulds (for both placing and removing E02D 11/00)
7/02 . Placing by driving
7/04 . . Hand pile-drivers
7/06 . . Power-driven drivers
7/08 . . . Drop drivers with free-falling hammer
7/10 . . . with pressure-operated hammer
7/12 . . . Drivers with explosion chambers
7/14 . . . Components for drivers
7/16 . . . . Scaffolds for drivers
7/18 . Placing by vibrating
7/20 . Placing by pressure or pulling power
7/22 . Placing by screwing down
7/24 . Placing by using fluid jets
7/26 . Placing by using several means simultaneously
7/28 . Placing of hollow piles or mould-pipes by means arranged inside the piles or pipes
7/30 . . by driving cores

9/00 Removing sheet pile bulkheads, piles, mould-pipes, or other moulds (for both placing and removing E02D 11/00)
9/02 . by withdrawing
9/04 . by cutting-off under water

11/00 Methods or apparatus for both placing and removing sheet pile bulkheads, piles, or mould-pipes (features relating to placing only E02D 7/00, to removing only E02D 9/00)

13/00 Accessories for placing or removing piles or bulkheads
13/02 . specially adapted for placing or removing bulkheads
13/04 . Guide devices; Guide frames
13/06 . for observation while placing
13/08 . Removing obstacles
13/10 . Follow-blocks of pile-drivers or like devices

15/00 Handling building or like materials for hydraulic engineering or foundations (conveying or working-up concrete or similar masses in general E04G 21/02)
15/02 . Handling of bulk concrete specially for foundation purposes
15/04 . . Placing concrete in mould-pipes, pile tubes, boreholes, or narrow shafts
15/06 . . Placing concrete under water
15/08 . Sinking workpieces into water or soil
15/10 . Placing gravel or like material under water

17/00 Excavations; **Bordering of excavations**; **Making embankments** (soil shifting apparatus E02F; earth drilling E21)
17/02 . Foundation pits
17/04 . . Bordering or stiffening the sides of foundation pits
17/06 . Foundation ditches or narrow shafts
17/08 . . Bordering or stiffening the sides of ditches or narrow shafts for foundations
17/10 . . Covering trenches for foundations
17/12 . . Back-filling of foundation trenches or ditches
17/13 . Foundation slots; Implements for making these slots
17/16 . Loosening of soil or rock, under water (for correcting streams E02B 3/02; by dredgers or excavators E02F)
17/18 . Making embankments (E02D 17/20 takes precedence)
17/20 . Securing of slopes or inclines

19/00 Keeping dry foundation sites or other areas in the ground (sheet piles or bulkheads E02D 5/02)
19/02 . Restraining of open water
19/04 . . by coffer-dams
19/06 . Restraining of underground water
19/08 . . by employing open ditches arranged below the level of the water
19/10 . . by lowering level of ground water
19/12 . . by damming or interrupting the passage of underground water
19/14 . . . by freezing the soil (in connection with sinking shafts E21D 1/12)
19/16 . . . by placing or applying sealing substances (consolidating by placing solidifying or pore-filling substances in the soil E02D 3/12)
19/18 . . . by making use of sealing aprons (sealings or joints for engineering work E02B 3/16)
19/20 . . . by displacing the water, e.g. by compressed air
19/22 . Lining sumps in trenches

23/00 Caissons; **Construction or placing of caissons** (tunnels submerged into or built in open water E02D 29/063) **[6]**
23/02 . Caissons able to be floated on water and to be lowered into water in situ
23/04 . Pneumatic caissons
23/06 . . Bringing persons or material into, or out of, compressed air caissons
23/08 . Lowering or sinking caissons
23/10 . . Caissons filled with compressed air
23/12 . . Inclined lowering
23/14 . . Decreasing the skin friction while lowering
23/16 . Jointing caissons to the foundation soil, specially to uneven foundation soil

25/00 Joining caissons or like sunk units to each other under water

27/00 Foundations as substructures
27/01 . Flat foundations
27/02 . . Flat foundations without substantial excavation (E02D 27/04, E02D 27/08 take precedence)
27/04 . . in water or on quicksand
27/06 . . . Floating caisson foundations
27/08 . . Reinforcements for flat foundations
27/10 . Deep foundations
27/12 . . Pile foundations
27/14 . . . Pile framings
27/16 . . . Foundations formed of separate piles
27/18 . . Foundations formed by making use of caissons
27/20 . . Caisson foundations combined with pile foundations
27/22 . . Caisson foundations made by starting from fixed or floating artificial islands by using protective bulkheads
27/24 . Foundations constructed by making use of diving-bells (equipment for dwelling or working under water B63C 11/00)

27/26 . Compacting soil locally before forming foundations; Construction of foundation structures by forcing binding substances into gravel fillings (consolidating foundation soil in general E02D 3/02 to E02D 3/12)
27/28 . Stressing the soil or the foundation structure while forming foundations
27/30 . Foundations made with permanent use of sheet pile bulkheads, walls of planks, or sheet piling boxes
27/32 . Foundations for special purposes
27/34 . . Foundations for sinking or earthquake territories (building constructions with protection arrangements against earthquakes E04H 9/02)
27/35 . . Foundations formed in frozen ground, e.g. in permafrost soil **[3]**
27/36 . . Foundations formed in moors or bogs
27/38 . . Foundations for large tanks, e.g. oil tanks
27/40 . . Foundations for dams across valleys or for dam constructions
27/42 . . Foundations for poles, masts, or chimneys
27/44 . . Foundations for machines, engines, or ordnance (special layout of foundations with respect to machinery to be supported F16M 9/00)
27/46 . . Foundations for supply conduits or other canals
27/48 . . Foundations inserted underneath existing buildings or constructions
27/50 . . Anchored foundations
27/52 . . Submerged foundations

29/00 Underground or underwater structures (underground tanks B65D 88/76; hydraulic engineering, e.g. sealings or joints, E02B; underground garages E04H 6/00; underground air-raid shelters E04H 9/12; burial vaults E04H 13/00); **Retaining walls [6]**

29/02 . Retaining or protecting walls (piers or quay walls E02B 3/06)
29/045 . Underground structures, e.g. tunnels or galleries, built in the open air or by methods involving disturbance of the ground surface all along the location line; Methods of making them **[6]**
29/05 . . at least part of the cross-section being constructed in an open excavation or from the ground surface, e.g. assembled in a trench **[6]**
29/055 . . . further excavation of the cross-section proceeding underneath an already installed part of the structure, e.g. the roof of a tunnel **[6]**
29/063 . Tunnels submerged into, or built in, open water (construction or placing of caissons in general E02D 23/00; joining caissons to each other under water, in general E02D 25/00) **[6]**
29/067 . . Floating tunnels; Submerged bridge-like tunnels, i.e. tunnels supported by piers or the like above the water-bed (pontoons or floating bridges E01D 15/14) **[6]**
29/07 . . Tunnels or shuttering therefor preconstructed as a whole or continuously made, and moved into place on the water-bed, e.g. into a preformed trench **[6]**
29/073 . . Tunnels or shuttering therefor assembled from sections individually sunk onto, or laid on, the water-bed, e.g. in a preformed trench (caisson-type sections lowered onto the water-bed E02D 29/077) **[6]**
29/077 . . Tunnels at least partially built beneath the water-bed characterised by being made by methods involving disturbance thereof all along the location line, e.g. by cut-and-cover or caisson methods **[6]**
29/09 . Constructions or methods of constructing, in water, not otherwise provided for **[6]**
29/12 . Manhole shafts; Other inspection or access chambers; Accessories therefor (for underground tanks B65D 90/10; for sewerage E03F 5/02) **[6]**
29/14 . . Covers for manholes or the like; Frames for covers **[6]**
29/16 . Arrangement or construction of joints in foundation structures (sealing joints not restricted to foundation structures E04B 1/68)

31/00 Protective arrangements for foundations or foundation structures; **Ground foundation measures for protecting the soil or the subsoil water, e.g. preventing or counteracting oil pollution** (spillage retaining means for tanks B65D 90/24)

31/02 . against ground humidity or ground water
31/04 . . Watertight packings for use under hydraulic pressure
31/06 . against corrosion by soil or water
31/08 . against transmission of vibrations or movements in the foundation soil
31/10 . against soil pressure or hydraulic pressure
31/12 . . against upward hydraulic pressure
31/14 . . against frost heaves in soil **[3]**

33/00 Testing foundations or foundation structures (testing methods or apparatus, see the relevant subclasses of class G01; testing structures or apparatus as regards function, in general, G01M; investigating or analysing materials by determining their chemical or physical properties, in general G01N)

35/00 Straightening, lifting, or lowering of foundation structures or of constructions erected on foundations

37/00 Repair of damaged foundations or foundation structures

E02F DREDGING; **SOIL-SHIFTING** (winning peat E21C 49/00)

Note

This subclass covers:
– primarily equipment for excavating or loosening earth or for moving loose earth;
– equipment for working similarly on other materials and similar equipment for loading or unloading materials.

Subclass index

1/00 **General working methods with dredgers or soil-shifting machines** (methods for making embankments E02D 17/18; methods for mining E21C)

3/00 **Dredgers**; **Soil-shifting machines** (for special purposes E02F 5/00; other machines or apparatus for mining E21C; tunnelling E21D)

3/02 . hand-operated
3/04 . mechanically-driven
3/06 . . with digging screws
3/08 . . with digging elements on an endless chain (conveyers B65G)
3/10 . . . with tools that only loosen the material
3/12 . . . Component parts
3/14 . . . . Buckets; Chains; Guides for buckets or chains; Drives for chains
3/16 . . . . Safety or control devices (safety devices in general F16P; controlling in general G05)
3/18 . . with digging wheels turning round an axis
3/20 . . . with tools that only loosen the material
3/22 . . . Component parts
3/24 . . . . Digging wheels; Digging elements of wheels; Drives for wheels
3/26 . . . . Safety or control devices (safety devices in general F16P; controlling in general G05)
3/28 . . with digging tools mounted on a dipper- or bucket-arm, e.g. dippers, buckets **[4]**
3/30 . . . with a dipper-arm pivoted on a cantilever beam
3/32 . . . . working downwardly and towards the machine, e.g. with backhoes
3/34 . . . with bucket-arms directly pivoted on the frames of tractors or self-propelled machines **[4]**
3/342 . . . . Buckets emptying overhead (E02F 3/348 to E02F 3/358 take precedence) **[4]**
3/345 . . . . Buckets emptying side-ways (E02F 3/348 to E02F 3/358 take precedence) **[4]**
3/348 . . . . Buckets emptying into a collecting or conveying device **[4]**
3/352 . . . . Buckets movable along a fixed guide **[4]**
3/355 . . . . Buckets connected to the rear end of a tractor **[4]**
3/358 . . . . Bucket-arms pivoted on a turntable being part of a tractor frame **[4]**
3/36 . . . Component parts
3/38 . . . . Cantilever beams; Dipper-arms; Bucket-arms **[4]**
3/39 . . . . . with telescopic arms **[4]**
3/40 . . . . Dippers; Buckets **[4]**
3/407 . . . . . with ejecting device **[4]**
3/413 . . . . . with grabbing device (grab equipment for cranes B66C) **[4]**
3/42 . . . . Drives for dippers, buckets, dipper-arms or bucket-arms **[4]**
3/43 . . . . . Control of dipper or bucket position; Control of sequence of drive operations **[4]**
3/46 . . with reciprocating digging or scraping elements moved by cables or hoisting ropes **[4]**
3/47 . . . with grab buckets (grab equipment for cranes B66C) **[4]**
3/48 . . . Drag-lines
3/50 . . . with buckets or other digging elements moved along a rigid guideway
3/52 . . . Cableway excavators (cable cranes B66C)
3/54 . . . Cable scrapers
3/56 . . . . with hand-controlled scraper or other digging elements
3/58 . . . Component parts
3/60 . . . . Buckets, scrapers, or other digging elements
3/627 . . Devices to connect beams or arms to a tractor or similar self-propelled machine **[4]**
3/633 . . . Drives therefor **[4]**
3/64 . . Bucket cars, i.e. having scraper bowls **[4]**
3/65 . . . Component parts, e.g. drives, control devices **[4]**
3/76 . . Graders, bulldozers, or the like with scraper plates or ploughshare-like elements (soil working A01B); Levelling devices **[4]**
3/78 . . . with rotating digging elements
3/80 . . . Component parts
3/815 . . . . Blades; Levelling tools **[4]**
3/84 . . . . Drives or control devices therefor
3/85 . . . . . Applications of hydraulic or pneumatic systems
3/88 . . with arrangements acting by a sucking or forcing effect, e.g. suction dredgers (pumps in general F04)
3/90 . . . Component parts, e.g. drives, control devices
3/92 . . . . Digging elements, e.g. suction heads
3/94 . . . . Apparatus for separating stones from the dredged material
3/96 . . with arrangements for alternate use of different digging elements

5/00 **Dredgers or soil-shifting machines for special purposes**

5/02 . for digging trenches or ditches (agricultural ploughs for working ridges A01B 13/02)
5/04 . . with digging screws
5/06 . . with digging elements mounted on an endless chain
5/08 . . with digging wheels turning round an axis
5/10 . . with arrangements for reinforcing trenches or ditches; with arrangements for making or assembling conduits or for laying conduits or cables (laying pipes per se F16L 1/00; making pipes in situ F16L 1/038; laying electric cables per se H02G 1/06) **[6]**
5/12 . . with equipment for back-filling trenches or ditches (E02F 5/10 takes precedence) **[3]**
5/14 . . Component parts for trench excavators, e.g. indicating devices

5/16 . Machines for digging other holes in the soil (earth drilling E21)
5/18 . . for horizontal holes
5/20 . . for vertical holes
5/22 . for making embankments; for back-filling (in combination with trench excavators E02F 5/12)
5/24 . . Depositing dredged material in mounds
5/26 . . Combined conveying-bridges and dredgers
5/28 . for cleaning watercourses or other waters
5/30 . Auxiliary apparatus, e.g. for thawing, cracking, blowing-up, or other preparatory treatment of the soil
5/32 . . Rippers **[4]**

7/00 Equipment for conveying or separating excavated material (barges adapted for carrying-away material from floating dredgers B63B 35/28)
7/02 . Conveying equipment mounted on a dredger (conveyers in general B65G)
7/04 . Loading devices mounted on a dredger (loading devices in general B65G)
7/06 . Delivery chutes or screening plants mounted on a dredger (separating equipment in general B03; delivery chutes in general B65G)
7/10 . Pipe-lines for conveying excavated materials (pipes in general F16L; pipe-line systems F17D)

9/00 Component parts of dredgers or soil-shifting machines, not restricted to one of the kinds covered by groups E02F 3/00 to E02F 7/00 (laying-out or take-up devices for trailing electric cables B66C) **[3]**
9/02 . Travelling gear (for motor vehicles B60B, B60G; undercarriages for locomotives or railroad cars B61F; track-laying vehicles B62D; for cranes B66C)
9/04 . . Walking gears moving the dredger forward step-by-step
9/06 . Floating substructures as supports
9/08 . Superstructures; Supports for superstructures
9/10 . . Supports for movable superstructures mounted on travelling or walking gears or on other superstructures
9/12 . . . Slewing or traversing gears (roller and ball bearings F16C)
9/14 . Booms; Cable suspensions
9/16 . Cabins, platforms, or the like for the driver (for cranes B66C 13/54)
9/18 . Counterweights
9/20 . Drives; Control devices (gearing in general F16H; controlling in general G05; electric multi-motor drives H02K, H02P)
9/22 . . Hydraulic or pneumatic drives
9/24 . Safety devices
9/26 . Indicating devices
9/28 . Small metalwork for digging elements, e.g. teeth

E03 WATER SUPPLY; SEWERAGE

E03B INSTALLATIONS OR METHODS FOR OBTAINING, COLLECTING, OR DISTRIBUTING WATER (drilling wells, obtaining fluids in general from wells E21B; pipe-line systems in general F17D)

Subclass index

1/00 **Methods or layout of installations for water supply** (E03B 3/00, E03B 9/00 take precedence) **[4]**

1/02 . for public or like main supply

1/04 . for domestic or like local supply

3/00 **Methods or installations for obtaining or collecting drinking water or tap water** (treatment of water C02F) **[4]**

3/02 . from rain-water

3/03 . . Special vessels for collecting or storing rain-water for use in the household, e.g. water-butts

3/04 . from surface water

3/06 . from underground

3/08 . . Obtaining and confining water by means of wells (applicable to a combination of water and other liquids or to other liquids only E21B 43/00)

3/10 . . . by means of pit wells

3/11 . . . . in combination with tubes, e.g. perforated, extending horizontally, or upwardly inclined, exterior to the pits

3/12 . . . by means of vertical pipe wells

3/14 . . . by means of horizontal or oblique wells

3/15 . . . Keeping wells in good condition, e.g. by cleaning, repairing, regenerating; Maintaining or enlarging the capacity of wells or water-bearing layers (with artificial enrichment E03B 3/32)

3/16 . . . Component parts of wells

3/18 . . . . Well filters (filters in general B01D 24/00 to B01D 35/00)

3/20 . . . . . of elements of special shape

3/22 . . . . . Selection of specified materials

3/24 . . . . . formed of loose materials, e.g. gravel

3/26 . . . . . with packed filtering material

3/28 . from humid air (condensing of vapours in general B01D 5/00; dehumidification of air for air-conditioning F24F 3/14)

3/30 . from snow or ice **[4]**

3/32 . with artificial enrichment, e.g. by adding water from a pond or a river

3/34 . . of underground water

3/36 . . of surface water

3/38 . Curbs for springs

3/40 . Other devices for confining, e.g. trenches, drainage

5/00 **Use of pumping plants or installations**; **Layouts thereof** (pumps, pumping plants or installations per se, F04)

5/02 . arranged in buildings

5/04 . arranged in wells

5/06 . . Special equipment

7/00 **Water main or service pipe systems** (pipes or tubes in general F16L)

7/02 . Public or like main pipe systems

7/04 . Domestic or like local pipe systems (domestic plumbing E03C 1/02)

7/07 . Arrangement of devices, e.g. filters, flow controls, measuring devices, siphons, valves, in the pipe systems (devices per se, see the relevant classes for these devices)

7/08 . . Arrangement of draining devices (draining devices in general F16K, F16L)

7/09 . Component parts or accessories (tools for cleaning pipes B08B 9/02; devices for preventing contamination of drinking water pipes for domestic use E03C 1/10; devices for preventing damage in case of bursts of pipes F16L; heating of pipes in general F16L 53/00)

7/10 . . Devices preventing bursting of pipes by freezing (devices preventing bursting of pipes in general F16L 55/00)

7/12 . . . by preventing freezing

7/14 . . Devices for thawing frozen pipes

9/00 **Methods or installations for drawing-off water** (domestic water-drawing devices E03C; taps or valves per se F16K) **[4]**

9/02 . Hydrants; Arrangement of valves therein; Keys for hydrants

9/04 . . Column hydrants

9/06 . . . Covers

9/08 . . Underground hydrants

9/10 . . . Protective plates or covers

9/12 . . . Stand-pipes

9/14 . . Draining devices for hydrants

9/16 . . Devices for retaining foreign matter, e.g. sand

9/18 . . Cleaning tools for hydrants

9/20 . . Pillar fountains or like apparatus for dispensing drinking water

11/00 **Arrangements or adaptations of tanks for water supply** (water-butts E03B 3/03; storage aspects B65D, B65G, F17B, F17C; foundations E02D 27/38; construction or assembling of bulk storage containers employing civil engineering techniques E04H 7/00; tower aspects E04H 12/00)

11/02 . for domestic or like local water supply

11/04 . . without air regulator

11/06 . . with air regulator

11/08 . . . Air regulators

11/10 . for public or like main water supply

11/12 . . of high-level tanks
11/14 . . of underground tanks
11/16 . . Adaptations of devices for putting pumping plants in and out of operation, e.g. automatic control devices

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E03C DOMESTIC PLUMBING INSTALLATIONS FOR FRESH WATER OR WASTE WATER (not connected to either water-supply main or to waste pipe A47K; devices of the kind used in the ground E03B, E03F); **SINKS**

1/00 Domestic plumbing installations for fresh water or waste water; Sinks
1/01 . for combinations of baths, showers, sinks, wash-basins, closets, urinals, or the like
1/02 . Plumbing installations for fresh water
1/04 . . Water-basin installations specially adapted to wash-basins or baths (valves, faucets, mixing valves, taps F16K)
1/042 . . . Arrangements on taps for wash-basins or baths for connecting to the wall
1/044 . . . having a heating or cooling apparatus in the supply line (water heaters, e.g. with continuous flow, F24H)
1/046 . . . Adding soap, disinfectant, or the like, in the supply line (preventing contamination of drinking-water pipes E03C 1/10)
1/048 . . . supplying water through two or more openings around or along one side of the water-basin
1/05 . . Arrangements of devices on wash-basins, baths, sinks, or the like, for remote control of taps (remote control of taps or the like, per se F16K)
1/06 . . Devices for suspending or supporting the supply pipe or supply hose of a shower-bath
1/08 . . Jet regulators, e.g. anti-splash devices
1/084 . . . Jet regulators with aerating means
1/086 . . . Jet regulators or jet guides, easily mountable on the outlet of taps
1/10 . . Devices for preventing contamination of drinking-water pipes, e.g. means for aerating self-closing flushing valves (vacuum-breakers in general F16K, F16L)
1/12 . Plumbing installations for waste water; Basins or fountains connected thereto (drainage devices in floors E03F 5/04); Sinks
1/122 . . Pipe-line systems for waste water in buildings (pipe-line systems in general F17D)
1/126 . . Installations for disinfecting or deodorising waste-water plumbing installations
1/14 . . Wash-basins connected to the waste pipe
1/16 . . Wash-fountains connected to the waste pipe
1/18 . . Sinks, whether or not connected to the waste-pipe
1/181 . . . Anti-splash devices in sinks (jet regulators E03C 1/08)
1/182 . . . connected to the waste pipe
1/184 . . . . adapted for attachment of washing machines or heating or cooling devices (washing machines for attachment D06F 7/00)
1/186 . . . Separate partition walls, lids, protecting borders, or the like, for sinks
1/20 . . Connecting baths or bidets to the waste pipe
1/22 . . Outlet devices mounted in basins, baths, or sinks (stoppers A47K 1/14)
1/23 . . . with mechanical closure mechanisms
1/232 . . . . combined with overflow devices (overflow devices for basins or baths per se E03C 1/24)
1/24 . . Overflow devices for basins or baths (E03C 1/232 takes precedence)
1/242 . . . automatically actuating supply or draining valves
1/244 . . . Separate devices to be placed on the outlet opening
1/26 . . Object-catching inserts or similar devices for waste pipes or outlets (E03C 1/28 takes precedence)
1/262 . . . combined with outlet stoppers
1/264 . . . Separate sieves or similar object-catching inserts
1/266 . . . Arrangement of disintegrating apparatus in waste pipes or outlets; Disintegrating apparatus specially adapted for installation in waste pipes or outlets
1/28 . . Odour seals
1/282 . . . combined with additional object-catching devices
1/284 . . . having U-shaped trap
1/286 . . . . having hand-operated valves against return of waste water
1/288 . . . . having non-return valves against return of waste water (E03C 1/286 takes precedence)
1/29 . . . having housing containing dividing wall, e.g. tubular
1/292 . . . . having elastic housing
1/294 . . . with provisions against loss of water lock
1/295 . . . . using air-supply valves
1/296 . . . . using water-supply valves
1/298 . . . consisting only of non-return valve
1/30 . . Devices to facilitate removing of obstructions in waste pipes or sinks
1/302 . . . using devices moved through the pipes
1/304 . . . using fluid under pressure
1/306 . . . . by means of a tube connected to the water mains
1/308 . . . . by means of a pumping device
1/32 . . Holders or supports for basins
1/322 . . . connected to the wall only
1/324 . . . . adjustable
1/326 . . . resting on the floor
1/328 . . . . adjustable
1/33 . . . Fastening sinks or basins in an apertured support

E03D WATER-CLOSETS OR URINALS WITH FLUSHING DEVICES; FLUSHING VALVES THEREFOR

Subclass index

1/00 Water flushing devices with cisterns

1/01 . Shape or selection of material for flushing cisterns
1/012 . . Details of shape of cisterns, e.g. for connecting to wall, for supporting or connecting flushing-device actuators
1/02 . High-level flushing systems
1/04 . . Cisterns with bell siphons
1/05 . . . with movable siphon bells
1/06 . . Cisterns with tube siphons
1/07 . . . with movable or deformable siphon tubes
1/08 . . . Siphon action initiated by air or water pressure
1/10 . . . Siphon action initiated by raising the water level in the cistern, e.g. by means of displacement members
1/12 . . . Siphon action initiated by outlet of air
1/14 . . Cisterns discharging variable quantities of water (twin or multiple flushing cisterns E03D 1/22; flushing devices operated by pressure of the water supply system and discharging variable quantities of water E03D 3/12)
1/16 . . Cisterns for periodical discharge
1/18 . . Cisterns empty when not in action
1/20 . . Cisterns with tiltably-mounted containers
1/22 . . Twin or multiple flushing cisterns
1/24 . Low-level flushing systems
1/26 . . Bowl with flushing cistern mounted on the rearwardly extending end of the bowl (shape or material of the cistern E03D 1/01; constructional features of the bowl E03D 11/02 to E03D 11/12)
1/28 . . Bowl integral with the flushing cistern
1/30 . Valves for high or low cisterns; Their arrangement (inlet valves, valves in general F16K)
1/32 . . Arrangement of inlet valves (devices for reducing noise E03D 9/14)
1/33 . . Adaptations or arrangements of floats (actuating-floats in general F16K 33/00)
1/34 . . Flushing valves for outlets; Arrangement of outlet valves
1/35 . . . Flushing valves having buoyancy **[2]**
1/36 . . Associated working of inlet and outlet valves
1/38 . Adaptations or arrangements of flushing pipes (noise-absorbing means in pipe systems F16L 55/00)

3/00 Flushing devices operated by pressure of the water supply system

3/02 . Self-closing flushing valves (self-closing valves in general F16K 21/04)
3/04 . . with piston valve and pressure chamber for retarding the valve-closing movement
3/06 . . with diaphragm valve and pressure chamber for retarding the valve-closing movement
3/08 . . with other retarding devices
3/10 . Flushing devices with pressure-operated reservoir, e.g. air chamber
3/12 . Flushing devices discharging variable quantities of water (flushing cisterns discharging variable quantities of water E03D 1/14)

5/00 Special constructions of flushing devices (in motor vehicles or trailers B60R 15/00; in railway carriages B61D 35/00; in ships B63B 29/14; in aircraft B64D 11/02)

5/01 . using flushing pumps
5/012 . combined with movable closure elements in the bowl outlet (bowls with closure elements between bottom or outlet and outlet pipe E03D 11/10)
5/014 . . with devices for separate removal of liquids and solids
5/016 . with recirculation of bowl-cleaning fluid
5/02 . operated mechanically or hydraulically (E03D 5/01, E03D 5/12 take precedence)
5/04 . . directly by the seat or cover
5/06 . . directly by the door
5/08 . . directly by foot
5/09 . . directly by hand
5/092 . . . the flushing element, e.g. siphon bell, being actuated through a lever
5/094 . . . the flushing element, e.g. siphon bell, being actuated through a cable, chain, or the like
5/10 . operated electrically (E03D 5/01, E03D 5/12 take precedence)
5/12 . discharging periodically (high-level cisterns for periodical discharge E03D 1/16)

7/00 Wheeled lavatories (wheeled closets without flushing A47K 11/00; construction of land vehicles B62)

9/00 Sanitary or other accessories for lavatories (hand tools for cleaning the toilet bowl A47K 11/10; seats or covers for closets A47K 13/00; body supports, other than seats, for closets A47K 17/02; devices for preventing contamination of drinking-water pipes E03C 1/10)

9/02 . Devices adding a disinfecting, deodorising or cleaning agent to the water while flushing, or in the flushing tank (apparatus for disinfection of materials or objects in general A61L 2/00; treatment of water in general C02F)
9/03 . . consisting of a separate container with an outlet through which the agent is introduced into the flushing water, e.g. by suction
9/04 . Special arrangement or operation of ventilating devices (ventilating rooms in general F24F)
9/05 . . ventilating the bowl
9/052 . . . using incorporated fans **[2]**
9/06 . Auxiliary chambers with water connection to the flushing pipe and adapted to receive utensils for bowl-cleaning, e.g. brushes

9/08 . Devices in the bowl producing upwardly-directed sprays; Modifications of the bowl for use with such devices (showers A47K 3/28; bathing devices for special therapeutic or hygienic purposes A61H 33/00, for specific parts of the body A61H 35/00)

9/10 . Waste-disintegrating apparatus combined with the bowl

9/12 . Means to prevent freezing of lavatories

9/14 . Noise-reducing means combined with flushing valves (noise-absorbing means in pipe systems F16L 55/00)

9/16 . Water pressure regulating means in flushing pipes

11/00 Other component parts of water-closets (pipe joints or couplings in general F16L)

11/02 . Water-closet bowls (auxiliary chambers with connections to flushing water for bowl-cleaning utensils E03D 9/06; modified for using upwardly-directed sprays E03D 9/08; seats or covers A47K 13/00)

11/04 . . Bowls of flat shape with only slightly inclined bottom

11/06 . . Bowls with downwardly-extending flanges

11/08 . . Bowls with means producing a flushing water swirl

11/10 . . Bowls with closure elements provided between bottom or outlet and the outlet pipe; Bowls with pivotally supported inserts

11/11 . . Bowls combined with a reservoir, e.g. containing apparatus for disinfecting or for disintegrating

11/12 . Swivel-mounted bowls, e.g. for use in restricted spaces

11/13 . Parts or details of bowls; Special adaptations of pipe joints or couplings for use with bowls **[2]**

11/14 . . Means for connecting the bowl to the wall, e.g. to a wall outlet **[2]**

11/16 . . Means for connecting the bowl to the floor, e.g. to a floor outlet **[2]**

11/17 . . Means for connecting the bowl to the flushing pipe **[2]**

11/18 . Siphons (for pipes in general F16L 43/00, F16L 45/00)

13/00 Urinals (without flushing devices A47K 11/00)

E03F SEWERS; CESSPOOLS

Subclass index

1/00 Methods, systems, or installations for draining-off sewage or storm water

3/00 Sewer pipe-line systems

3/02 . Arrangement of sewer pipe-lines or pipe-line systems

3/04 . Pipes or fittings specially adapted to sewers (manufacture of concrete tubes B28; pipes or pipe fittings in general F16L)

3/06 . Methods of, or installations for, laying sewer pipes (making pipes in situ F16L 1/038) **[6]**

5/00 Sewerage structures

5/02 . Manhole shafts or other inspection chambers (in general E02D 29/12); Snow-filling openings; Accessories (covers or frames for manholes or the like E02D 29/14)

5/04 . Gullies with or without odour seals or sediment traps

5/042 . . Arrangements of means against overflow of water, backing-up from the drain

5/046 . . adapted to be used with kerbs (E03F 5/06 takes precedence)

5/06 . . Gully gratings

5/08 . Ventilation of sewers

5/10 . Collecting-tanks; Equalising-tanks for regulating the run-off; Laying-up basins

5/12 . Emergency outlets

5/14 . Devices for separating liquid or solid substances from sewage, e.g. sand or sludge traps, rakes or grates (for use in sewage purification plants or both in sewage purification plants or in sewer systems B01D, C02F)

5/16 . . Devices for separating oil, water, or grease from sewage in drains leading to the main sewer

5/18 . Tanks for disinfecting, neutralising, or cooling sewage (arrangements in tanks as to the biological or chemical aspect C02F)

5/20 . Siphon pipes or inverted siphons (for connections of baths, basins, or the like E03C 1/12)

5/22 . Adaptations of pumping plants for lifting sewage (wheeled apparatus for emptying sewers or cesspools E03F 7/10; pumps, pumping plants, per se F04)

5/24 . Installations for neutralising explosions in sewers

5/26 . Installations for stirring-up sewage

7/00 Other installations or implements for operating sewer systems, e.g. for preventing or indicating stoppage; Emptying cesspools

7/02 . Shut-off devices (in general F16K)

7/04 . . Valves for preventing return flow

7/06 . Devices for restraining rats or other animals

7/08 . Hand implements for emptying sewers or cesspools

7/10 . Wheeled apparatus for emptying sewers or cesspools

7/12 . Installations enabling inspection personnel to drive along sewer canals

9/00 Arrangements or fixed installations for cleaning sewer pipes, e.g. by flushing (sediment traps, rakes, screens, or the like, arranged in sewer lines E03F 5/14; cleaning pipes in general, devices for cleaning pipes B08B 9/02)

11/00 Cesspools (emptying cesspools E03F 7/00; features relating to treatment of sewage C02F)

E04 BUILDING

E04B GENERAL BUILDING CONSTRUCTIONS; WALLS, E.G. PARTITIONS; ROOFS; FLOORS; CEILINGS; INSULATION OR OTHER PROTECTION OF BUILDINGS (border constructions of openings in walls, floors, or ceilings E06B 1/00)

(1) This subclass covers working methods used in constructing new buildings and analogous working methods on existing buildings. Other working methods on existing buildings, except those for insulating, are classified in group E04G 23/00. **[5]**

(2) In this subclass, the following term is used with the meaning indicated:
– "ceiling" includes all the finishing material concealing the underside of the load-carrying ceiling structure or roof structure. **[4]**

1/00 **Constructions in general**; **Structures which are not restricted either to walls, e.g. partitions, or floors or ceilings or roofs** (scaffolds, shutterings E04G; structures specially adapted for buildings for special purposes, general layout of buildings, e.g. modular co-ordination, E04H; the particular parts of buildings, see the relevant groups for those parts)

1/02 . Structures consisting primarily of load-supporting, block-shaped or slab-shaped elements (E04B 1/32 to E04B 1/36 take precedence)

1/04 . . the elements consisting of concrete, e.g. reinforced concrete, or other stone-like material

1/06 . . . the elements being prestressed

1/08 . . the elements consisting of metal

1/10 . . the elements consisting of wood

1/12 . . the elements consisting of other material

1/14 . . the elements being composed of two or more materials (of reinforced concrete E04B 1/04)

1/16 . Structures made from masses, e.g. concrete, cast or similarly formed in situ with or without making use of additional elements, such as permanent forms, sub-structures to be coated with load-bearing material (E04B 1/32 to E04B 1/36 take precedence)

1/18 . Structures comprising elongated load-supporting parts, e.g. columns, girders, skeletons (E04B 1/32 to E04B 1/36 take precedence; elongated load-supporting parts as elements, trusses, truss-like structures E04C 3/00)

1/19 . . Three-dimensional framework structures **[2]**

Note

Group E04B 1/19 takes precedence over groups E04B 1/20 to E04B 1/30. **[2]**

1/20 . . the supporting parts consisting of concrete, e.g. reinforced concrete, or other stone-like material

1/21 . . . Connections specially adapted therefor **[2]**

1/22 . . . with parts being prestressed

1/24 . . the supporting parts consisting of metal

1/26 . . the supporting parts consisting of wood

1/28 . . the supporting parts consisting of other material

1/30 . . the supporting parts being composed of two or more materials; Composite steel and concrete constructions (of reinforced concrete E04B 1/20)

1/32 . Arched structures; Vaulted structures; Folded structures (vaulted roofs E04B 7/08)

1/34 . Extraordinary structures, e.g. with suspended or cantilever parts supported by masts or tower-like structures enclosing elevators or stairs; Features relating to the elastic stability (E04B 1/342, E04B 1/343, E04B 1/348 take precedence; for floors E04B 5/43; buildings for special purposes, e.g. withstanding earthquake, E04H)

1/342 . Structures covering a large free area, whether open-sided or not, e.g. hangars, halls (roof trusses E04C 3/00; non-structural features for specified purposes, see the relevant groups of E04H)

1/343 . Structures characterised by movable, separable, or collapsible parts, e.g. for transport (movable roof parts E04B 7/16; floatable buildings B63B; small prefabricated buildings, transportable as a whole, E04H 1/12; small garages E04H 6/02; tents or canopies, in general E04H 15/00)

1/344 . . with hinged parts

1/346 . . Rotary buildings; Buildings with rotary units, e.g. rooms

1/348 . Structures composed of units comprising at least considerable parts of two sides of a room, e.g. box-like or cell-like units closed or in skeleton form (wall units locating conduits or the like E04C 2/52)

1/35 . Extraordinary methods of construction, e.g. lift-slab, jack-block (E04B 1/34 takes precedence; falsework, shuttering for shaping walls, floors, ceilings or roofs for structures of particular shape in situ E04G 11/04; conveying or assembling of building materials E04G 21/00; working measures on existing buildings E04G 23/00)

1/36 . Bearings or like supports allowing movement (for bridges E01D 19/04; buildings withstanding earthquake E04H 9/02)

1/38 . Connections for building structures in general

Note

Connections specially adapted for particular building parts or for particular building structures are classified in the groups for those parts or structures, e.g. in groups E04B 1/21, E04B 2/00, E04B 5/00, E04B 7/00 or E04B 9/00. Joints not specially adapted for building construction, or of more general application, are classified in the appropriate subclasses, e.g. F16B. **[5]**

1/41 . . Connecting devices specially adapted for embedding in concrete or masonry (spacers for cavity walls E04B 2/30, E04B 2/44; connectors for reinforcing elements E04C 5/16; fastening frames to the border of openings E06B 1/56)

1/48 . . Dowels, i.e. members adapted to penetrate the surfaces of two parts and to take the shear stresses

1/49 . . . with self-penetrating parts, e.g. claw dowels

1/58 . . of bar-shaped building elements
1/61 . . of slab-shaped building elements with each other **[5]**
1/62 . Insulation or other protection; Elements or use of specified material therefor (chemical compositions C01 to C11; implements for applying insulation or sealings E04F 21/00; buildings to withstand, or to provide protection against, external undesired influences E04H 9/00; sealing pipes in walls or partitions F16L 5/02; shielding against dangerous radiation G21F; constructions of particular parts of buildings, see the relevant groups for those parts)
1/64 . . for making damp-proof; Protection against corrosion (sealings E04B 1/66)
1/66 . . Sealings (additions of anti-leak properties to plaster C04B; bituminous sealing masses C08L 95/00; sealings for hydraulic engineering work in general E02B 3/16; against ground humidity or ground water E02D 31/02; coverings against rain or other precipitations of the atmosphere E04D; composition of material or manufacture of sealing foils, see the relevant classes for these foils)
1/68 . . . of joints, e.g. expansion joints (packing for joints in roads or airfields E01C 11/02; expansion joints for bridges E01D 19/06; sealing joints between foundation piles E02D 5/14; joints in foundation structures E02D 29/16; devices for sealing the spaces or joints between roof-covering elements E04D 1/36; sealing joints between roof-covering elements E04D 3/38; construction of joints for flooring or floor layers made of masses in situ E04F 15/14)
1/682 . . . . formed in situ **[5]**
1/684 . . . . using preformed elastomeric elements **[5]**
1/686 . . . . . comprising a plurality of hollow, deformable internal cells **[5]**
1/70 . . Drying or keeping dry, e.g. by air vents (by sealings E04B 1/66; during erection E04G 21/28)
1/72 . . Pest control (by keeping dry E04B 1/70; impregnation of wood or like materials B27K)
1/74 . . Heat, sound or noise insulation, absorption, or reflection (forms of, or arrangements in, rooms for influencing or directing sound E04B 1/99); Other building methods affording favourable thermal or acoustical conditions, e.g. accumulating of heat within walls (fire protection E04B 1/94; elements chiefly adapted for structural purposes E04C 1/00 to E04C 3/00; chiefly adapted for surface coverings E04F 13/00; as underlayers for floor coverings E04F 15/18; closures for wall or like openings E06B)
1/76 . . . specifically with respect to heat only (heat insulation in general F16L 59/00)
1/78 . . . . Heat insulating elements
1/80 . . . . . slab-shaped
1/82 . . . specifically with respect to sound only (noise damping in ducts or channels E04F 17/00; noise damping in general G10K 11/16)
1/84 . . . . Sound-absorbing elements
1/86 . . . . . slab-shaped
1/88 . . . Insulating elements for both heat and sound
1/90 . . . . slab-shaped
1/92 . . Protection against other undesired influences or dangers (buildings providing protection against external dangers E04H 9/00; shielding against dangerous radiation G21F)
1/94 . . . against fire (fire-fighting A62C; impregnation of wood or similar materials B27K; fireproof doors E06B 5/16)
1/98 . . . against vibrations or shocks (on foundations E02D 31/08); against mechanical destruction, e.g. by air-raids (against incendiary damage only E04B 1/94; finishing work therefor E04F; buildings withstanding earthquake or the like, shelters, arrangements of splinter-catching walls E04H 9/00)
1/99 . Room acoustics, i.e. forms of, or arrangements in, rooms for influencing or directing sound (E04B 1/82 takes precedence; acoustics in general G10K 11/00; electric signal processing for producing a reverberation or echo sound G10K 15/08)

2/00 **Walls, e.g. partitions, for buildings**; **Wall construction with regard to insulation**; **Connections specially adapted to walls** (connections for building structures in general E04B 1/38; insulation for building in general E04B 1/62; building elements of relatively thin form for parts of buildings E04C 2/00)
2/02 . built-up from layers of building elements
2/04 . . Walls having neither cavities between, nor in, the solid elements
2/06 . . . using elements having specially-designed means for stabilising the position
2/08 . . . . by interlocking of projections or inserts with indentations, e.g. of tongues, grooves, dovetails
2/10 . . . . by filling material with or without reinforcements in small channels in, or in grooves between, the elements
2/12 . . . using elements having a general shape differing from that of a parallelepiped
2/14 . . Walls having cavities in, but not between, the elements, i.e. each cavity being enclosed by at least four sides forming part of one single element
2/16 . . . using elements having specially designed means for stabilising the position
2/18 . . . . by interlocking of projections or inserts with indentations, e.g. of tongues, grooves, dovetails
2/20 . . . . by filling material with or without reinforcements in small channels in, or in grooves between, the elements
2/22 . . . using elements having a general shape differing from that of a parallelepiped
2/24 . . . the walls being characterised by fillings in some of the cavities forming load-bearing pillars or beams
2/26 . . . the walls being characterised by fillings in all cavities in order to form a wall construction
2/28 . . Walls having cavities between, but not in, the elements; Walls of elements each consisting of two or more parts kept in distance by means of spacers, all parts being solid
2/30 . . . using elements having specially designed means for stabilising the position; Spacers for cavity walls
2/32 . . . . by interlocking of projections or inserts with indentations, e.g. of tongues, grooves, dovetails
2/34 . . . . by filling material with or without reinforcements in small channels in, or in grooves between, the elements
2/36 . . . using elements having a general shape differing from that of a parallelepiped

2/38 . . . the walls being characterised by fillings in some of the cavities forming load-bearing pillars or beams

2/40 . . . the walls being characterised by fillings in all cavities in order to form a wall construction

2/42 . . Walls having cavities between, as well as in, the elements; Walls of elements each consisting of two or more parts, kept in distance by means of spacers, at least one of the parts having cavities

2/44 . . . using elements having specially designed means for stabilising the position; Spacers for cavity walls

2/46 . . . . by interlocking of projections or inserts with indentations, e.g. of tongues, grooves, dovetails

2/48 . . . . by filling material with or without reinforcements in small channels in, or in grooves between, the elements

2/50 . . . using elements having a general shape differing from that of a parallelepiped

2/52 . . . the walls being characterised by fillings in some of the cavities forming load-bearing pillars or beams

2/54 . . . the walls being characterised by fillings in all cavities in order to form a wall construction

2/56 . Walls of framework or pillarwork; Walls incorporating load-bearing elongated members (E04B 2/74, E04B 2/88 take precedence; pillars E04C 3/30)

2/58 . . with elongated members of metal

2/60 . . . characterised by special cross-section of the elongated members

2/62 . . . . the members being formed of two or more elements in side-by-side relationship

2/64 . . with elongated members of concrete

2/66 . . . characterised by special cross-section of the elongated members

2/68 . . . made by filling-up wall cavities (E04B 2/24, E04B 2/38, E04B 2/52 take precedence)

2/70 . . with elongated members of wood

2/72 . Walls of elements of relatively thin form (E04B 2/56, E04B 2/74, E04B 2/88 take precedence; with joint fillings acting as framework or pillars E04B 2/68; elements E04C 2/00)

2/74 . Removable non-load-bearing partitions; Partitions with a free upper edge (framed panels E04C 2/38)

2/76 . . with framework or posts of metal

2/78 . . . characterised by special cross-section of the frame members

2/80 . . with framework or posts of wood

2/82 . . characterised by the manner in which edges are connected to the building; Means therefor; Special details of easily-removable partitions

2/84 . Walls made by casting, pouring, or tamping in situ (E04B 2/02, E04B 2/56 take precedence; forms therefor E04G 11/06; working of concrete or similar masses able to be cast or poured in situ E04G 21/02)

2/86 . . made in permanent forms

2/88 . Curtain walls

2/90 . . comprising panels directly attached to the structure **[4]**

2/92 . . . Sandwich-type panels **[4]**

2/94 . . . Concrete panels (E04B 2/92 takes precedence) **[4]**

2/96 . . comprising panels attached to the structure through mullions or transoms **[4]**

5/00 **Floors**; **Floor construction with regard to insulation**; **Connections specially adapted therefor** (elements for floors, e.g. bricks, stones, filling bodies, girders, E04C; flooring as finishing work, insulation of flooring, sectional false floors, e.g. for computers, E04F 15/00) **[5]**

5/02 . Load-carrying floor structures formed substantially of prefabricated units (E04B 5/43 to E04B 5/48 take precedence)

5/04 . . with beams of concrete or other stone-like material, e.g. asbestos cement (E04B 5/08, E04B 5/14 take precedence)

5/06 . . . placed against one another

5/08 . . assembled of block-shaped elements, e.g. hollow stones (E04B 5/14 takes precedence; floors composed of reinforced brickwork E04B 5/44)

5/10 . . with metal beams or girders, e.g. with steel lattice girders (E04B 5/14 takes precedence)

5/12 . . with wooden beams (E04B 5/14 takes precedence)

5/14 . . with beams or girders laid in two directions

5/16 . Load-carrying floor structures wholly or partly cast or similarly formed in situ (E04B 5/43 to E04B 5/48 take precedence; floors merely characterised by the prefabricated elements E04C)

5/17 . . Floor structures partly formed in situ

5/18 . . . with stiffening ribs or other beam-like formations wholly cast between filling members

5/19 . . . . the filling members acting as self-supporting permanent forms (E04B 5/21 takes precedence)

5/21 . . . . Cross-ribbed floors

5/23 . . . with stiffening ribs or other beam-like formations wholly or partly prefabricated (with all load-carrying parts substantially consisting of prefabricated units E04B 5/02)

5/26 . . . . with filling members between the beams (E04B 5/28 takes precedence)

5/28 . . . . Cross-ribbed floors

5/29 . . . . the prefabricated parts of the beams consisting wholly of metal (E04B 5/28 takes precedence)

5/32 . . Floor structures wholly cast in situ with or without form units or reinforcements

5/36 . . . with form units as part of the floor

5/38 . . . . with slab-shaped form units acting simultaneously as reinforcement; Form slabs with reinforcements extending laterally outside the element

5/40 . . . . . with metal form slabs

5/43 . Floor structures of extraordinary design; Features relating to the elastic stability; Floor structures specially designed for resting on columns only, e.g. mushroom floors (extraordinary constructions in general E04B 1/34)

5/44 . Floors composed of stones, mortar, and reinforcing elements (with inserts of glass E04B 5/46)

5/46 . Special adaptation of floors for transmission of light, e.g. by inserts of glass (of ceilings E04B 9/32; block-shaped elements E04C 1/42; slab- or sheet-shaped elements E04C 2/54; for roof covering E04D 3/06) **[5]**

5/48 . Special adaptations of floors for incorporating ducts, e.g. for heating or ventilating (in block-shaped elements E04C 1/39; in slab- or sheet-shaped elements E04C 2/52)

7/00 **Roofs**; **Roof construction with regard to insulation** (structures for roofs as well as for floors E04B 5/00; ceilings E04B 9/00; greenhouses A01G 9/14; large containers having floating covers B65D 88/34; roof trusses, truss-like structures, joists E04C 3/02; roof coverings E04D) **[5]**

7/02 . with plane sloping surfaces, e.g. saddle roofs (E04B 7/12 takes precedence)

7/04 . . supported by horizontal beams or the equivalent resting on the walls (E04B 7/06 takes precedence)

7/06 . . Constructions of roof intersections or hopped ends

7/08 . Vaulted roofs (E04B 7/14 takes precedence; vaulted structures in general E04B 1/32; inflatable tents or canopies, in general E04H 15/20; inflatable forms for shaping in situ E04G 11/04)

7/10 . . Shell structures, e.g. of hyperbolic-parabolic shape; Grid-like formations acting as shell structures; Folded structures

7/12 . formed in bays, e.g. sawtooth roofs (E04B 7/10 takes precedence)

7/14 . Suspended roofs (suspended tents or canopies, in general E04H 15/04)

7/16 . Roof structures with movable roof parts (buildings for special purposes E04H)

7/18 . Special structures in or on roofs, e.g. dormer windows (in connection with roof coverings E04D 13/00, especially domes E04D 13/03)

7/20 . Roofs consisting of self-supporting slabs, e.g. able to be loaded **[5]**

7/22 . . the slabs having insulating properties, e.g. being laminated with layers of insulating material (E04B 7/24 takes precedence) **[6]**

7/24 . . the slabs being collapsible, e.g. for transport **[6]**

9/00 **Ceilings**; **Construction of ceilings, e.g. false ceilings**; **Ceiling construction with regard to insulation** (ceilings used as forms for making floors E04B 5/00; coverings or linings for ceilings E04F 13/00) **[5]**

9/02 . having means for ventilation or vapour discharge **[5]**

9/04 . comprising slabs, sheets or the like (E04B 9/06 to E04B 9/34 take precedence; slabs, sheets or the like per se E04C 2/00) **[5]**

9/06 . characterised by constructional features of the supporting construction **[5]**

9/08 . . having the capability of expansion **[5]**

9/10 . . Connections between parallel members of the supporting construction (E04B 9/08 takes precedence) **[5]**

9/12 . . Connections between non-parallel members of the supporting construction (E04B 9/08 takes precedence) **[5]**

9/14 . . . all the members being discontinuous and lying at least partly in the same plane **[5]**

9/16 . . . the members lying in different planes **[5]**

9/18 . Means for suspending the supporting construction **[5]**

9/20 . . adjustable **[5]**

9/22 . Connection of slabs, sheets or the like to the supporting construction **[5]**

9/24 . . with the slabs, sheets or the like positioned on, or held against, horizontal flanges of the supporting construction **[5]**

9/26 . . . by means of snap action of elastically deformable elements **[5]**

9/28 . . with the slabs, sheets or the like having grooves engaging with horizontal flanges of the supporting construction or accessory means connected thereto **[5]**

9/30 . characterised by edge details of the ceiling, e.g. securing to an adjacent wall **[5]**

9/32 . Translucent ceilings, i.e. permitting both the transmission and diffusion of light (E04B 9/34 takes precedence; lighting F21) **[5]**

9/34 . Open-work ceilings, e.g. lattice type (E04B 9/30 takes precedence) **[5]**

9/36 . . consisting of parallel slats **[5]**

E04C **STRUCTURAL ELEMENTS**; **BUILDING MATERIALS** (for bridges E01D; specially designed for insulation or other protection E04B; elements used as building aids E04G; for mining E21; for tunnels E21D; structural elements with broader range of application than for building engineering F16, particularly F16S)

1/00 **Building elements of block or other shape for the construction of parts of buildings** (of relatively thin form E04C 2/00; structural elongated elements designed for load-supporting E04C 3/00, e.g. columns or pillars E04C 3/30; manufacture or material of building bricks, stones, or the like B28, C03, C04; paving elements E01C; general building constructions E04B, e.g. walls E04B 2/00, floors E04B 5/00, roofs E04B 7/00, ceilings E04B 9/00; structural elements specially designed for built-in conduit shafts E04F; special elements for building ovens or furnaces F24B, F27D) **[5]**

1/39 . characterised by special adaptations, e.g. serving for locating conduits, for forming soffits, cornices, or shelves, for fixing wall-plates or door-frames, for claustra

1/40 . built-up from parts of different materials, e.g. composed of layers of different materials or stones with filling material or with insulating inserts

1/41 . . composed of insulating material and load-bearing concrete, stone or stone-like material **[6]**

1/42 . of glass or other transparent material

2/00 **Building elements of relatively thin form for the construction of parts of buildings, e.g. sheet materials, slabs, or panels** (materials or manufacture, see the relevant places, e.g. B27N, B29, D21J; made in situ E04B; specially designed for insulation or other protection E04B 1/62; load-carrying floor structures E04B 5/02, E04B 5/16; roofs consisting of self-supporting slabs E04B 7/20; roof- or like covering elements E04D 3/00; for lining or finishing E04F 13/00)

2/02 . characterised by specified materials (translucent E04C 2/54)

2/04 . . of concrete or other stone-like material; of asbestos cement (E04C 2/26 takes precedence; material or manufacture B28, C04)

2/06 . . . reinforced

2/08 . . of metal, e.g. sheet metal (E04C 2/26 takes precedence)

2/10 . . of wood, fibres, chips, vegetable stems, or the like; of plastics; of foamed products (E04C 2/26 takes precedence)

2/12 . . . of solid wood

2/14 . . . . reinforced
2/16 . . . of fibres, chips, vegetable stems, or the like
2/18 . . . . with binding wires, reinforcing bars, or the like
2/20 . . . of plastics
2/22 . . . . reinforced
2/24 . . . laminated and composed of materials covered by two or more of groups E04C 2/12, E04C 2/16, E04C 2/20
2/26 . . composed of materials covered by two or more of groups E04C 2/04, E04C 2/08, E04C 2/10, or of materials covered by one of these groups with a material not specified in one of these groups
2/28 . . . combinations of materials fully covered by groups E04C 2/04 and E04C 2/08
2/284 . . . at least one of the materials being insulating **[6]**
2/288 . . . . composed of insulating material and concrete, stone or stone-like material **[6]**
2/292 . . . . composed of insulating material and sheet metal **[6]**
2/296 . . . . composed of insulating material and non-metallic or unspecified sheet-material (E04C 2/288 takes precedence) **[6]**
2/30 . characterised by the shape or structure (translucent E04C 2/54)
2/32 . . formed of corrugated or otherwise indented sheet-like material; composed of such layers with or without layers of flat sheet-like material
2/34 . . composed of two or more spaced sheet-like parts (E04C 2/32 takes precedence; spacers for cavity walls E04B 2/44)
2/36 . . . spaced apart by transversely-placed strip material, e.g. honeycomb panels (honeycomb or other core members for layered products B32B)
2/38 . . with attached ribs, flanges, or the like, e.g. framed panels (concerned with attaching to other panels or elements to form a structure, see the places for the relevant structure, e.g. E04B 2/00)
2/40 . . composed of a number of smaller components rigidly or movably connected together, e.g. interlocking, hingedly connected
2/42 . . Gratings; Grid-like panels (reinforcing elements E04C 5/00; built-in gratings E04F 19/10; gratings in general F16S 3/00)
2/52 . . with special adaptations for auxiliary purposes, e.g. serving for locating conduits (E04C 2/54 takes precedence; block-shaped elements therefor E04C 1/39; floor structures incorporating ducts E04B 5/48)
2/54 . Slab-like translucent elements (floors for transmitting light E04B 5/46; translucent or open-work ceilings E04B 9/32, E04B 9/34; translucent roof coverings E04D 3/06, E04D 3/28)

3/00 Structural elongated elements designed for load-supporting (as building aids E04G)

3/02 . Joists; Girders, trusses, or truss-like structures, e.g. prefabricated; Lintels; Transoms (E04C 3/38 takes precedence; for structures characterised by movable, separable, or collapsible parts E04B 1/343)
3/04 . . of metal (E04C 3/29 takes precedence; as reinforcing elements E04C 5/06; manufacture B21)
3/06 . . . with substantially solid, i.e. unapertured, web (E04C 3/10, E04C 3/11 take precedence)
3/07 . . . . at least partly of bent or otherwise deformed strip- or sheet-like material
3/08 . . . with apertured web, e.g. with a web consisting of bar-like components; Honeycomb girders (E04C 3/10, E04C 3/11 take precedence)
3/09 . . . . at least partly of bent or otherwise deformed strip- or sheet-like material
3/10 . . . prestressed
3/11 . . . with non-parallel upper and lower edges, e.g. roof trusses (arched girders, portal frames E04C 3/38)
3/12 . . of wood, e.g. with reinforcements, with tensioning members (E04C 3/292 takes precedence)
3/14 . . . with substantially solid, i.e. unapertured, web (E04C 3/17, E04C 3/18 take precedence)
3/16 . . . with apertured web, e.g. trusses (E04C 3/17, E04C 3/18 take precedence)
3/17 . . . with non-parallel upper and lower edges, e.g. roof trusses
3/18 . . . with metal reinforcements or tensioning members
3/20 . . of concrete or other stone-like material, e.g. with reinforcements or tensioning members (reinforcing elements E04C 5/00)
3/22 . . . built-up by elements joined in line
3/26 . . . prestressed (E04C 3/22, E04C 3/29 take precedence; prestressing members E04C 5/08)
3/28 . . of other materials
3/29 . . built-up from parts of different materials
3/292 . . . the materials being wood and metal
3/293 . . . the materials being steel and concrete (concrete with internal reinforcements or tensioning members E04C 3/20)
3/294 . . . . of concrete combined with a girder-like structure extending laterally outside the element (light-weight girders used as reinforcement E04C 5/065; as part of a floor structure E04B 5/23)
3/30 . Columns; Pillars; Struts (not designed for end loading E04C 3/02; posts, masts, as independent structures E04H 12/00)
3/32 . . of metal (E04C 3/36 takes precedence)
3/34 . . of concrete or other stone-like material, with or without permanent form elements, with or without internal or external reinforcement, e.g. metal coverings (E04C 3/36 takes precedence)
3/36 . . of other materials
3/38 . Arched girders or portal frames (straight girders able to be bent E04C 3/02; inflatable tents or canopies, in general E04H 15/20)
3/40 . . of metal (E04C 3/46 takes precedence)
3/42 . . of wood, e.g. units for rafter roofs (E04C 3/46 takes precedence)
3/44 . . of concrete or other stone-like material, e.g. with reinforcements or tensioning members (E04C 3/46 takes precedence)
3/46 . . of other materials

5/00 Reinforcing elements, e.g. for concrete; **Auxiliary elements therefor** (material composition C21, C22; arrangements of reinforcing elements, see the relevant classes)

5/01 . Reinforcing elements of metal, e.g. with non-structural coatings **[5]**
5/02 . . of low bending resistance, i.e. of essentially one-or two-dimensional extent
5/03 . . . with indentations, projections, ribs, or the like, for augmenting the adherence to the concrete
5/04 . . . Mats (bases for plaster E04F 13/04)

5/06 . . of high bending resistance, i.e. of essentially three-dimensional extent, e.g. lattice girders
5/065 . . . Light-weight girders, e.g. with precast parts (light-weight girders in general E04C 3/08, E04C 3/294)
5/07 . Reinforcing elements of material other than metal, e.g. of glass, of plastics, or not exclusively made of metal (metal elements with non-structural coatings E04C 5/01) **[5]**
5/08 . Members specially adapted to be used in prestressed constructions
5/10 . . Ducts
5/12 . Anchoring devices (tools or methods for tensioning E04G 21/12) **[5]**
5/16 . Auxiliary parts for reinforcements, e.g. connectors, spacers, stirrups (tools for connecting reinforcing elements E04G 21/12)
5/18 . . of metal or substantially of metal
5/20 . . of other material than metal or with only additional metal parts, e.g. concrete or plastics spacers with metal binding wires

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E04D **ROOF COVERINGS**; **SKY-LIGHTS**; **GUTTERS**; **ROOF-WORKING TOOLS** (coverings of outer walls by plaster or other porous material E04F 13/00)

Note

In this subclass, the following expression is used with the meaning indicated:
– "roof coverings" includes any similar kind of watertight covering against rain, snow, hail, or the like, for other parts of buildings.

Subclass index

1/00 **Roof covering by making use of tiles, slates, shingles, or other small roofing elements** (roofing supports E04D 12/00)
1/02 . Grooved or vaulted roofing elements (E04D 1/28, E04D 1/30 take precedence)
1/04 . . of ceramics, glass or concrete, with or without reinforcement
1/06 . . of metal
1/08 . . of plastics; of fibrous materials
1/10 . . of specified materials, or of combinations of materials, not covered by any one of groups E04D 1/04 to E04D 1/08
1/12 . Roofing elements shaped as plain tiles or shingles, i.e. with flat outer surface (E04D 1/28, E04D 1/30 take precedence)
1/14 . . of slate material, with or without fastening means
1/16 . . of ceramics, glass or concrete, with or without reinforcement
1/18 . . of metal
1/20 . . of plastics, fibrous materials, or wood
1/22 . . of specified materials, or of combinations of materials, not covered by any one of groups E04D 1/14 to E04D 1/20
1/24 . Roofing elements with cavities, e.g. hollow tiles (E04D 1/28 takes precedence)
1/26 . Strip-shaped roofing elements appearing as a row of shingles
1/28 . Roofing elements comprising two or more layers, e.g. for insulation
1/30 . Special roof-covering elements, e.g. ridge tiles, gutter tiles, gable tiles, ventilation tiles (E04D 3/40 takes precedence; roof covering aspects of energy collecting devices E04D 13/18)
1/34 . Fastenings for attaching roof-covering elements to the supporting elements
1/36 . Devices for sealing the spaces or joints between roof-covering elements (sealing joints not restricted to roof covering elements E04B 1/68)

3/00 **Roof covering by making use of flat or curved slabs or stiff sheets** (E04D 1/00 takes precedence; built-up roofs E04D 11/02)
3/02 . of plane slabs, slates, or sheets, or in which the cross-section is unimportant (E04D 3/35 takes precedence)
3/04 . . of concrete or ceramics (of asbestos cement E04D 3/18)
3/06 . . of glass or other translucent material; Fixing means therefor (fixing glass panes by means applicable to windows E06B 3/54)
3/08 . . . with metal glazing bars
3/14 . . . with glazing bars of other material, e.g. of glass
3/16 . . of metal
3/18 . . of specified materials, or of combinations of materials, not covered by any of groups E04D 3/04, E04D 3/06 or E04D 3/16
3/24 . with special cross-section, e.g. with corrugations on both sides, with ribs, flanges, or the like (E04D 3/35 takes precedence)
3/26 . . of concrete or ceramics
3/28 . . of glass
3/30 . . of metal
3/32 . . of plastics, fibrous materials, or asbestos cement
3/34 . . of specified materials, or of combinations of materials, not covered by any one of groups E04D 3/26 to E04D 3/32
3/35 . Roofing slabs or stiff sheets comprising two or more layers, e.g. for insulation
3/36 . Connecting; Fastening

Note

In groups E04D 3/361 to E04D 3/368, additional small fastening elements, e.g. nails, screws, are not to be considered to be separate connecting elements.

3/361 . . by specially-profiled marginal portions of the slabs or sheets

3/362 . . . by locking the edge of one slab or sheet within the profiled marginal portion of the adjacent slab or sheet, e.g. using separate connecting elements

3/363 . . . with snap action **[4]**

3/3645 . . . by interference fitting **[4]**

3/365 . . by simple overlapping of the marginal portions with use of separate connecting elements, e.g. hooks or bolts for corrugated sheets

3/366 . . by closing the space between the slabs or sheets by gutters, bulges, or bridging elements, e.g. strips

3/367 . . by permanent deformation of the marginal portions of adjacent slabs or sheets, e.g. by folding the edges **[4]**

3/368 . . by forcing together the marginal portions of adjacent slabs or sheets

3/369 . . by welding of the marginal portions of adjacent slabs or sheets

3/38 . Devices for sealing spaces or joints between roof-covering elements (E04D 3/36 takes precedence; sealing joints not restricted to roof covering elements E04B 1/68)

3/40 . Slabs or sheets locally modified for auxiliary purposes, e.g. for resting on walls, for serving as guttering; Elements for particular purposes, e.g. ridge elements, specially designed for use in conjunction with slabs or sheets (roof covering aspects of energy collecting devices E04D 13/18)

5/00 **Roof covering by making use of flexible material, e.g. supplied in roll form** (using stiff sheets E04D 3/00; gravelling of flat roofs E04D 7/00; built-up roofs E04D 11/02)

Note

Group E04D 5/12 takes precedence over groups E04D 5/02 to E04D 5/08.

5/02 . of materials impregnated with sealing substances, e.g. roofing felt

5/04 . by making use of metal foils

5/06 . by making use of plastics

5/08 . by making use of other materials

5/10 . by making use of compounded or laminated materials, e.g. metal foils or plastic films coated with bitumen (E04D 5/12 takes precedence)

5/12 . specially modified, e.g. perforated, with granulated surface, with attached pads

5/14 . Fastening means therefor

7/00 **Roof covering by sealing masses applied in situ; Gravelling of flat roofs**

9/00 **Roof covering by using straw, thatch, or like materials** (impregnation against incendiary damage B27K)

11/00 **Roof covering, as far as not restricted to features covered by only one of groups E04D 1/00 to E04D 9/00; Roof covering in ways not provided for by groups E04D 1/00 to E04D 9/00**

11/02 . Built-up roofs, i.e. consisting of two or more layers bonded together in situ, at least one of the layers being of watertight composition (gravelling of flat roofs E04D 7/00; venting or ventilation E04D 13/17)

12/00 **Non-structural supports for roofing materials, e.g. battens, boards** (E04D 11/02 takes precedence)

13/00 **Special arrangements or devices in connection with roof coverings; Roof drainage** (ventilation tiles E04D 1/30; ventilation slabs E04D 3/40; internal channels E04F 17/00; roofing elements therefor, see the relevant groups)

13/02 . Roof-covering aspects of dormer windows (E04D 13/14 takes precedence; structures therefor E04B 7/18)

13/03 . Sky-lights; Domes; Ventilating sky-lights (E04D 13/14 takes precedence; structures therefor E04B 7/18)

13/035 . . characterised by having movable parts

13/04 . Roof drainage; Drainage fittings in flat roofs (gutter tiles E04D 1/30; gutter slabs E04D 3/40; street gullies E03F 5/04)

13/064 . . Gutters **[6]**

13/068 . . . Means for fastening gutter parts together **[6]**

13/072 . . . Hanging means (in combination with means for fastening gutter parts together E04D 13/068) **[6]**

13/076 . . Devices or arrangements for removing snow, ice or debris from gutters or for preventing accumulation thereof **[6]**

13/08 . . Down pipes; Special clamping means therefor (clamping pipes in general F16B, F16L)

13/10 . Snow traps

13/12 . Devices or arrangements allowing walking on the roof or in the gutter

13/14 . Junctions of roof sheathings to chimneys or other parts extending above the roof

13/143 . . with ventilating means **[6]**

13/147 . . specially adapted for inclined roofs **[6]**

13/15 . Trimming strips; Edge strips; Fascias (E04D 13/14 takes precedence) **[6]**

13/152 . . with ventilating means **[6]**

13/155 . . retaining the roof sheathing **[6]**

13/158 . . covering the overhang at the eave side, e.g. soffits, or the verge of saddle roofs **[6]**

13/16 . Insulating devices or arrangements in so far as the roof covering is concerned (methods for keeping dry building structures in general E04B 1/70; buildings for extreme climates E04H 9/16) **[6]**

13/17 . Ventilation of roof coverings not otherwise provided for (ventilation of rooms or spaces F24F) **[6]**

13/18 . Roof covering aspects of energy collecting devices, e.g. including solar panels (heat collectors per se F24J, e.g. solar heat collectors F24J 2/02; semiconductor devices for converting solar energy into electrical energy H01L 25/00, H01L 31/00) **[4]**

15/00 **Apparatus or tools for roof working**

15/02 . for roof coverings comprising tiles, shingles, or like roofing elements

15/04 . for roof coverings comprising slabs, sheets or flexible material

15/06 . for handling roofing or sealing material in roll form

15/07 . for handling roofing or sealing material in bulk form

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E04F FINISHING WORK ON BUILDINGS, E.G. STAIRS, FLOORS (windows, doors E06B)

Subclass index

10/00 **Sunshades**; **Awnings** (baldachins A45B, A45F, E04H; trailer awnings E04H 15/08; for tents E04H 15/58)

10/02 . of flexible canopy materials, e.g. canvas

10/04 . . with material fixed on sections of a collapsible frame

10/06 . . comprising a roller-blind with means for holding the end away from a building

10/08 . of a plurality of similar rigid parts, e.g. slabs, lamellae (rigidly-arranged sunshade roofs with coherent surfaces E04B 7/00)

10/10 . . collapsible

11/00 **Stairways, ramps, or like structures** (mounting or marking-off stairways E04F 21/26; of temporary construction E04G 27/00); **Balustrades**; **Handrails** (ladders permanently attached to fixed structures E06C 9/00)

11/02 . Stairways; Layouts thereof

11/022 . . characterised by the supporting structure **[6]**

11/025 . . . Stairways having stringers **[6]**

11/028 . . . . having a central stringer **[6]**

11/032 . . . Spiral stairways supported by a central column **[6]**

11/035 . . . Stairways consisting of a plurality of assembled modular parts without further support **[6]**

11/038 . . . . each modular part having a load-bearing balustrade part **[6]**

11/04 . . Movable stairways, e.g. of loft ladders which may or may not be concealable or extensible (ship ladders B63B; stairs for aircraft B64F; escalators or moving walkways B66B)

11/06 . . . collapsible, e.g. folding, telescopic

11/09 . . Tread-and-riser units **[6]**

11/104 . . Treads (E04F 11/09 takes precedence) **[6]**

11/108 . . . of wood **[6]**

11/112 . . . of metal **[6]**

11/116 . . . of stone, concrete or like material **[6]**

11/16 . . . Surfaces thereof; Protecting means for the edges or corners thereof (floor fabrics, fastenings therefor A47G 27/00)

11/17 . . . . Surfaces **[6]**

11/18 . Balustrades; Handrails (guard-rails on ships B63B; for bridges E01D 19/10; for roads E01F 13/00, E01F 15/00; fences E04H 17/00)

13/00 **Coverings or linings, e.g. for walls or ceilings** (flooring E04F 15/00; decoration of surfaces, mosaic work B44, e.g. paper-hanging B44C 7/00; made of webs, e.g. of fabrics or wallpaper, D03D, D04G, D04H, D06N, D21H; construction of ceilings E04B 9/00; roofings or similar water-tight coverings against precipitation E04D) **[3]**

13/02 . of plastic materials hardening after applying, e.g. plaster (surface treatment in painting technique B44D; inorganic or bituminous masses C04B; organic plastics C08L)

13/04 . . Bases for plaster (sub-ceilings with plaster-carrying means E04B 9/06)

13/06 . . . Edge-protecting borders

13/07 . composed of covering or lining elements; Sub-structures therefor; Fastening means therefor **[8]**

13/072 . . composed of specially adapted, structured or shaped covering or lining elements **[8]**

13/073 . . . for particular building parts, e.g. corners or columns **[8]**

13/074 . . . for accommodating service installations or utility lines, e.g. heating conduits, electrical lines, lighting devices or service outlets **[8]**

13/075 . . . for insulation or surface protection, e.g. against noise or impact **[8]**

13/076 . . . characterised by the joints between neighbouring elements, e.g. with joint fillings or with tongue and groove connections **[8]**

13/077 . . . composed of several layers, e.g. sandwich panels (E04F 13/075 takes precedence) **[8]**

13/078 . . . Stretched foil- or web-like elements attached with edge gripping devices **[8]**

13/08 . . composed of a plurality of similar covering or lining elements (E04F 13/072 takes precedence; borders, skirtings E04F 19/02) **[1,8]**

13/09 . . . of elements attached to a common web, support plate or grid **[8]**

Note

Group E04F 13/09 takes precedence over groups E04F 13/10 to E04F 13/18. **[8]**

13/10 . . . of wood **[1,8]**

13/12 . . . of metal **[1,8]**

13/14 . . . of stone or stone-like materials, e.g. ceramics; of glass **[1,8]**

13/15 . . . . characterised by the use of glass elements **[8]**

13/16 . . . of fibres or chips, e.g. bonded with synthetic resins **[1,8]**

13/18 . . . of organic plastics with or without reinforcements or filling materials (of plastic-bound fibres or chips E04F 13/16) **[1,8]**
13/21 . . Fastening means specially adapted for covering or lining elements **[8]**
13/22 . . . Anchors, support angles or consoles **[8]**
13/23 . . . . adjustable **[8]**
13/24 . . . Hidden fastening means on the rear of the covering or lining elements (E04F 13/30 takes precedence) **[8]**
13/25 . . . . adjustable **[8]**
13/26 . . . Edge engaging fastening means, e.g. clamps, clips or border profiles **[8]**
13/28 . . . . adjustable **[8]**
13/30 . . . Magnetic fastening means **[8]**

15/00 Flooring (stair treads E04F 11/104; coverings not specially adapted for floors E04F 13/00; borders, skirtings E04F 19/02; gratings for cleaning soles of footwear A47L 23/24; of similar materials to roads E01C; basic or rough floors E04B 5/00) **[6]**
15/02 . Flooring or floor layers composed of a number of similar elements (of webs E04F 15/16)
15/022 . . Flooring consisting of parquetry tiles on a non-rollable sub-layer of other material, e.g. board, concrete, cork **[2]**
15/024 . . Sectional false floors, e.g. computer floors
15/04 . . only of wood, e.g. with wooden connecting members (rollable parquet E04F 15/16)
15/06 . . of metal, whether or not in combination with other material (gratings as building elements E04C 2/42)
15/08 . . only of stone or stone-like material, e.g. concrete; of glass
15/10 . . of other materials, e.g. fibrous or chipped materials, organic plastics, magnesite, hardboard
15/12 . Flooring or floor layers made of masses in situ, e.g. seamless magnesite floors, terrazzo (inorganic or bituminous masses C04B; organic plastic masses C08L)
15/14 . . Construction of joints, e.g. dividing strips (sealing joints not restricted to flooring E04B 1/68)
15/16 . Flooring, e.g. parquet on flexible web, laid as flexible webs; Webs specially adapted for use as flooring (resiliently-mounted floors, e.g. sprung floors, E04F 15/22; linoleum D06N; webs in general, manufacturing of webs, see the relevant classes)
15/18 . Separately-laid insulating layers; Other additional insulating measures; Floating floors (insulating of buildings in general E04B 1/62)
15/20 . . for sound insulation
15/22 . Resiliently-mounted floors, e.g. sprung floors (laid as webs E04F 15/16) **[2]**

17/00 Vertical ducts; **Channels, e.g. for drainage** (pipes in general F16L; pipe-line systems F17D)
17/02 . for carrying away waste gases, e.g. flue gases (free-standing chimneys E04H 12/28; connections between fireplace and chimney, chimney fittings, covers for cleaning holes of chimneys F23J; chimney tops F23L); Building elements specially designed therefor, e.g. shaped bricks or sets thereof
17/04 . Air-ducts or air channels
17/06 . Light shafts, e.g. for cellars
17/08 . for receiving utility lines, e.g. cables, pipes (covers giving access to the ducts or channels, covers of inspection holes E04F 19/08) **[6]**
17/10 . Arrangements in buildings for the disposal of refuse (refuse bins, gathering or removal of refuse B65F)
17/12 . . Chutes

19/00 Other details or constructional parts for finishing work on buildings (ladders, e.g. climbing irons, E06C 9/04)
19/02 . Borders; Finishing strips, e.g. beadings; Light coves (for protecting edges of plaster E04F 13/06)
19/04 . . for use between floor or ceiling and wall, e.g. skirtings
19/06 . . specially designed for securing panels
19/08 . Built-in cupboards; Masks of niches; Covers of holes enabling access to installations (clean-out doors of chimneys F23J)
19/10 . Built-in gratings, e.g. foot-scrapers

21/00 Implements for finishing work on buildings (for working or treating building elements of stone or stone-like material B28D; designed specifically for special details provided for in the other groups of this subclass, see the relevant groups for the details)
21/02 . for applying plasticised masses to surfaces, e.g. plastering walls (specially for laying flooring E04F 21/20; applying liquids or other fluent materials to surfaces, in general B05; decorative arts B44)
21/04 . . Patterns or templates; Jointing rulers
21/05 . . . Supports for jointing rulers
21/06 . . Implements for applying plaster, insulating material, or the like
21/08 . . . Mechanical implements (E04F 21/14 takes precedence; spraying apparatus in general B05B; sand-blasting B24C)
21/10 . . . . centrifugally acting
21/12 . . . . acting by gas pressure, e.g. steam pressure
21/14 . . . in shafts, e.g. chimneys
21/16 . . Implements for after-treatment of plaster or the like, e.g. smoothing tools, profile trowels
21/165 . for finishing joints, e.g. implements for raking or filling joints, jointers (bricklayers' tools E04G 21/16; repairing, e.g. filling cracks, E04G 23/02) **[3]**
21/18 . for setting wall or ceiling slabs or plates (tools for mosaic work B44C)
21/20 . for laying flooring (made of similar material to roads or pavements E01C)
21/22 . . of single elements, e.g. flooring cramps
21/24 . . of masses made in situ, e.g. smoothing tools
21/26 . for mounting staircases, e.g. tools for marking steps
21/28 . for glazing (glass cutters C03B 33/10)
21/30 . . Putty squeezers or guns
21/32 . . Putty knives; Putty removers

E04G SCAFFOLDING; FORMS; SHUTTERING; BUILDING IMPLEMENTS OR OTHER BUILDING AIDS, OR THEIR USE; HANDLING BUILDING MATERIALS ON THE SITE; REPAIRING, BREAKING-UP OR OTHER WORK ON EXISTING BUILDINGS

Note

In this subclass, the following term is used with the meaning indicated:
– "scaffolding" includes other supports for like purposes.

Subclass index

Workmen's or safety scaffolds

1/00 Scaffolds primarily resting on the ground

1/02 . composed essentially of members elongated in one dimension only, e.g. poles, lattice masts, with or without end portions of special form, connected together by any means

1/04 . . the members being exclusively poles, rods, beams, or other members of similar form and simple cross-section

1/06 . . . comprising members with rod-like or tubular portions fitting together end to end, with or without separate connecting pieces

1/08 . . . secured together by bolts or the like penetrating the members

1/10 . . . . Timber-work constructions

1/12 . . comprising members of special, e.g. composite, cross-section, or with lugs or the like or lateral apertures for supporting or attaching other members

1/14 . Comprising essentially pre-assembled two-dimensional frame-like elements, e.g. of rods in L- or H-shape, with or without bracing (E04G 1/15 takes precedence) **[1,8]**

1/15 . essentially comprising special means for supporting or forming platforms (E04G 1/20 takes precedence); Platforms (boards or planks therefor E04G 5/08) **[1,8]**

1/17 . Comprising essentially pre-assembled three-dimensional elements, e.g. cubic elements **[8]**

1/18 . adjustable in height

1/20 . . Scaffolds comprising upright members and provision for supporting cross-members or platforms at different positions therealong

1/22 . . Scaffolds having a platform on an extensible sub-structure, e.g. of telescopic type or with lazy-tongs mechanism

1/24 . comprising essentially special base constructions; comprising essentially special ground-engaging parts, e.g. inclined struts, wheels (component parts E04G 5/00)

1/28 . designed to provide support only at a low height

1/30 . . Ladder scaffolds

1/32 . . Other free-standing supports, e.g. using trestles (stands or trestles in general F16M 11/00)

1/34 . Scaffold constructions able to be folded in prismatic or flat parts or able to be turned down

1/36 . Scaffolds for particular parts of buildings or buildings of particular shape, e.g. for stairs, cupolas, domes

1/38 . Scaffolds partly supported by the building (ladders attachable to structures E06C 1/34) **[8]**

3/00 Scaffolds essentially supported by building constructions, e.g. adjustable in height (E04G 1/00 takes precedence)

3/18 . supported by cantilevers or other provisions mounted in openings in the building, e.g. window openings (E04G 3/28 takes precedence) **[8]**

3/20 . supported by walls (E04G 3/28 takes precedence; wall-anchors for supporting scaffolds E04G 5/04; consoles E04G 5/06) **[8]**

3/22 . supported by roofs or ceilings (E04G 3/28 takes precedence) **[8]**

3/24 . specially adapted for particular parts of buildings or for buildings of particular shape, e.g. chimney stacks or pylons (E04G 3/28 takes precedence) **[8]**

3/26 . . specially adapted for working on roofs **[8]**

3/28 . Mobile scaffolds; Scaffolds with mobile platforms **[8]**

3/30 . . suspended by flexible supporting elements, e.g. cables **[8]**

3/32 . . . Hoisting devices; Safety devices **[8]**

3/34 . . characterised by supporting structures provided on the roofs **[8]**

5/00 Component parts or accessories for scaffolds (connections E04G 7/00) **[1,8]**

5/02 . Scaffold feet, e.g. with arrangements for adjustment

5/04 . Means for fastening, supporting, or bracing scaffolds on or against building constructions (fastenings in general F16B)

5/06 . Consoles; Brackets

5/08 . Scaffold boards or planks

5/10 . Steps or ladders specially adapted for scaffolds **[8]**

5/12 . Canopies **[8]**

5/14 . Railings **[8]**

5/16 . Struts or stiffening rods, e.g. diagonal rods **[8]**

7/00 **Connections between parts of the scaffold** (for building structures in general E04B 1/38; connections in general F16B)
7/02 . with separate coupling elements
7/04 . . Flexible elements, with or without brackets, e.g. ropes, cables, chains (in general F16G)
7/06 . . Stiff scaffolding clamps for connecting scaffold members of common shape
7/08 . . . Clamps for parallely-arranged members
7/10 . . . . Self-tightening clamps, e.g. stirrups
7/12 . . . Clamps or clips for crossing members (E04G 7/22 takes precedence)
7/14 . . . . for clamping the members independently
7/16 . . . . . of which the clamping parts for the different members are rotatable with respect to one another
7/18 . . . . for clamping the members against one another or against a separate cushioning piece between them
7/20 . . . for ends of members only, e.g. for connecting members in end-to-end relation
7/22 . . . for scaffold members in end-to-side relation
7/24 . . . Couplings involving arrangements covered by more than one of the groups E04G 7/08, E04G 7/12, E04G 7/20, E04G 7/22
7/26 . . for use with specially-shaped scaffold members
7/28 . . Clips or connections for securing boards (brackets E04G 5/06)
7/30 . Scaffolding bars or members with non-detachably fixed coupling elements
7/32 . . with coupling elements using wedges **[8]**
7/34 . . with coupling elements using positive engagement, e.g. hooks or pins **[8]**

Falsework, forms or shutterings for shaping of building parts in situ [5]

9/00 **Forming or shuttering elements for general use**
9/02 . Forming boards or similar elements (E04G 9/08, E04G 9/10 take precedence)
9/04 . . the form surface being of wood **[2]**
9/05 . . the form surface being of plastics **[2]**
9/06 . . the form surface being of metal **[2]**
9/08 . Forming boards or similar elements, which are collapsible, foldable, or able to be rolled up
9/10 . with additional peculiarities such as surface shaping, insulating or heating, permeability to water or air

11/00 **Forms, shutterings, or falsework for making walls, floors, ceilings, or roofs**
11/02 . for rooms as a whole, whole storeys, or whole buildings
11/04 . for structures of spherical, spheroid or similar shape, or for cupola structures of circular or polygonal horizontal or vertical section; Inflatable forms (connection of valves to inflatable elastic bodies B60C 29/00)
11/06 . for walls, e.g. curved (E04G 11/04 takes precedence)
11/08 . . Forms which are completely dismantled after setting of the concrete and re-built for the next pouring (connecting or supporting means for forms E04G 17/00)
11/10 . . . of elements without beams (E04G 11/18 takes precedence)
11/12 . . . of elements and beams (E04G 11/18 takes precedence)
11/14 . . . . with beams arranged in alignment with, and between the, elements
11/16 . . . . with beams placed within the wall
11/18 . . . for double walls
11/20 . . Movable forms; Movable forms for moulding cylindrical, conical, or hyperbolical structures; Templates serving as forms for positioning blocks or the like (E04G 11/04 takes precedence)
11/22 . . . Sliding forms raised continuously or step-by-step and being in contact with the poured concrete during raising; Arrangements of lifting means therefor
11/24 . . . . Construction of lifting jacks or climbing rods for sliding forms (climbing-type hoisting units in general B66F)
11/26 . . . the sheathing of which consists of ribbons, endless aprons, or the like, guided by driven rollers
11/28 . . . Climbing forms, i.e. forms which are not in contact with the poured concrete during lifting from layer to layer
11/30 . . . . which are lifted from layer to layer by turning, tilting, or similar moving upwards about a horizontal axis
11/32 . . . Tiltable forms or tilting tables for making walls as a whole or in parts in situ
11/34 . . . Horizontally-travelling moulds for making walls blockwise or sectionwise (E04G 11/26 takes precedence)
11/36 . for floors, ceilings, or roofs of plane or curved surfaces
11/38 . . for plane ceilings of concrete
11/40 . . for coffered or ribbed ceilings
11/42 . . . with beams of metal or prefabricated concrete
11/44 . . . with supporting beams for the shuttering used simultaneously as permanent reinforcement of the ribs
11/46 . . . of hat-like or trough-like shape encasing a rib or the section between two ribs or encasing one rib and its adjacent flat floor or ceiling section
11/48 . . Supporting structures for shutterings or frames for floors or roofs (struts E04G 25/00)
11/50 . . . Girders, beams, or the like as supporting members for forms (members, e.g. consoles, for attachment to the wall E04G 17/16; girders intended to form part of the construction E04C 3/02)
11/52 . . . . of several units arranged one after another
11/54 . . . . of extensible type, with or without adjustable supporting shoes, fishplates, or the like
11/56 . . . . . of telescopic type

13/00 **Falsework, forms or shutterings for particular parts of buildings, e.g. stairs, steps, cornices or balconies** (moulds for making units for prefabricated buildings or prefabricated stair units B28B 7/22)
13/02 . for columns or like pillars; Special tying or clamping means therefor
13/04 . for lintels, beams, or transoms to be encased separately; Special tying or clamping means therefor (members, e.g. consoles, for attachment to the wall E04G 17/16)
13/06 . for stairs, steps, cornices, balconies, or other parts corbelled out of the wall

15/00 **Forms or shutterings for making openings, cavities, slits, or channels** (forming part of shuttering for walls E04G 11/06)

15/02 . for windows, doors, or the like

15/04 . Cores for anchor holes or the like

15/06 . for cavities or channels in walls or floors, e.g. for making chimneys

17/00 **Connecting or other auxiliary members for forms, falsework structures, or shutterings**

17/02 . Connecting or fastening means for non-metallic forming or stiffening elements

17/04 . Connecting or fastening means for metallic forming or stiffening elements

17/06 . Tying means; Spacers

17/065 . . Tying means, the tensional elements of which are threaded to enable their fastening or tensioning **[5]**

17/07 . . Tying means, the tensional elements of which are fastened or tensioned by means of wedge-shaped members **[5]**

17/075 . . Tying means, the tensional elements of which are fastened or tensioned by other means **[5]**

17/12 . . with arms engaging the forms

17/14 . Bracing or strutting arrangements for formwalls; Devices for aligning forms (E04G 25/00 takes precedence)

17/16 . Members, e.g. consoles, for attachment to the wall to support girders, beams, or the like carrying forms or moulds for floors, lintels, or transoms

17/18 . Devices for suspending or anchoring form elements to girders placed in ceilings, e.g. hangers

19/00 **Auxiliary treatment of forms, e.g. dismantling**; **Cleaning devices** (lubricating compositions C10M)

21/00 **Preparing, conveying, or working-up building materials or building elements <u>in situ</u>; Other devices or measures for constructional work** (working stone-like materials B28D; conveying in general B65G; lifting devices B66; measuring instruments G01)

21/02 . Conveying or working-up concrete or similar masses able to be heaped or cast (working concrete in general, e.g. mixing machines, B28C; composition of concrete C04B; construction and surfacing of floorings made of similar material to roads or pavements E01C; in connection with barrages E02B 7/00; in connection with foundations E02D 15/00; in connection with finishing work E04F)

21/04 . . Devices for both conveying and distributing (concrete pumps F04)

21/06 . . Compacting concrete, e.g. by application of vacuum before hardening (for road building E01C 19/00; devices for compacting also soil E02D 3/02)

21/08 . . . Internal vibrators

21/10 . . Devices for levelling, e.g. templates or boards (smoothing tools E04F 21/16, E04F 21/24)

21/12 . Mounting of reinforcing inserts; Prestressing (shell tubes for prestressing members E04C 5/10; anchoring means E04C 5/12; connections of reinforcing elements and spacers E04C 5/16)

21/14 . Conveying or assembling building elements (roofing E04D; finishing work E04F)

21/16 . . Tools or apparatus (devices for erecting fences E04H 17/26)

21/18 . . . Adjusting tools; Templates

21/20 . . . for applying mortar

21/22 . . . for setting building elements with mortar, e.g. brick-laying machines

21/24 . Safety or protective measures preventing damage to building parts or finishing work during construction (as auxiliary structures for scaffolds E04G 5/00)

21/26 . . Strutting means for wall parts; Supports or the like, e.g. for holding in position prefabricated walls (E04G 25/00 takes precedence; on existing buildings E04G 23/04)

21/28 . . against unfavourable weather influence

21/30 . . against mechanical damage or dirt, e.g. guard covers of stairs

21/32 . Safety or protective measures for persons during the construction of buildings (related to scaffolds E04G 5/00; ropes or belts for life-saving A62B 1/16, A62B 35/00; climbing tools, e.g. climbing irons for masts, A63B 27/00)

23/00 **Working measures on existing buildings** (on foundations E02D 35/00, E02D 37/00; in connection with insulations E04B; subsequent or finishing work E04F)

<u>Note</u>

In addition to the subject matter referred out in this group, subject matter relating to working measures on existing buildings which are analogous to those used in constructing new buildings, is classified in the appropriate construction groups. **[5]**

23/02 . Repairing, e.g. filling cracks; Restoring; Altering; Enlarging

23/03 . . specially adapted for roofs, e.g. to fit out attics **[5]**

23/04 . Propping of endangered or damaged buildings or building parts, e.g. with respect to air-raid action (struts E04G 25/00)

23/06 . Separating, lifting, removing of buildings; Making a new sub-structure

23/08 . Wrecking of buildings (dismantling bridges E01D 24/00) **[1,8]**

25/00 **Shores or struts** (specially designed for use in mines E21D 15/00); **Chocks**

25/02 . non-telescopic

25/04 . telescopic

25/06 . . with parts held together by positive means

25/08 . . with parts held relatively to each other by friction or gripping

27/00 **Temporary arrangements for giving access from one level to another for men or vehicles, e.g. steps, ramps** (as parts or accessories for scaffolds E04G 5/00; gangways B63; lifts B66; landing bridges E01D 15/24; permanent stairways or ramps E04F 11/00; ladders E06C)

E04H BUILDINGS OR LIKE STRUCTURES FOR PARTICULAR PURPOSES; **SWIMMING OR SPLASH BATHS OR POOLS**; **MASTS**; **FENCING**; **TENTS OR CANOPIES, IN GENERAL** (foundations E02D) **[4]**

(1) This subclass covers
- primarily the layout of buildings as a whole;
- details which are peculiar to types of buildings, or buildings for special purposes, specified in the groups;
- canopies in general and canopies similar in construction to tents. **[4]**

(2) This subclass does not cover canopies having special application, which are covered by the relevant place, e.g. protecting chairs against the weather A47C 7/66, bed canopies A47C 29/00, sun shades or awnings for buildings E04F 10/00. **[4]**

(3) In this subclass, the following terms are used with the meanings indicated:
- "buildings" does not exclude engineering structures and other constructions;
- "tent" means a tent or canopy having a supporting means, e.g. frame and a flexible cover. **[4]**

Subclass index

1/00 Buildings or groups of buildings for dwelling or office purposes; **General layout, e.g. modular co-ordination, staggered storeys** (E04H 3/00 takes precedence; buildings for two or more purposes, drive-in buildings E04H 14/00; building construction in general E04B 1/00)

1/02 . Dwelling houses; Buildings for temporary habitation (small erections for limited occupation E04H 1/12)

1/04 . . Apartment houses arranged in two or more levels

1/06 . Office buildings; Banks (E04H 1/12 takes precedence; furniture or fittings for shops, storehouses, or the like A47F)

1/12 . Small buildings or other erections for limited occupation, erected in the open air or arranged in buildings, e.g. kiosks, waiting shelters for bus stops or for filling stations, roofs for railway platforms, watchmen's huts, dressing cubicles (movable screens as household equipment A47G 5/00)

1/14 . . Telephone cabinets

3/00 Buildings or groups of buildings for public or similar purposes; **Institutions, e.g. infirmaries, prisons** (portions of buildings for individual occupation, e.g. cubicles, E04H 1/00; structures covering a large free area E04B 1/342)

3/02 . Hotels; Motels; Coffee-houses; Restaurants; Shops; Department stores

3/04 . . Restaurants or shops having arrangements for self-service (paying counters A47F 9/02; furniture or installations specially adapted for supermarkets A47F 10/00; transport aspects B65G; coin-freed apparatus G07F)

3/06 . Museums; Library buildings

3/08 . Hospitals, infirmaries, or the like; Schools; Prisons

3/10 . for meetings, entertainments, or sports

3/12 . . Tribunes, grandstands or terraces for spectators (auditoriums E04H 3/30; chairs, stools, benches A47C) **[2]**

3/14 . . Gymnasiums; Other sporting buildings (tribunes E04H 3/12)

3/16 . . . for swimming (swimming or splash baths or pools E04H 4/00) **[5]**

3/22 . . Theatres; Concert halls; Studios for broadcasting, cinematography, television or similar purposes (drive-in buildings E04H 14/00; equipment for theatres or concert halls A63J) **[2]**

3/24 . . . Constructional features of stages

3/26 . . . . Revolving stages; Stages able to be lowered (devices for raising or lowering persons A63J 5/12)

3/28 . . . . Shiftable or portable platforms

3/30 . . . Constructional features of auditoriums (chairs, stools, benches A47C; building details providing acoustical effects E04B 1/99)

4/00 Swimming or splash baths or pools (wave-producers for baths A47K 3/10; separation B01D; treatment of water C02F; wave-producing pumps F04D 35/00) **[5]**

4/02 . formed in situ **[5]**

4/04 . prefabricated or composed of prefabricated elements **[5]**

4/06 . Safety devices; Coverings for baths **[5]**

4/08 . . Coverings consisting of rigid elements **[5]**

4/10 . . Coverings of flexible material **[5]**

4/12 . Devices or arrangements for circulating water **[5]**

4/14 . Parts, details or accessories not otherwise provided for **[5]**

4/16 . . specially adapted for cleaning (cleaning devices peculiar to vessels B63B 59/00) **[5]**

5/00 Buildings or groups of buildings for industrial or agricultural purposes (building construction in general E04B 1/00)

5/02 . Buildings or groups of buildings for industrial purposes, e.g. for power-plants, factories (buildings forming part of cooling plants E04H 5/10; building structures for parking vehicles E04H 6/00)

5/04 . . Transformer houses; Substations or switchgear houses **[5]**

5/06 . . Pits or building structures for inspection or services (manhole shafts or other inspection chambers in general E02D 29/12)

5/08 . Buildings or groups of buildings for agricultural purposes (silos E04H 7/22; manure storage places A01C 3/02; greenhouses A01G 9/14)

5/10 . Buildings forming part of cooling plants

5/12 . . Cooling towers (towers in general E04H 12/00; cooling equipment F28)

6/00 Buildings for parking cars, rolling-stock, aircraft, vessels, or like vehicles, e.g. garages (tents for use as garages E04H 15/00; bicycle stands B62H; storing of vessels on land B63C 15/00; construction of ground-supported surfaces E01C; marking of parking areas on the ground E01F 9/00; building construction in general E04B 1/00)

6/02 . Small garages, e.g. for one or two cars (attached to, or supported by, the vehicle B62D; prefabricated and with undivided interior E04B 1/343)

6/04 . . wheeled, hinged, foldable, telescopic, swinging, or otherwise movable (transportable or collapsible buildings in general E04B 1/343)

6/06 . . with means for shifting or lifting vehicles

6/08 . Garages for many vehicles

6/10 . . without mechanical means for shifting or lifting vehicles, e.g. with helically-arranged fixed ramps, with movable ramps

6/12 . . with mechanical means for shifting or lifting vehicles

6/14 . . . with endless conveyer chains having load-carrying parts moving vertically, e.g. paternoster lifts

6/16 . . . Garages shaped as a wheel or drum rotatable about a horizontal axis

6/18 . . . with means for transport in vertical direction only or independently in vertical and horizontal directions (E04H 6/14 takes precedence)

6/20 . . . . characterised by use of conveyer chains or rotatable rollers for horizontal transport

6/22 . . . . characterised by use of movable platforms for horizontal transport

6/24 . . . . characterised by use of dollies for horizontal transport

6/26 . . . . characterised by use of tiltable floors or floor sections; characterised by use of movable ramps

6/28 . . . . characterised by use of turntables or rotary rings for horizontal transport

6/30 . . . with means for transport in horizontal direction only

6/32 . . . . characterised by use of conveyer chains or rotatable rollers

6/34 . . . . characterised by use of movable platforms

6/36 . . . . characterised by use of freely-movable dollies

6/38 . . . . characterised by use of tiltable floors or floor sections

6/40 . . . . characterised by use of turntables or rotary rings

6/42 . Devices or arrangements peculiar to garages, not covered elsewhere, e.g. securing devices, safety devices

6/44 . for storing aircraft (structures covering a large free area E04B 1/342)

7/00 Construction or assembling of bulk storage containers employing civil engineering techniques <u>in situ</u> or off the site (tower aspects E04H 12/00; storage aspects, e.g. floating roofs, sealing means, filling or discharging means B65D, B65G, F17B, F17C; foundations E02D 27/38) **[2]**

7/02 . Containers for fluids or gases; Supports therefor (arrangements or adaptations of tanks for water supply E03B 11/00) **[2]**

7/04 . . mainly of metal

7/06 . . . with vertical axis

7/14 . . . ball-shaped

7/16 . . . with horizontal axis

7/18 . . mainly of concrete, e.g. reinforced concrete, or other stone-like material

7/20 . . . Prestressed constructions

7/22 . Containers for fluent solids, e.g. silos, bunkers; Supports therefor **[2]**

7/24 . . Constructions, with or without perforated walls, depending on the use of specified materials

7/26 . . . mainly of concrete, e.g. reinforced concrete, or other stone-like material

7/28 . . . . composed of special building elements

7/30 . . . mainly of metal

7/32 . . . mainly of wood

9/00 Buildings, groups of buildings, or shelters, adapted to withstand or provide protection against, abnormal external influences, e.g. war-like action, earthquake, extreme climate (floating buildings B63B; foundation aspects E02D; building constructions in general E04B; bearings or like supports allowing movement E04B 1/36; special details regarding insulation or other protection E04B 1/62; supporting structures for endangered or damaged existing buildings or parts thereof E04G 23/04; doors, windows E06B 5/00; air-conditioning, ventilation F24F; camouflage F41H 3/00; cells or rooms shielded against dangerous radiation G21F 7/00)

9/02 . withstanding earthquake or sinking of ground (foundations E02D 27/34)

9/04 . against air-raid or other war-like actions (respiratory apparatus A62B)

9/06 . . Structures arranged in, or forming part of, buildings

9/08 . . . Structures arranged underneath buildings, e.g. air-raid shelters

9/10 . . Independent shelters; Arrangement of independent splinter-proof walls

9/12 . . . entirely underneath the level of the ground, e.g. air-raid galleries (tunnels, galleries E21D)

9/14 . against other dangerous influences, e.g. tornadoes, floods

9/16 . against adverse conditions, e.g. extreme climate, pests

12/00 Towers; **Masts, poles**; **Chimney stacks**; **Water-towers**; **Methods of erecting such structures** (cooling towers E04H 5/12; supports for road signs E01F 9/011; foundation piles E02D 5/22; foundations for masts, poles, or chimneys E02D 27/42; structural elongated members in general E04C 3/00; fixed climbing irons E06C 9/04; derricks for oil drilling E21B 15/00) **[6]**

12/02 . Structures made of specified materials (E04H 12/16, E04H 12/18 take precedence)

12/04 . . of wood

12/06 . . . Truss-like structures

12/08 . . of metal

12/10 . . . Truss-like structures
12/12 . . of concrete or other stone-like material, with or without internal or external reinforcement, e.g. with metal coverings, with permanent form elements
12/14 . . . Truss-like structures
12/16 . Prestressed structures
12/18 . movable or with movable sections, e.g. rotatable, telescopic (rotary buildings E04B 1/346)
12/20 . Side-supporting means therefor, e.g. using guy ropes, struts (ground anchors E02D 5/80; fastening means for cables or ropes F16G 11/00)
12/22 . Sockets or holders for poles or posts
12/24 . Cross-arms
12/26 . Winding towers for mines (elevators B66B)
12/28 . Chimney stacks, e.g. free-standing, or similar ducts (foundations E02D 27/42; chimneys as part of buildings E04F 17/02; connections between furnace and smoke stack, chimney equipment F23J)
12/30 . Water-towers (tanks B65D 88/00; use of high-level tanks E03B 11/12)
12/32 . Flagpoles (flags, banners, mountings therefor G09F 17/00)
12/34 . Arrangements for erecting or lowering towers, masts, poles, chimney stacks, or the like **[6]**

13/00 **Monuments**; **Tombs**; **Burial vaults**; **Columbaria** (sculpture or other artistic features B44)

14/00 **Buildings for combinations of different purposes not covered by any single one of main groups E04H 1/00 to E04H 13/00 of this subclass, e.g. for double purpose** (E04H 3/02, E04H 9/06 take precedence); **Buildings of the drive-in type**

15/00 **Tents or canopies, in general [4]**
15/02 . Tents combined or specially associated with other devices **[4]**
15/04 . . suspended type, e.g. from trees, from cantilever supports (supporting frames E04H 15/34) **[4]**
15/06 . . Tents at least partially supported by vehicles **[4]**
15/08 . . . Trailer awnings or the like **[4]**
15/10 . . Heating, lighting, or ventilating (for heating, lighting, or ventilating devices per se, see the relevant classes, e.g. F21, F24) **[4]**
15/12 . . . Heating **[4]**
15/14 . . . Ventilating **[4]**
15/16 . . . . of tent roofs **[4]**
15/18 . Tents having plural sectional covers, e.g. pavilions, vaulted tents, marquees, circus tents (inflatable E04H 15/20); Plural tents, e.g. modular **[4]**
15/20 . inflatable, e.g. shaped, strengthened, or supported by fluid pressure (connection of valves to inflatable elastic bodies B60C 29/00; inflatable forms for making walls, floors, ceilings or roofs in situ E04G 11/04) **[4]**
15/22 . . supported by air pressure inside the tent **[4]**
15/24 . cone shaped, e.g. teepees **[4]**
15/26 . Center-pole supported tents (umbrella type E04H 15/28) **[4]**
15/28 . Umbrella type tents **[4]**
15/30 . convertible, e.g. from one type tent to another type tent, from tent to canopy, from tent cover into diverse article (sacks or packs convertible into tents A45F 4/04; coats or capes convertible into tent coverings A45F 4/14) **[4]**
15/32 . Parts, components, construction details, accessories, interior equipment, specially adapted for tents, e.g. guy-line equipment, skirts, thresholds **[4]**
15/34 . . Supporting means, e.g. frames **[4]**
15/36 . . . arch-shaped type (E04H 15/42 takes precedence) **[4]**
15/38 . . . . expansible, e.g. extensible **[4]**
15/40 . . . . flexible **[4]**
15/42 . . . external type, e.g. frame outside of cover **[4]**
15/44 . . . collapsible, e.g. breakdown type (E04H 15/42 takes precedence; building structures having collapsible parts in general E04B 1/343) **[4]**
15/46 . . . . telescoping and foldable **[4]**
15/48 . . . . foldable, i.e. having pivoted or hinged means (E04H 15/46 takes precedence) **[4]**
15/50 . . . . . lazy-tongs type **[4]**
15/52 . . . . . parallelogram type **[4]**
15/54 . . Covers of tents or canopies (ventilated tent roofs E04H 15/16) **[4]**
15/56 . . Floors **[4]**
15/58 . . Closures; Awnings; Sunshades **[4]**
15/60 . . Poles **[4]**
15/62 . . Pegs, stakes or the like **[4]**
15/64 . . Tent or canopy cover fastenings **[4]**

17/00 **Fencing, e.g. fences, enclosures, corrals** (features peculiar to electrified fences A01K 3/00, H05C; means for allowing passage through fences, barriers, or the like E06B 11/00)
17/02 . Wire fencing, e.g. made of wire mesh (E04H 17/14 takes precedence; working or processing of wire B21F, e.g. making wire nets B21F 27/00)
17/04 . . characterised by the use of specially adapted wire, e.g. barbed wire **[1,7]**
17/06 . . Parts for wire fences
17/08 . . . Anchoring means therefor, e.g. specially-shaped parts entering the ground; Struts or the like (for towers or masts E04H 12/20; sockets for posts E04H 12/22)
17/10 . . characterised by the way of connecting wire to the posts; Droppers
17/12 . . . the wire being placed in slots, grooves, or the like
17/14 . Fences constructed of rigid elements, e.g. with additional wire fillings or with posts
17/16 . . using prefabricated panel-like elements, e.g. wired frames
17/18 . . . Corrals, i.e. easily transportable or demountable enclosures
17/20 . . Posts therefor
17/22 . . . Anchoring means therefor, e.g. specially-shaped parts entering the ground; Struts or the like (for towers or masts E04H 12/20; sockets for posts E04H 12/22)
17/24 . . Connections for attaching additional wire to frames, posts or railings
17/26 . Devices for erecting or removing fences

E05 LOCKS; KEYS; WINDOW OR DOOR FITTINGS; SAFES

Note

In this class, the following terms are used with the meanings indicated:
- "wing" is a general term for swingable, slidable, or otherwise movable doors or windows. This term also includes other movable structures such as drawers, lids of chests, car boots, or car bonnets, to which the operating, mounting, latching, or locking means covered by this class may be applied;
- "frame" means any member to which a wing may be held by a fastening device. It does not include a framework forming part of the wing, but it may be another wing;
- "lock" means primarily a device for releasing or securing any member, which requires a key or a permutation mechanism for release. In groups E05B 1/00 to E05B 9/00, E05B 13/00 to E05B 17/00, E05B 39/00 to E05B 47/00, E05B 51/00, E05B 53/00, E05B 63/00 and E05B 65/00 however, the term "lock" may include other fastening devices;
- "bolt" means a sliding, pivoted, or otherwise movable member such as is normally carried by a door to hold it shut by engagement with a keeper on the frame. It may be operated by hand directly or through mechanism or by a key; it may be a latch (see below);
- "latch" means a bolt arranged to be moved to the releasing position against the force of a spring, or some other returning force, when a wing meets the frame on closing, so that it does not have to be operated by hand to secure the wing, but only to open it;
- "hasp" means a member hinged to the frame or wing so that it can be moved towards the face of the wing or frame and secured thereto, e.g. by a turn-button, by a padlock and staple.

E05B LOCKS; ACCESSORIES THEREFOR; HANDCUFFS

Subclass index

Details or accessories of locks or the like; keys

1/00 **Knobs or handles for wings** (for furniture A47B 95/02); **Knobs, handles, or press buttons for locks or latches on wings** (E05B 5/00, E05B 7/00 take precedence)
- 1/02 . of solid material
- 1/04 . with inner rigid member and outer cover or covers
- 1/06 . of sheet material

3/00 **Fastening handles to lock or latch parts**
- 3/02 . Fastening handles to the spindle by pinning or riveting
- 3/04 . Fastening the handle shank to the spindle by screws, springs, or snap bolts
- 3/06 . by means arranged in or on the rose
- 3/08 . Fastening the spindle to the follower
- 3/10 . by a bipartite or cleft spindle in the follower or in the handle shank

5/00 **Handles completely let into the surface of the wing**
- 5/02 . able to be turned outwards before operation
- 5/04 . able to be shifted parallel to the wing after being pulled out

7/00 **Handles pivoted about an axis parallel to the wing** (E05B 5/00 takes precedence)

9/00 **Lock or latch-mechanism casings mountable on or in wings** (padlock casings E05B 67/02)
- 9/02 . of latch-bolt locks
- 9/04 . of cylinder locks
- 9/06 . Fastening together the parts of casings
- 9/08 . Fastening the casings of latch-bolt locks or cylinder locks to the wing
- 9/10 . Coupling devices for the two halves of double cylinder locks

11/00 **Devices preventing keys from being removed from the lock**
- 11/02 . before the wing is locked
- 11/04 . before the wing is closed
- 11/06 . for catching skeleton or incorrect keys

13/00 **Devices preventing the key or the handle or both from being used**
- 13/02 . shaped as sectors of escutcheons, arranged in the keyhole
- 13/04 . shaped as fork-like implements grasping and fixing the key
- 13/06 . shaped as bolt detents arranged in the path of motion of the key bit
- 13/08 . formed by longitudinal bolt or cross-bar connecting the handle with a stationary lock part or fitting
- 13/10 . formed by a lock arranged in the handle

15/00 **Other details of locks**; **Parts for engagement by bolts of fastening devices** (fastening devices for wings other than locks E05C)
15/02 . Striking-plates; Keepers; Bolt staples; Escutcheons
15/04 . Spring arrangements in locks
15/06 . Lock wards
15/08 . Key guides; Key pins
15/10 . Bolts of locks or night latches
15/12 . Pins or detents for locking bolts
15/14 . Tumblers
15/16 . Use of special materials for parts of locks (for handles E05B 1/00)

17/00 **Accessories in connection with locks** (locks with indicating or timing devices E05B 39/00 to E05B 45/00; buffers E05F 5/00; means for preventing rattling of wings E05F 7/04; means for taking the weight of the wing E05F 7/06) **[4]**
17/02 . Coupling devices for double doors, i.e. two doors one behind the other and hinged on the same side
17/04 . Devices for coupling the turning cylinder of a single or double cylinder lock with the bolt-operating member
17/06 . Templates for marking the position of apertures in fittings of wings
17/08 . Lubricating devices
17/10 . Illuminating devices on, or for, locks or keys
17/12 . Devices for removing keys stuck in the lock
17/14 . Closures or guards for keyholes
17/16 . . shaped as pins or key bits
17/18 . . shaped as lids or slides
17/20 . Means independent of the locking mechanism for preventing unauthorised opening, e.g. for securing the bolt in the fastening position (pins or detents E05B 15/12) **[4]**
17/22 . Means for operating or controlling lock or fastening device accessories, i.e. other than the fastening members, e.g. switches, indicators **[4]**

19/00 **Keys**; **Accessories therefor** (making keys, see the relevant places, e.g. B21D 53/42; milling grooves in keys B23C 3/35)
19/02 . Construction of the shank of the key
19/04 . Construction of the bow of the key; Construction of flat keys
19/06 . Key bits; Flat key bits
19/08 . . Special forms of key bits, e.g. double key bits, folding key bits
19/10 . Fastening the key bit and bow on the shank of the key
19/12 . Keys with several bits moving relatively to each other when in use
19/14 . Double keys
19/16 . Extremely thin keys acting without rotation
19/18 . Keys adjustable before use
19/20 . Skeleton keys; Devices for picking locks; Other devices for similar purposes
19/22 . Keys with devices for indicating whether the last operation was locking or unlocking
19/24 . Key-distinguishing marks
19/26 . Use of special materials for keys

Locks with rotary keys moving lamelliform tumblers perpendicular to the key

21/00 **Locks with rotary keys moving lamelliform tumblers perpendicular to the key, in which the tumblers do not follow the movement of the bolt**
21/02 . with identical tumblers
21/04 . with stop pins on the tumbler (E05B 21/02 takes precedence)
21/06 . Cylinder locks, e.g. protector locks

23/00 **Locks with rotary keys moving lamelliform tumblers perpendicular to the key, in which the tumblers follow the movement of the bolt**

25/00 **Locks with rotary keys moving lamelliform tumblers perpendicular to the key, characterised by the tumblers**
25/02 . with tumblers in the cut-out of which the key bit is moved
25/04 . with tumblers in which the stop pin is guided from one locked position to the other in an inclined direction
25/06 . with tumblers in which the stop pin is guided from one locked position to the other along a curved path
25/08 . with tumblers with movable pawls engaging the key
25/10 . with tumblers formed to engage one another to determine their unlocked position

Locks of which the tumblers are set by pushing the key in

27/00 **Cylinder locks with tumbler pins or balls that are set by pushing the key in**
27/02 . operated by the edge of the key
27/04 . . arranged radially in one row
27/06 . . arranged radially in more than one row
27/08 . . arranged axially
27/10 . operated by other surfaces of the key, e.g. openings receiving projections on the tumblers

29/00 **Cylinder locks with plate tumblers that are set by pushing the key in**
29/02 . operated by the edge of the key
29/04 . . arranged singly
29/06 . . arranged in pairs
29/08 . operated by other surfaces of the key
29/10 . . operated by a curved groove or slot
29/12 . . operated by a curved rib
29/14 . with both axially and radially arranged plate tumblers

31/00 **Cylinder locks with both tumbler pins or balls and plate tumblers that are set by pushing the key in**

33/00 **Cylinder locks with tumblers that are set by pushing the key in, in which the bolt is moved by means other than the key**

35/00 **Locks for use with special keys or a plurality of keys**
35/02 . which can be shifted laterally
35/04 . for pull keys
35/06 . for screw keys
35/08 . operable by a plurality of keys
35/10 . . with master and pass keys
35/12 . . requiring the use of two keys, e.g. safe-deposit locks
35/14 . with keys of which different parts operate separate mechanisms

37/00 **Permutation locks** (electric permutation locks E05B 49/00; for bicycles E05B 71/02); **Puzzle locks**
37/02 . with tumbler discs or rings arranged on a single axis, each disc being adjustable independently of the others
37/04 . with tumbler discs on a single axis, all the discs being adjustable by rotating a shiftable knob
37/06 . . in padlocks
37/08 . with tumbler discs on a single axis, all the discs being adjustable by a rotary knob which is not shifted
37/10 . . in padlocks
37/12 . with tumbler discs on several axes
37/14 . . in padlocks
37/16 . with two or more push or pull knobs, slides, or the like
37/18 . . in padlocks
37/20 . Puzzle locks
37/22 . . in padlocks

Locks with indicating or timing devices

39/00 **Locks giving indication of unauthorised unlocking**
39/02 . with destructible seal closures or paper closures (seals per se G09F 3/00) **[4]**
39/04 . with counting or registering devices

41/00 **Locks with visible indication as to whether the lock is locked or unlocked**

43/00 **Time locks** (clocks or clock mechanisms with attached or built-in means operating any device at preselected times or after a predetermined time interval G04C 23/00)

45/00 **Alarm locks** (alarm devices actuated by tampering with fastenings in general G08B)
45/02 . with mechanically-operated bells
45/04 . with detonating alarm devices
45/06 . Electric alarm locks
45/08 . . with contact making inside the lock or in the striking plate
45/10 . . . by introducing the key
45/12 . . . by movement of the bolt
45/14 . . with contact making outside the lock

Operation or control of locks by non-mechanical means, e.g. from a distance

47/00 **Operating or controlling locks or other fastening devices by electric or magnetic means** (electric permutation locks E05B 49/00; holding in open position or limiting movement of wings by magnetic or electromagnetic attraction E05C 17/56; key switches H01H 27/00) **[2]**
47/02 . Adaptation of locks, latches, or parts thereof, for movement of the bolt by electromagnetic means
47/04 . . for unlocking only
47/06 . Controlling mechanically-operated bolts by electromagnetically-operated detents
47/08 . . the bolt being withdrawn by a spring which is stressed by closing the wing

49/00 **Electric permutation locks**; **Circuits therefor**
49/02 . with electrical arrangements inside the lock
49/04 . with electrical arrangements outside the lock

51/00 **Operating or controlling locks or other fastening devices by other non-mechanical means**
51/02 . by pneumatic or hydraulic means

53/00 **Operation or control of locks by mechanical transmissions, e.g. from a distance** (for passenger doors E05B 65/20)

Locks with provision for latching

55/00 **Locks in which a sliding latch is used also as a locking bolt**
55/02 . the bolt being secured by the tumbler
55/04 . the bolt being secured by the cross-bar or the turnbuckle and the handle being locked
55/06 . the handle being disconnected
55/08 . . the bolt being secured by transverse bolts
55/10 . . without securing the bolt
55/12 . the bolt being secured by the operation of a hidden parallel member
55/14 . the bolt being secured by the operation of a wing handle, or by means in the wing handle or knob
55/16 . . merely by normal use of the handle on one side of the wing

57/00 **Locks in which a pivoted latch is used also as locking means**

59/00 **Locks with latches separate from the lock-bolts, or with a plurality of latches or lock-bolts**
59/02 . with arrangements for securing the latch while shooting the lock-bolt
59/04 . Locks in which the latch is moved by a lock-bolt, or the lock-bolt by a latch, or one latch by another, or the like
59/06 . with a lock-bolt slidable in the latch

61/00 **Other locks with provision for latching**

Locks with special structural characteristics or for special use

63/00 **Locks with special structural characteristics**
63/02 . without springs
63/04 . for alternative use on the right-hand or left-hand side of wings
63/06 . with lengthwise-adjustable bolts
63/08 . Mortise locks
63/10 . . requiring only two cylindrical holes in the wing
63/12 . with means carried by the bolt for interlocking with the keeper (for passenger doors E05B 65/28)
63/14 . Arrangement of several locks or locks with several bolts, e.g. arranged one behind the other (locks for keys with several bits E05B 35/14; with provision for latching E05B 59/00, E05B 61/00; arrangements of simultaneously-actuated bolts or other securing devices at well-separated positions on the same wing E05C 9/00) **[4]**
63/16 . with the handles on opposite sides moving independently (the latch being secured by the operation of a wing handle E05B 55/14)
63/18 . with arrangements independent of the locking mechanism for retaining the bolt in the retracted position
63/20 . . released automatically when the wing is closed

63/22 . operated by a pulling or pushing action perpendicular to the front plate (E05B 35/04 takes precedence)

63/24 . Arrangements in which the fastening members which engage one another are mounted respectively on the wing and the frame and are both movable, e.g. for release by moving either of them (hasp locks E05B 65/48; hasp fastenings E05C 19/08) **[4]**

65/00 Locks for special use

65/02 . for thin, hollow, or thin-metal wings

65/04 . for wings, one behind the other, hinged on the same side (fastening devices specially adapted for two wings which lie one behind the other when closed E05C 7/02) **[4]**

65/06 . for swing doors

65/08 . for sliding wings

65/10 . for panic or emergency doors

65/12 . for vehicles (E05B 71/00 takes precedence; locking arrangements for non-fixed vehicle roofs B60J 7/185) **[2]**

65/14 . . for railway freight-cars or the like; for lorries (E05B 65/20 takes precedence)

65/16 . . . for back doors of vans

65/18 . . . with provision for sealing

65/19 . . for car-boot lids; for car bonnets

65/20 . . for passenger or like doors

65/22 . . . with rectilinearly-moving bolt

65/24 . . . . locked by a special movement of the door handle

65/26 . . . . with the outside door handle drawn into a recess when the door is locked

65/28 . . . . with means carried by the bolt for interlocking with the keeper

65/30 . . . . with two or more bolts moved simultaneously

65/32 . . . with the bolt turning about an axis

65/34 . . . . in which the member engaging the keeper is shaped as a lockable toothed wheel or the like

65/36 . . . Locking several doors simultaneously

65/38 . . . . by pneumatic or hydraulic means

65/40 . . . Locking one door by shutting another (by non-mechanical means E05B 47/00, E05B 51/00; operation of locks by mechanical transmissions E05B 53/00; fastenings, other than locks, for double doors E05C 7/06)

65/42 . . . Securing the latch or bolt by movement of the vehicle

65/44 . for furniture or drawers

65/46 . . Special locks for drawers, e.g. for a plurality of drawers **[4]**

65/48 . Hasp locks (hasp fastenings other than locks E05C 19/08)

65/50 . . for briefcases

65/52 . Other locks for chests, boxes, trunks, baskets, travelling bags, or the like (closures for bags or trunks A45C 13/06, A45C 13/10, A45C 13/16)

67/00 Padlocks (permutation locks E05B 37/00); **Details thereof**

67/02 . Cases

67/04 . . Armoured cases

67/06 . Shackles; Arrangement of the shackle

67/08 . . Padlocks with shackles hinged on the case

67/10 . . . with devices for securing the free end of the shackle

67/12 . . . . with built-in cylinder locks

67/14 . . . with devices for securing the hinged end of the shackle

67/16 . . . . with built-in cylinder locks

67/18 . . . with devices for securing both ends of the shackle

67/20 . . . . with built-in cylinder locks

67/22 . . Padlocks with sliding shackles, with or without rotary or pivotal movement

67/24 . . . with built-in cylinder locks

67/26 . . . with screw action, with or without the shackle being moved by turning the key

67/28 . . Padlocks with shackles forming a circle

67/30 . . . with built-in cylinder locks

67/32 . . Padlocks with pincer-like shackles

67/34 . . . with built-in cylinder locks

67/36 . Padlocks with closing means other than shackles

67/38 . Auxiliary or protective devices

Locking devices for clothing, sticks, umbrellas, or cycles

69/00 Devices for locking clothing; **Lockable clothing holders or hangers** (dress or hat holders in general A47G 25/00)

69/02 . Lockable clothing hooks (coin-controlled locking hooks G07F)

71/00 Locks specially adapted for bicycles, other than padlocks (locks integral with cycles B62H 5/00)

71/02 . with permutation locking devices

73/00 Devices for locking portable objects against unauthorised removal; **Locking devices not provided for in other groups of this subclass**

73/02 . for walking-sticks or umbrellas (stick or umbrella holders in general A47G 25/12)

75/00 Handcuffs

E05C BOLTS OR FASTENING DEVICES FOR WINGS, SPECIALLY FOR DOORS OR WINDOWS (latching means for sideboard or tailgate structures for vehicles B62D 33/037; fastening devices for constructional or engineering elements E04, F16B; locks, fastening devices structurally or operatively combined or having significant cooperation with locks E05B; means for operating or controlling wing fasteners in conjunction with mechanisms for moving the wing E05F)

(1) In this subclass, only the movement essential for securing the wing is considered, e.g. a sliding bolt which is rotated on its axis to prevent its withdrawal is classified as having only a sliding movement.

(2) Attention is drawn to the definitions following the title of class E05.

Subclass index

Bolts, latches or equivalent wing-fastening devices, characterised by special way of movement, e.g. moving rectilinearly, pivotally or rotatively

1/00 **Fastening devices with bolts moving rectilinearly** (devices released automatically by pull or pressure on the wing E05C 19/02)

1/02 . without latching action

1/04 . . with operating handle or equivalent member rigid with the bolt

1/06 . . with operating handle or equivalent member moving otherwise than rigidly with the bolt

1/08 . with latching action

1/10 . . with operating handle or equivalent member rigid with the latch

1/12 . . with operating handle or equivalent member moving otherwise than rigidly with the latch

1/14 . . . the handle or member moving essentially towards, or away from, the plane of the wing or frame

1/16 . . . the handle or member moving essentially in a plane substantially parallel to the wing

3/00 **Fastening devices with bolts moving pivotally or rotatively** (devices released automatically by pull or pressure on the wing E05C 19/02)

3/02 . without latching action

3/04 . . with operating handle or equivalent member rigid with the bolt

3/06 . . with operating handle or equivalent member moving otherwise than rigidly with the bolt

3/08 . . . the handle or member moving essentially towards, or away from, the plane of the wing or frame

3/10 . . . the handle or member moving essentially in a plane substantially parallel to the wing

3/12 . with latching action (devices in which the securing part is formed or merely carried by a spring and moves only by distortion of the spring, e.g. snaps, E05C 19/06)

3/14 . . with operating handle or equivalent member rigid with the latch

3/16 . . with operating handle or equivalent member moving otherwise than rigidly with the latch

3/22 . . . the bolt being spring-controlled

3/24 . . . . in the form of a bifurcated member

3/26 . . . . . engaging a stud-like keeper

3/28 . . . . . with simultaneously-operating double bolts

3/30 . . . . in the form of a hook

3/32 . . . . . engaging a hooked keeper (E05C 3/34 takes precedence)

3/34 . . . . . with simultaneously-operating double bolts

3/36 . . . . in the form of a rotary gear

3/38 . . . . with bolts engaging a hooked keeper (E05C 3/24, E05C 3/30, E05C 3/36 take precedence)

3/40 . . . . with bolts engaging a stud-like keeper (E05C 3/24, E05C 3/30, E05C 3/36 take precedence)

5/00 **Fastening devices with bolts moving otherwise than only rectilinearly and only pivotally or rotatively** (devices released automatically by pull or pressure on the wing E05C 19/02)

5/02 . both moving axially and turning about their axes to secure the wing

5/04 . . performing both movements simultaneously, e.g. screwing into a keeper

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7/00 **Fastening devices specially adapted for two wings**

Note

In this group, if a fastening device merely secures one wing to another wing which is already closed it is not regarded as specially adapted for two wings.

7/02 . for wings which lie one behind the other when closed

7/04 . for wings which abut when closed

7/06 . . a fastening device for one wing being actuated or controlled by closing another wing

9/00 **Arrangement of simultaneously-actuated bolts or other securing devices at well-separated positions on the same wing** (essentially involving locking means E05B 63/14; similar constructions for engineering closures for pressure vessels, in general F16J 13/08)

9/02 . with one sliding bar for fastening when moved in one direction and unfastening when moved in opposite direction; with two sliding bars moved in the same direction when fastening or unfastening **[4]**

9/04 . with two sliding bars moved in opposite directions when fastening or unfastening

9/06 . with three or more sliding bars

9/08 . with a rotary bar for actuating the fastening means

9/10 . Actuating mechanisms for bars

9/12 . . with gears and racks

9/14 . . with pins engaging slots

9/16 . . with crank pins and connecting rods

9/18 . Details of fastening means or of fixed retaining means for the ends of bars

9/20 . Coupling means for sliding bars, rods, or cables **[4]**

9/22 . Guides for sliding bars, rods, or cables (corner guides E05C 9/24) **[4]**

9/24 . Means for transmitting movements between vertical and horizontal sliding bars, rods, or cables, e.g. corner guides (means for transmitting movements between vertical and horizontal sliding bars, rods, or cables, for moving wings into open or closed position E05F 7/08) **[4]**

17/00 **Devices for holding wings open**; **Devices for limiting opening of wings or for holding wings open by a movable member extending between frame and wing**; **Braking devices, stops or buffers, combined therewith** (combined with hinges E05D 11/00; combined with operating apparatus for wings E05F; other braking devices, stops, buffers E05F 5/00) **[4]**

17/02 . by mechanical means (E05C 17/60 takes precedence) **[4]**

17/04 . . with a movable bar or equivalent member extending between frame and wing

17/06 . . . releasable to allow further opening only when the wing is nearly closed

17/08 . . . with special means for release, e.g. automatic release by further opening

17/10 . . . incorporating a special device for securing the wing in the closed position

17/12 . . . consisting of a single rod

17/14 . . . . Hook and eye, or equivalent

17/16 . . . . pivoted only at one end and having an elongated slot

17/18 . . . . pivoted only at one end and having a row of holes, notches, or pins

17/20 . . . . sliding through a guide (E05C 17/18 takes precedence)

17/22 . . . . . with braking, clamping or securing means in the guide **[4]**

17/24 . . . . pivoted at one end, and with the other end running along a guide member

17/26 . . . . . with braking, clamping or securing means at the pivot of the rod **[4]**

17/28 . . . . . with braking, clamping or securing means at the connection to the guide member **[4]**

17/30 . . . of extensible, e.g. telescopic, construction (flexible members E05C 17/36)

17/32 . . . consisting of two or more pivoted rods

17/34 . . . . with means for holding in more than one position

17/36 . . . comprising a flexible member, e.g. chains

17/38 . . with a curved rail rigid with the frame for engagement with means on the wing, or vice versa

17/40 . . Bars or like parts connecting a right wing with a left wing which move against each other when being closed

17/42 . . connecting exterior and interior wings

17/44 . . with a device carried on the wing for frictional or like engagement with a fixed flat surface, e.g. retractable feet

17/46 . . in which the wing or a member fixed thereon is engaged by a movable fastening member in a fixed position; in which a movable fastening member mounted on the wing engages a stationary member **[4]**

17/48 . . . comprising a sliding securing member

17/50 . . . comprising a single pivoted securing member

17/52 . . . comprising a snap, catch, or the like

17/54 . . Portable devices, e.g. wedges

17/56 . by magnetic or electromagnetic attraction (operation of locks or fasteners by electric or magnetic means E05B 47/00) **[2]**

17/58 . operated or controlled from a distance

17/60 . holding sliding wings open **[4]**

17/62 . . using notches **[4]**

17/64 . . by friction **[4]**

19/00 **Other devices specially designed for securing wings** (movable draft sealings additionally used for bolting E06B 7/18) **[2]**

19/02 . Automatic catches, i.e. released by pull or pressure on the wing (E05C 19/06 takes precedence)

19/04 . . Ball or roller catches

19/06 . in which the securing part is formed or carried by a spring and moves only by distortion of the spring, e.g. snaps

19/08 . Hasps; Hasp fastenings; Spring catches therefor

19/10 . Hook fastenings; Fastenings in which a link engages a fixed hook-like member

19/12 . . pivotally mounted

19/14 . . . with toggle action

19/16 . Devices holding the wing by magnetic or electromagnetic attraction

19/18 . Portable devices specially adapted for securing wings (preventing operation of handles E05B 13/00)

21/00 **Arrangement or combinations of wing fastening, securing, or holding devices, not covered by any single one of main groups E05C 1/00 to E05C 19/00**

21/02 . for holding a wing closed only

E05D **HINGES OR OTHER SUSPENSION DEVICES FOR DOORS, WINDOWS, OR WINGS** (pivotal connections in general F16C 11/00)

Subclass index

1/00 **Pinless hinges**; **Substitutes for hinges**

1/02 . made of one piece

1/04 . with guide members shaped as circular arcs

1/06 . consisting of two easily-separable parts

3/00 **Hinges with pins**

3/02 . with one pin

3/04 . . engaging three or more parts, e.g. sleeves, movable relatively to one another for connecting two or more wings to another member

3/06 . with two or more pins (E05D 7/08 takes precedence) **[2]**

3/08 . . for swing-doors, i.e. openable by pushing from either side

3/10 . . with non-parallel pins

3/12 . . with two parallel pins and one arm (E05D 3/08 takes precedence) **[7]**
3/14 . . with four parallel pins and two arms (E05D 3/08 takes precedence) **[7]**
3/16 . . with seven parallel pins and four arms (E05D 3/08 takes precedence) **[7]**
3/18 . . with sliding pins or guides (E05D 3/08 takes precedence) **[7]**

5/00 Construction of single parts, e.g. the parts for attachment
5/02 . Parts for attachment, e.g. flaps
5/04 . . Flat flaps
5/06 . . Bent flaps
5/08 . . of cylindrical shape
5/10 . Pins, sockets or sleeves; Removable pins (E05D 15/522 takes precedence) **[2]**
5/12 . . Securing pins in sockets, movably or not
5/14 . . Construction of sockets or sleeves
5/16 . . . to be secured without special attachment parts on the socket or sleeve

7/00 Hinges or pivots of special construction (used for special suspension arrangements E05D 15/00; so as to be self-closing E05F 1/06, E05F 1/12; with means for raising wings before being turned E05F 7/02)
7/02 . for use on the right-hand as well as on the left-hand side; Convertible right-hand or left-hand hinges
7/04 . Hinges adjustable relative to the wing or the frame
7/06 . to allow tilting of the members
7/08 . for use in suspensions comprising two spigots placed at opposite edges of the wing, especially at the top and the bottom, e.g. trunnions
7/081 . . the pivot axis of the wing being situated near one edge of the wing (braking devices therefor E05D 11/08) **[2]**
7/082 . . the pivot axis of the wing being situated at a considerable distance from the edges of the wing **[2]**
7/083 . . . with a fixed pivot axis **[2]**
7/084 . . . with a movable pivot axis **[2]**
7/085 . . . . with two or more pivot axes, e.g. used at the same time **[2]**
7/086 . . . Braking devices structurally combined with hinges (braking devices for windows per se E05F 5/00) **[2]**
7/10 . to allow easy separation of the parts at the hinge axis (substitutes for hinges E05D 1/06)
7/12 . to allow easy detachment of the hinge from the wing or the frame
7/14 . Hinges for safes

9/00 Flaps or sleeves specially designed for making from particular material, e.g. hoop-iron, sheet metal, plastics

11/00 Additional features or accessories of hinges
11/02 . Lubricating arrangements
11/04 . relating to the use of free balls as bearing-surfaces (E05D 7/06 takes precedence)
11/06 . Devices for limiting the opening movement of hinges
11/08 . Friction devices between relatively-movable hinge parts (E05D 7/086 takes precedence) **[2]**
11/10 . Devices for preventing movement between relatively-movable hinge parts

13/00 Accessories for sliding or lifting wings, e.g. pulleys, safety catches (counterbalance devices E05F 1/00, E05F 3/00) **[4]**

15/00 Suspension arrangements for wings (arrangements of wings not characterised by the construction of the supporting means E06B 3/32)
15/02 . for revolving wings
15/04 . with arms fixed on the wing pivoting about an axis outside of the wing
15/06 . for wings sliding horizontally more or less in their own plane
15/08 . . consisting of two or more independent parts movable each in its own guides
15/10 . . movable out of one plane into a second parallel plane
15/12 . . consisting of parts connected at their edges
15/14 . . with movable arms situated in the plane of the wing
15/16 . for wings sliding vertically more or less in their own plane
15/18 . . consisting of two or more independent parts movable each in its own guides
15/20 . . movable out of one plane into a second parallel plane
15/22 . . allowing an additional movement
15/24 . . consisting of parts connected at their edges
15/26 . for folding wings
15/28 . supported on arms movable in horizontal plane
15/30 . . with pivoted arms and sliding guides
15/32 . . with two pairs of pivoted arms
15/34 . . . with wings opening parallel to themselves
15/36 . moving along slide-ways so arranged that one guide member of the wing moves in a direction substantially perpendicular to the movement of another guide member
15/38 . . for upwardly-moving wings, e.g. up-and-over doors
15/40 . supported on arms movable in vertical planes
15/42 . . with pivoted arms and horizontally-sliding guides
15/44 . . with pivoted arms and vertically-sliding guides
15/46 . . with two pairs of pivoted arms
15/48 . allowing alternative movements (for vertically-sliding wings E05D 15/22)
15/50 . . for opening at either of two opposite edges
15/52 . . for opening about a vertical as well as a horizontal axis
15/522 . . . with disconnecting means for the appropriate pivoting parts **[2]**
15/523 . . . . using movable rods **[2]**
15/524 . . . . . Actuating mechanisms **[2]**
15/526 . . . Safety devices **[2]**
15/54 . . for opening both inwards and outwards
15/56 . with successive different movements
15/58 . . with both swinging and sliding movements

E05F DEVICES FOR MOVING WINGS INTO OPEN OR CLOSED POSITION; CHECKS FOR WINGS; WING FITTINGS NOT OTHERWISE PROVIDED FOR, CONCERNED WITH THE FUNCTIONING OF THE WING

Note

In this subclass, the following terms are used with the meanings indicated:
– "closer" or "opener" includes devices for assisting wing-movement or for wing-counterbalancing. **[4]**

Subclass index

1/00 **Closers or openers for wings, not otherwise provided for in this subclass**
1/02 . gravity-actuated
1/04 . . for wings which lift during movement
1/06 . . . Mechanisms in the shape of hinges or pivots, operated by the weight of the wing
1/08 . spring-actuated
1/10 . . for swinging wings
1/12 . . . Mechanisms in the shape of hinges or pivots, operated by springs
1/14 . . . with double-acting springs, e.g. for closing and opening or checking and closing
1/16 . . for sliding wings **[4]**

3/00 **Closers or openers with braking devices, e.g. checks**; **Construction of pneumatic or liquid braking devices** (construction of non-pneumatic or non-liquid braking devices E05F 5/00; friction devices in hinges E05D 11/08)
3/02 . with pneumatic piston brakes (rotary type E05F 3/14)
3/04 . with liquid piston brakes (rotary type E05F 3/14)
3/06 . . in which a torsion spring rotates a member around an axis perpendicular to the axis of the piston
3/08 . . in which a torsion spring rotates a member around an axis arranged in the direction of the axis of the piston
3/10 . . with a spring, other than a torsion spring, and a piston, the axes of which are the same or lie in the same direction
3/12 . . Special devices controlling the circulation of the liquid, e.g. valve arrangement (valves per se F16K)
3/14 . with fluid brakes of the rotary type
3/16 . with friction brakes
3/18 . with counteracting springs (double-acting springs E05F 1/14)
3/20 . in hinges
3/22 . Additional arrangements for closers, e.g. for holding the wing in opened or other position

5/00 **Braking devices, e.g. checks**; **Stops**; **Buffers** (construction of pneumatic or liquid braking devices E05F 3/00; combined with devices for holding wings open E05C 17/00; devices for limiting opening of wings or for holding wings open by a movable member extending between frame and wing E05C 17/04) **[4]**
5/02 . specially for preventing the slamming of wings
5/04 . . hand-operated; operated by centrifugal action
5/06 . Buffers (E05F 5/02 takes precedence)
5/08 . . with springs
5/10 . . with piston brakes
5/12 . specially for preventing the closing of a wing before another wing has been closed

7/00 **Accessories for wings not provided for in other groups of this subclass** (specially adapted for furniture A47B 95/00; door-lifters B66F, E04F 21/00; knobs or handles E05B) **[2]**
7/02 . for raising wings before being turned
7/04 . Arrangements affording protection against rattling (with buffering action E05F 5/00)
7/06 . Devices for taking the weight of the wing, arranged away from the hinge axis
7/08 . Means for transmitting movements between vertical and horizontal sliding bars, rods, or cables (means for transmitting movements between vertical and horizontal sliding bars, rods, or cables, for the fastening of wings E05C 9/24)

Operating mechanisms for wings [2]

9/00 **Means for operating wings by hand rods not guided in or on the frame, including those which also operate the fastening** (bolts or fastening devices for wings E05C)

11/00 **Man-operated mechanisms for operating wings, including those which also operate the fastening** (connecting mechanisms for a plurality of wings E05F 17/00)
11/02 . for wings in general, e.g. fanlights (E05F 11/36 takes precedence; for windows to be lowered vertically E05F 11/38; for doors E05F 11/54)
11/04 . . with cords, chains, or cables
11/06 . . . in guide-channels
11/08 . . with longitudinally-moving bars guided, e.g. by pivoted links, in or on the frame
11/10 . . . Mechanisms by which a handle moves the bar
11/12 . . . Mechanisms by which the bar shifts the wing
11/14 . . . . directly, i.e. without links, shifting the wing, e.g. by rack-and-gear or pin-and-slot
11/16 . . . . shifting the wing by pivotally-connected members moving in a plane perpendicular to the pivot axis of the wing
11/18 . . . . . consisting of a lever, e.g. an angle lever, only
11/20 . . . . . consisting of a lever, e.g. an angle lever, and only one additional link
11/22 . . . . . consisting of a lever, e.g. an angle lever, and two or more additional links in series

11/24 . . . . shifting the wing by pivotally-connected members moving in a plane parallel to the pivot axis of the wing
11/26 . . . . . consisting of a lever, e.g. an angle lever, only
11/28 . . . . . consisting of a lever, e.g. an angle lever, and one or more additional links
11/30 . . . . . consisting of links in rhomb form
11/32 . . with rotary bars guided in the frame (E05F 11/34 takes precedence)
11/34 . . with screw mechanisms
11/36 . specially designed for passing through a wall
11/38 . for sliding windows, e.g. vehicle windows, to be opened or closed by vertical movement
11/40 . . operated by screw mechanism
11/42 . . operated by rack bars and toothed wheels
11/44 . . operated by one or more lifting arms
11/46 . . operated by lazy-tongs mechanism
11/48 . . operated by cords or chains
11/50 . . Crank gear with clutches or retaining brakes, for operating window mechanisms
11/52 . . combined with means for producing an additional movement, e.g. a horizontal or a rotary movement
11/53 . for sliding windows, e.g. vehicle windows, to be opened or closed by horizontal movement **[2]**
11/54 . for doors

13/00 **Operating mechanisms for wings, operated by the movement or weight of a person or vehicle** (through power-operated wing-operating mechanisms E05F 15/00)
13/02 . by devices, e.g. lever arms, affected by the movement of the user
13/04 . by platforms lowered by the weight of the user

15/00 **Power-operated mechanisms for wings**
15/02 . with pressure medium
15/04 . . for swinging wings
15/06 . . for horizontally-sliding wings
15/08 . . for vertically-sliding wings
15/10 . with rotary electromotors
15/12 . . for swinging wings
15/14 . . for horizontally-sliding wings
15/16 . . for vertically-sliding wings
15/18 . with other electrical means, e.g. solenoids
15/20 . controlled by automatically-acting means, e.g. by photocells, by electric waves, by thermostats, by rain, by fire

17/00 **Special devices for shifting a plurality of wings operated simultaneously** (for simultaneously moving a plurality of interconnected ventilating lamellae E06B 7/086) **[2]**

E05G **SAFES OR STRONG-ROOMS FOR VALUABLES**; **BANK PROTECTION DEVICES**; **SAFETY TRANSACTION PARTITIONS** (alarm arrangements per se G08B) **[2]**

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "bank" is a building or portion of a building devoted to the safekeeping or exchange of valuables between the "bank" and its customers; **[2]**
– "bank protection device" is a mechanism in or on a bank for protecting the valuables or repelling attacks by stealth or force. **[2]**

1/00 **Safes or strong-rooms for valuables** (savings boxes A45C 1/12; floatable safes B63C 7/30; storage containers without attack or fire repellent features B65D; bank buildings in general, e.g. modular construction, floor plan, E04H 1/06; buildings resistant to earthquake or war action E04H 9/00)
1/02 . Details (safe hinges E05D 7/14)
1/024 . . Wall or panel structure **[2]**
1/026 . . Closures (protective doors, windows, or like closures against air-raid or other war-like action E06B 5/10; shutters, movable grilles, other safety closures E06B 9/02) **[2]**
1/04 . . Closure fasteners (locks E05B)
1/06 . having provision for multiple compartments **[2]**
1/08 . . secured individually **[2]**
1/10 . with alarm, signal, or indicator (burglar, theft, or intruder alarm per se G08B 13/00; fire or explosion alarm per se G08B 17/00) **[2]**
1/12 . with fluent-material releasing, generating, or distributing means, e.g. repellent or fire extinguishing (E05G 1/14 takes precedence; identifying, scaring or incapacitating burglars, thieves, or intruders with smoke, gas, powder, or liquid G08B 15/02) **[2,6]**
1/14 . with means for marking or destroying the valuables, e.g. in case of theft **[6]**

5/00 **Bank protection devices** (E05G 1/12, E05G 7/00 take precedence; closed-circuit television systems H04N 7/18) **[2]**
5/02 . Trapping or confining mechanisms (thief or burglar incapacitating means in general G08B 15/00) **[2]**

7/00 **Safety transaction partitions, e.g. movable payplates** (non-safety paying counters, e.g. for supermarkets, A47F 9/02) **[2]**

E06 DOORS, WINDOWS, SHUTTERS, OR ROLLER BLINDS, IN GENERAL; LADDERS

E06B FIXED OR MOVABLE CLOSURES FOR OPENINGS IN BUILDINGS, VEHICLES, FENCES, OR LIKE ENCLOSURES, IN GENERAL, E.G. DOORS, WINDOWS, BLINDS, GATES (shades or blinds for greenhouses A01G 9/22; curtains A47H; lids for car boots or bonnets B62D 25/10; sky-lights E04B 7/18; sunshades, awnings E04F 10/00)

(1) This subclass does not cover combinations of wings or frames with operating, mounting, latching or locking means of the type found in class E05, which are covered by the relevant subclasses of class E05, except such as are covered by groups E06B 7/086, E06B 9/00, or E06B 11/02 of this subclass. **[2]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "wing" means a swingable, slidable or otherwise movable member such as a door or window, for closing an opening;
- "wing frame" means the peripheral edge or edges which define the outer border of the wing.

(3) For vehicle door or window arrangements, attention is drawn to Note (1) following the title of subclass B60J. **[3]**

Subclass index

1/00 Border constructions of openings in walls, floors, or ceilings; Frames to be rigidly mounted in such openings (E06B 5/00 takes precedence; features relating also to inner frames or wing frames, features relating solely to the mounting of inner frames E06B 3/00; corner joints or edge joints E06B 3/96) **[4]**

1/02 . Base frames, i.e. template frames for openings in walls or the like, provided with means for securing a further rigidly-mounted frame; Special adaptations of frames to be fixed therein

1/04 . Frames for doors, windows, or the like to be fixed in openings (special adaptations for fixing in base frames E06B 1/02; features relating solely to the mounting of glass panes or other sheets E06B 3/00)

1/06 . . Wooden frames

1/08 . . . composed of several parts with respect to the cross-section of the frame itself

1/10 . . . . adjustable with respect to the thickness of walls

1/12 . . Metal frames

1/14 . . . of special cross-section (E06B 1/18, E06B 1/22 take precedence)

1/16 . . . . Hollow frames

1/18 . . . composed of several parts with respect to the cross-section of the frame itself

1/20 . . . . adjustable with respect to the thickness of walls

1/22 . . . with integral thresholds of special form

1/24 . . Frames of natural stone, concrete, or other stone-like material

1/26 . . Frames of plastics

1/28 . . . Hollow frames (E06B 1/30 takes precedence)

1/30 . . . composed of several parts with respect to the cross-section of the frame itself

1/32 . . Frames composed of parts made of different materials

1/34 . . Coverings, e.g. protecting against weather, for decorative purposes

1/36 . . Frames uniquely adapted for windows

1/38 . . . for shop-, show- or like large windows

1/40 . . . Frames with parts removable to admit the glass (E06B 1/38 takes precedence)

1/52 . . Frames specially adapted for doors

1/56 . Fastening frames to the border of openings

1/58 . . by filling-up the joints, e.g. by cementing

1/60 . . by mechanical means, e.g. anchoring means

1/62 . Tightening or covering joints between the border of openings and the frame (E06B 1/34 takes precedence)

1/64 . . by loosely-inserted means, e.g. strip, resilient tongue

1/66 . . by labyrinth packings

1/68 . . by profiled external parts

1/70 . Sills; Thresholds

3/00 Window sashes, door leaves, or like elements for closing openings; Layout of fixed or moving closures, e.g. windows; Features of rigidly-mounted outer frames relating to the mounting of wing frames (E06B 5/00 takes precedence; shutters or the like E06B 9/00; glass panes C03; uniting glass sheets by fusion C03B 23/203; joining glass to glass other than by fusing or to other inorganic material C03C 27/00)

3/01 . Removable or disappearing walls for hangars or other halls, e.g. for aircraft (wall constructions E04B 2/00)

3/02 . Wings made completely of glass

3/04 . Wing frames not characterised by the manner of movement (features relating to the manner of movement E06B 3/32)

3/06 . . Single frames

3/08 . . . Constructions depending on the use of specified materials (E06B 3/24 takes precedence)

3/10 . . . . of wood

3/12 . . . . of metal

3/14 . . . . . of special cross-section

3/16 . . . . . Hollow frames

3/18 . . . . of concrete or other stone-like material

3/20 . . . . of plastics

3/22 . . . . . Hollow frames

3/24 . . . specially adapted for double glazing (separable parts for securing panes E06B 3/64)

3/26 . . Compound frames, i.e. one frame within or behind another (E06B 3/263, E06B 3/28 take precedence; arrangements of movable frames E06B 3/32)

3/263 . . Frames with special provision for insulation **[6]**
3/267 . . . with insulating elements formed in situ **[6]**
3/273 . . . with prefabricated insulating elements held in position by deformation of portions of the frame members **[6]**
3/277 . . . with prefabricated insulating elements held in position by expansion of the insulating elements **[6]**
3/28 . . with additional removable glass panes or the like, framed or unframed
3/30 . Coverings, e.g. protecting against weather, for decorative purposes
3/32 . Arrangements of wings characterised by the manner of movement; Arrangements of movable wings in openings; Features of wings or frames relating solely to the manner of movement of the wing **[3]**
3/34 . . with only one kind of movement (E06B 3/48 takes precedence)
3/36 . . . with a single vertical axis of rotation at one side of the opening, or swinging through the opening (wings requiring lifting before opening E06B 3/52)
3/38 . . . with a horizontal axis of rotation at the top or bottom of the opening
3/40 . . . with a vertical or horizontal axis of rotation not at one side of the opening, e.g. turnover wings
3/42 . . . Sliding wings; Details of frames with respect to guiding
3/44 . . . . Vertically-sliding wings
3/46 . . . . Horizontally-sliding wings
3/48 . . Wings connected at their edges, e.g. foldable wings
3/50 . . with more than one kind of movement (E06B 3/48 takes precedence)
3/52 . . . Wings requiring lifting before opening
3/54 . Fixing of glass panes or like plates
3/56 . . by means of putty, cement, or adhesives only (E06B 3/64 takes precedence)
3/58 . . by means of borders, cleats, or the like (E06B 3/64 takes precedence)
3/60 . . . of clamping cleats of metal
3/62 . . . of rubber-like elastic cleats
3/64 . . Fixing of more than one pane to a frame
3/66 . Units comprising two or more parallel glass or like panes in spaced relationship, the panes being permanently secured together, e.g. along the edges (layered products essentially comprising sheet glass B32B 17/00; coating of glass C03C 17/00)
3/663 . . Elements for spacing panes **[6]**
3/667 . . . Connectors therefor **[6]**
3/67 . . characterised by additional arrangements or devices for heat or sound insulation **[6]**
3/673 . . Assembling the units (E06B 3/677 takes precedence) **[6]**
3/677 . . Evacuating or filling the gap between the panes; Preventing condensation in the gap between the panes (by means of spacing elements E06B 3/663); Cleaning the gap between the panes **[6]**
3/68 . Window bars
3/70 . Door leaves (wing frames E06B 3/04)
3/72 . . consisting of frame and panels
3/74 . . . with wooden panels
3/76 . . . with metal panels
3/78 . . . with panels of plastics
3/80 . . flexible
3/82 . . Flush doors, i.e. with completely flat surface (E06B 3/02 takes precedence)
3/84 . . . of plywood
3/86 . . . of plastics
3/88 . . Edge-protecting devices for door leaves (finger guards for doors or windows E06B 7/36)
3/90 . Revolving doors; Cages or housings therefor (turnstiles E06B 11/08)
3/92 . Doors or windows extensible when set in position (sliding wings for windows E06B 3/42; foldable wings E06B 3/48; wall-closing devices which may be rolled up, e.g. shutters, E06B 9/08)
3/94 . . Doors of the bellows type
3/96 . Corner joints or edge joints for windows, doors, or the like frames or wings **[4]**
3/964 . . using separate connecting pieces, e.g. T-connecting pieces (E06B 3/984, E06B 3/988, E06B 3/99 take precedence) **[5]**
3/968 . . . characterised by the way the connecting pieces are fixed in or on the frame members **[5]**
3/972 . . . . by increasing the cross-section of the connecting pieces, e.g. by expanding the connecting pieces with wedges (E06B 3/976 takes precedence) **[5]**
3/976 . . . . by deformation of the frame members **[5]**
3/98 . . . . the connecting pieces being specially adapted for drawing the frame members towards each other (E06B 3/972, E06B 3/976 take precedence) **[5]**
3/984 . . specially adapted for frame members of wood or other material worked in a similar way (E06B 3/99 takes precedence) **[5]**
3/988 . . specially adapted for frame members of sheet metal, or similar sheet material, with an open generally U-shaped cross-section, e.g. for door frame members **[5]**
3/99 . . for continuous frame members crossing each other without interruption (window bars E06B 3/68) **[5]**

5/00 Doors, windows, or like closures for special purposes; Border constructions therefor

5/01 . Trap-doors
5/02 . for out-buildings or cellars; Other simple closures not designed to be close-fitting
5/04 . . with fixed wooden frames
5/06 . . with fixed metal frames
5/08 . . with fixed frames made of concrete, stone-like material, or plastics
5/10 . for protection against air-raid or other war-like action; for other protective purposes
5/11 . . against burglary **[6]**
5/12 . . against air pressure, explosion, or gas
5/14 . . . Gasproof doors or similar closures; Adaptation of fixed constructions therefor
5/16 . . Fireproof doors or similar closures; Adaptations of fixed constructions therefor
5/18 . . against harmful radiation (against heat E06B 5/16)
5/20 . for insulation against noise

7/00 Special arrangements or measures in connection with doors or windows (screening or similar protective devices E06B 9/00)

7/02 . for providing ventilation, e.g. through double windows; Arrangement of ventilation roses (airflow control members per se F24F 13/08)
7/03 . . Ventilating devices for inserting under upwardly-sliding windows (rain or draught deflectors E06B 7/26)

7/04 . . with ventilation wings (E06B 7/08 takes precedence)
7/06 . . . with one ventilation wing only
7/08 . . Louvre doors, windows, or grilles
7/082 . . . with rigid or slidable lamellae
7/084 . . . with rotatable lamellae
7/086 . . . . interconnected for concurrent movement **[2]**
7/088 . . . . . with facing protective grille or safety guard **[2]**
7/09 . . . . . mounted in movable wing, e.g. door **[2]**
7/092 . . . . . operable in two or more distinct sets **[2]**
7/094 . . . . . operable in sequence; characterised by additional independent movement **[2]**
7/096 . . . . . operated or interconnected by gearing (wing operators with gearing in general E05F 11/00) **[2]**
7/098 . . . . . with weather seal **[2]**
7/10 . . by special construction of the frame members
7/12 . Measures preventing the formation of condensed water (double glazing E06B 3/24 to E06B 3/28, E06B 3/64, E06B 3/66; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84)
7/14 . Measures for draining-off condensed water or water leaking-in
7/16 . Sealing arrangements on wings or parts co-operating with the wings (E06B 7/098 takes precedence) **[2]**
7/18 . . by means of movable edgings, e.g. draught sealings additionally used for bolting
7/20 . . . automatically withdrawn when the wing is opened
7/205 . . . . with sealing strip mounted on sill **[2]**
7/21 . . . . with sealing strip movable in plane of wing **[2]**
7/215 . . . . with sealing strip being moved to a retracted position by elastic means, e.g. springs **[2]**
7/22 . . by means of elastic edgings, e.g. elastic rubber tubes; by means of resilient edgings, e.g. felt or plush strips, resilient metal strips (E06B 7/18 takes precedence)
7/23 . . . Plastic, sponge rubber, or like strips or tubes
7/232 . . . Resilient strips of hard material, e.g. metal
7/24 . . without separate sealing members, e.g. with labyrinth
7/26 . Rain or draught deflectors, e.g. under sliding wings
7/28 . Other arrangements on doors or windows, e.g. door-plates, windows adapted to carry plants, hooks for window cleaners
7/30 . . Peep-holes; Devices for speaking through; Doors having windows
7/32 . . Serving doors; Passing-through doors
7/34 . . Doors containing cupboards (cabinets in general A47B)
7/36 . . Finger guards **[7]**

9/00 Screening or protective devices for openings, with or without operating or securing mechanisms; **Closures of similar construction** (E06B 5/10 takes precedence; wings for doors or windows, connected at their edges, E06B 3/48; additional indoor equipment of doors or windows, not forming part of the proper finishing work of a building, e.g. curtains, A47H; gratings as building elements E04C 2/42; locks, accessories therefor E05B; bolts or fastening devices for wings E05C; operating mechanism for wings in general E05F)
9/01 . Grilles fixed to walls, doors, or windows; Grilles moving with doors or windows; Walls formed as grilles, e.g. claustra
9/02 . Shutters, movable grilles, or other safety closing devices, e.g. against burglary (louvre windows or grilles E06B 7/08; lamellar blinds E06B 9/26)
9/04 . . of wing type, e.g. revolving or sliding
9/06 . . collapsible or foldable, e.g. of the bellows or lazy-tongs type (bellows-type doors E06B 3/94; roll-type grilles E06B 9/18)
9/08 . . Roll-type closures (roller blinds E06B 9/40; operating, guiding or securing devices or arrangements for roll-type closures E06B 9/56; usable only as awnings E04F 10/06) **[5]**
9/11 . . . Roller shutters **[5]**
9/13 . . . . with closing members of one piece, e.g. of corrugated sheet metal **[5]**
9/15 . . . . with closing members formed of slats or the like **[5]**
9/165 . . . . . with slats disappearing in each other; with slats the distance between which can be altered **[5]**
9/17 . . . . Parts or details of roller shutters, e.g. suspension devices, shutter boxes, wicket doors, ventilation openings **[5]**
9/171 . . . . . Rollers therefor; Fastening roller shutters to rollers **[5]**
9/172 . . . . . by clamping bars
9/173 . . . . . by clasps or buttons
9/174 . . . . . Bearings specially adapted therefor **[5]**
9/18 . . . Roll-type grilles **[5]**
9/24 . Screens or other constructions affording protection against light, especially against sunshine; Similar screens for privacy or appearance (operating, guiding or securing devices or arrangements for roll-type closures E06B 9/56; free-hanging flexible screens A47H 23/00)
9/26 . . Lamellar or like blinds, e.g. venetian blinds
9/262 . . . with flexibly-interconnected horizontal or vertical strips; Concertina blinds
9/264 . . . Combinations of lamellar blinds with roller shutters, screen windows, windows, or double panes; Lamellar blinds with special devices
9/266 . . . Devices or accessories for making or mounting lamellar blinds or parts thereof **[3]**
9/28 . . . with horizontal lamellae, e.g. non-liftable (louvre windows or gratings E06B 7/08)
9/30 . . . . liftable
9/302 . . . . . without ladder-tape, e.g. with lazy-tongs, with screw spindle
9/303 . . . . . with ladder-tape
9/304 . . . . . with tilting bar and separate raising shaft
9/305 . . . . . with tilting bar and raising cords guided along fixed bar
9/306 . . . . . with tilting bar along which the raising cords are guided

9/307 . . . . . Details of tilting bars or their operation
9/308 . . . . . with coaxial tilting bar and raising shaft
9/32 . . . . . Operating, guiding, or securing devices therefor (operation of tilting bars E06B 9/307)
9/322 . . . . . Details of operating devices, e.g. pulleys, brakes, spring drums, drives (devices of general interest specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34)
9/323 . . . . . Structure or support of upper box
9/324 . . . . . Cord-locks
9/325 . . . . . Immobilising devices preventing raising
9/326 . . . . . Details of cords, e.g. buckles, drawing knobs
9/327 . . . . . Guides for raisable lamellar blinds with horizontal lamellae
9/34 . . . . roller type
9/36 . . . with vertical lamellae
9/38 . . . Other details
9/382 . . . . Details of ladder-tapes or ladder-chains, e.g. buckles for local shortening of tapes
9/384 . . . . Details of interconnection or interaction of tapes and lamellae
9/386 . . . . Details of lamellae
9/388 . . . . Details of bottom or upper slats or their attachment
9/40 . . Roller blinds (usable only as awnings E04F 10/06) **[5]**
9/42 . . . Parts or details of roller blinds, e.g. suspension devices, blind boxes (brackets or adjustable mountings for roller blinds and drawable curtains A47H 1/13) **[5]**
9/44 . . . . Rollers therefor; Fastening roller blinds to rollers **[5]**
9/46 . . . . . by clamping bars **[5]**
9/48 . . . . . by clasps or buttons **[5]**
9/50 . . . . Bearings specially adapted therefor **[5]**
9/52 . Devices affording protection against insects, e.g. fly screens; Mesh windows for other purposes
9/54 . . Roller fly screens (operating, guiding or securing devices therefor E06B 9/56) **[2,5]**
9/56 . Operating, guiding or securing devices or arrangements for roll-type closures; Spring drums; Tape drums; Counterweighting arrangements therefor (devices of general interest specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34) **[5]**
9/58 . . Guiding devices **[5]**
9/60 . . Spring drums operated only by closure members **[5]**
9/62 . . Counterweighting arrangements (E06B 9/60 takes precedence) **[5]**
9/64 . . with lowerable roller **[5]**
9/66 . . with a roller situated at the bottom **[5]**
9/68 . . Operating devices or mechanisms, e.g. with electric drive **[5]**
9/70 . . . comprising an electric motor positioned outside the roller **[5]**
9/72 . . . comprising an electric motor positioned inside the roller **[5]**
9/74 . . . adapted for selective electrical or manual operation **[5]**
9/76 . . . using crank handles **[5]**
9/78 . . for direct manual operation, e.g. by tassels, by handles **[5]**
9/80 . . Safety measures against dropping or unauthorised opening; Braking or immobilising devices; Devices for limiting unrolling (securing devices or arrangements for direct manual operation E06B 9/78) **[5]**
9/82 . . . automatic **[5]**
9/84 . . . . against dropping **[5]**
9/86 . . . . against unauthorised opening **[5]**
9/88 . . . . for limiting unrolling **[5]**
9/90 . . . . for immobilising the closure member in various chosen positions **[5]**
9/92 . . Means allowing the closures to be shifted out of the plane of the opening **[5]**

11/00 **Means for allowing passage through fences, barriers, or the like, e.g. stiles** (general features of doors E06B 1/00 to E06B 9/00)
11/02 . Gates; Doors
11/04 . . characterised by the kind of suspension (suspensions <u>per se</u> E05D)
11/06 . . characterised by the kind of fastening (fastening devices for wings E05C)
11/08 . Turnstiles (on vehicles B60N 5/00; with registering means G07C 9/02)

E06C **LADDERS** (E04F 11/00 takes precedence; step-stools A47C 12/00; adaptation of ladders to use on ships B63B, to use on aircraft B64; scaffolding E04G) **[5,6]**

1/00 **Ladders in general** (mounted on undercarriages or vehicles E06C 5/00; permanently attached to fixed structures E06C 9/00)
1/02 . with rigid longitudinal member or members
1/04 . . Ladders for resting against objects, e.g. walls, poles, trees (supports for ladder heads E06C 7/48)
1/06 . . . in one piece
1/08 . . . multi-part
1/10 . . . . Sections fitted end to end
1/12 . . . . extensible, e.g. telescopic
1/14 . . Ladders capable of standing by themselves
1/16 . . . with struts which rest on the ground (with struts rigid with the ladder E06C 1/24; having platforms E06C 1/39)
1/18 . . . . with supporting struts formed as ladders
1/20 . . . . with supporting struts formed as poles
1/22 . . . . . with extensible, e.g. telescopic, ladder parts or struts
1/24 . . . Free-standing ladders
1/26 . . . . in one piece
1/28 . . . . multi-part (with movable supporting struts formed as ladders E06C 1/18)
1/30 . . . . . extensible, e.g. telescopic

1/32 . . Ladders with a strut which is formed as a ladder and can be secured in line with the ladder
1/34 . . Ladders attachable to structures, such as windows, cornices, poles, or the like (ladders permanently fastened to buildings E06C 9/00)
1/36 . . . Ladders suspendable by hooks or the like
1/38 . . Special constructions of ladders, e.g. ladders with more or less than two longitudinal members, ladders with movable rungs or other treads, longitudinally-foldable ladders
1/383 . . . Foldable ladders in which the longitudinal members are brought together on folding
1/387 . . . having tip-up steps
1/39 . . . Ladders having platforms; Ladders changeable into platforms (platforms for use on ladders E06C 7/16)
1/393 . . . . Ladders having platforms foldable with the ladder
1/397 . . . characterised by having wheels, rollers, or runners
1/52 . with non-rigid longitudinal members
1/54 . . of the lazy-tongs type
1/56 . . Rope or chain ladders
1/58 . with both rigid and non-rigid longitudinal members

5/00 Ladders characterised by being mounted on undercarriages or vehicles; **Securing ladders on vehicles** (ladders having wheels, rollers, or runners E06C 1/397)

5/02 . with rigid longitudinal members
5/04 . . capable of being elevated or extended
5/06 . . . by piston and cylinder, or equivalent means, operated by a pressure medium
5/08 . . . . derived directly from a pressure reservoir
5/10 . . . . . charged by a pump or compressor driven by the motor of the vehicle or another motor on the vehicle
5/12 . . . . derived directly from a pump or compressor
5/14 . . . . . driven by the motor of the vehicle or another motor on the vehicle
5/16 . . . using mechanical transmission only, with or without fluid or other non-mechanical couplings or clutches
5/18 . . . . using power from the motor of the vehicle or another motor
5/20 . . . . using hand-power (hand-operated extending means carried by the ladder E06C 7/04)
5/22 . . . by, or with the assistance of, springs (E06C 5/06, E06C 5/16 take precedence)
5/24 . . Dismounting ladders from vehicles
5/26 . with non-rigid longitudinal members
5/28 . . of the lazy-tongs type
5/30 . . formed of links which reinforce themselves against each other
5/32 . Accessories
5/34 . . Indicating devices
5/36 . . Safety devices against slipping or falling of ladders; Safety devices against overloading ladders
5/38 . . Devices for blocking the springs of the vehicle; Devices for supporting the undercarriage directly from the ground
5/40 . . Devices for canting ladders laterally
5/42 . . Devices for altering inclination; Latching devices therefor
5/44 . . Other accessories on ladders, e.g. acoustical signalling devices, dismountable switchboards

7/00 Component parts, supporting parts, or accessories

7/02 . Extending means (for ladders mounted on undercarriages or vehicles E06C 5/00)
7/04 . . Hand-operated extending means carried by the ladder
7/06 . Securing devices or hooks for parts of extensible ladders
7/08 . Special construction of longitudinal members, or rungs or other treads
7/10 . Reinforcements for ladders
7/12 . Lifts or other hoisting devices on ladders
7/14 . Holders for pails or other equipment on or for ladders
7/16 . Platforms on, or for use on, ladders, e.g. liftable or lowerable platforms (aspects relating to the lifting B66F)
7/18 . Devices for preventing persons from falling (life-saving belts A62B 1/16)
7/42 . Ladder feet; Supports therefor (for scaffold elements E04G 5/02)
7/44 . . Means for mounting ladders on uneven ground
7/46 . . Non-skid equipment
7/48 . Ladder heads; Supports for heads of ladders for resting against objects
7/50 . Joints or other connecting parts

9/00 Ladders characterised by being permanently attached to fixed structures, e.g. fire escapes (movable stairways E04F 11/04)

9/02 . rigidly mounted
9/04 . . in the form of climbing irons or the like
9/06 . movably mounted
9/08 . . with rigid longitudinal members
9/10 . . . forming part of a building, such as a balcony grid, window grid, or other window part
9/12 . . . laterally displaceable
9/14 . . with non-rigid longitudinal members, e.g. rope or chain ladders, ladders of the lazy-tongs type

EARTH OR ROCK DRILLING; MINING

E21 EARTH OR ROCK DRILLING; MINING

Note

In this class, the following term is used with the meaning indicated:
– "drilling" covers boring and vice versa.

E21B EARTH OR ROCK DRILLING (mining, quarrying E21C; making shafts, driving galleries or tunnels E21D); **OBTAINING OIL, GAS, WATER, SOLUBLE OR MELTABLE MATERIALS OR A SLURRY OF MINERALS FROM WELLS [5]**

(1) This subclass covers: **[7]**
– primarily equipment for drilling of earth or rock in their natural formation; **[7]**
– similar equipment for drilling of man-made structures in situ, e.g. of road surfaces or concrete structures. **[7]**

(2) This subclass does not cover: **[7]**
– hand-held drilling machines, e.g. for domestic use; **[7]**
– drilling equipment for manufacturing operations, i.e. where an article is worked, e.g. for further processing; **[7]**
which are covered by relevant subclasses of section B, e.g. B23B; **[7]**
– compositions for drilling of boreholes or wells or for treating boreholes or wells, which compositions are covered by group C09K 8/00, e.g. compositions for enhanced recovery methods for obtaining hydrocarbons C09K 8/58. **[8]**

(3) Processes using enzymes or micro-organisms in order to: **[8]**
(i) liberate, separate or purify a pre-existing compound or composition, or to **[8]**
(ii) treat textiles or clean solid surfaces of materials **[8]**
are further classified in subclass C12S. **[8]**

Subclass index

Methods or apparatus for drilling

1/00 Percussion drilling (drives used in the borehole E21B 4/00) **[3]**
1/02 . Surface drives for drop hammers, e.g. with a cable **[1,7]**
1/04 . . Devices for reversing the movement of the rod or cable at the surface
1/12 . with a reciprocating impulse member (E21B 1/02, E21B 1/38 take precedence) **[7]**
1/14 . . driven by a rotating mechanism **[7]**
1/16 . . . with spring-mounted reciprocating masses, e.g. with air cushion **[7]**
1/18 . . . . with elastic joining of the drive to the push-rod by double buffer springs **[7]**
1/20 . . . formed as centrifugal hammers **[7]**
1/22 . . driven by electromagnets **[7]**
1/24 . . the impulse member being a piston driven directly by fluid pressure **[7]**
1/26 . . . by liquid pressure **[7]**
1/28 . . . . working with pulses **[7]**
1/30 . . . by air, steam or gas pressure **[7]**
1/32 . . . . working with pulses **[7]**
1/34 . . . . . the impulse member being a piston of an internal-combustion engine **[7]**
1/36 . Tool-carrier piston type, i.e. in which the tool is connected to an impulse member **[7]**
1/38 . Hammer piston type, i.e. in which the tool bit or anvil is hit by an impulse member **[7]**

3/00 Rotary drilling (drives used in the borehole E21B 4/00; rotary drilling machines in general B23B) **[3]**
3/02 . Surface drives for rotary drilling
3/025 . . with a to-and-fro rotation of the tool **[7]**
3/03 . . with an intermittent unidirectional rotation of the tool **[7]**
3/035 . . with slipping or elastic transmission **[7]**
3/04 . . Rotary tables
3/06 . . . Adaptation of rotary draw works to drive rotary tables (connecting or disconnecting couplings or joints E21B 19/16; rope, cable, or chain winding mechanisms, capstans B66D) **[3]**

4/00 Drives for drilling, used in the borehole [3]

4/02 . Fluid rotary type drives (hydraulic turbines for drilling wells F03B 13/02) **[3]**

4/04 . Electric drives (E21B 4/12 takes precedence) **[3]**

4/06 . Down-hole impacting means, e.g. hammers (percussion drill bits E21B 10/36; boring rams E21B 11/02; releasing-jars E21B 31/107) **[3]**

4/08 . . impact being obtained by gravity only, e.g. with lost-motion connection **[3]**

4/10 . . continuous unidirectional rotary motion of shaft or drilling pipe effecting consecutive impacts **[3]**

4/12 . . Electrically operated hammers **[3]**

4/14 . . Fluid operated hammers **[3]**

4/16 . Plural down-hole drives, e.g. for combined percussion and rotary drilling (E21B 4/10 takes precedence); Drives for multi-bit drilling units **[3]**

4/18 . Anchoring or feeding in the borehole **[3,7]**

4/20 . combined with surface drive (E21B 4/10 takes precedence) **[3]**

6/00 Drives for drilling with combined rotary and percussive action (drives used in the borehole E21B 4/00; portable percussive machines with superimposed rotation B25D 16/00) **[3]**

6/02 . the rotation being continuous **[7]**

6/04 . . Separate drives for percussion and rotation **[7]**

6/06 . the rotation being intermittent, e.g. obtained by a ratchet device **[7]**

6/08 . . Separate drives for percussion and rotation **[7]**

7/00 Special methods or apparatus for drilling (supports for the drilling machine, e.g. derricks or masts, E21B 15/00) **[1,7]**

7/02 . Drilling rigs characterised by means for land transport, e.g. skid mounting or wheel mounting (portable drilling rigs for use on underwater floors E21B 7/124) **[1,7]**

7/04 . Directional drilling

7/06 . . Deflecting the direction of boreholes

7/08 . . . Special apparatus for deflecting the boring, e.g. special drill bits, knuckle joints, whipstocks (directional window cutting E21B 29/06; deflecting the direction of fishing tools E21B 31/14)

7/10 . . Correction of deflected boreholes

7/12 . Underwater drilling (telescoping joints E21B 17/07; using heave compensators E21B 19/09; well heads specially adapted for underwater installations E21B 33/035) **[1,7]**

7/124 . . with underwater tool drive prime mover, e.g. portable drilling rigs for use on underwater floors **[3]**

7/128 . . from floating support with independent underwater anchored guide base **[3]**

7/132 . . from underwater buoyant support **[3]**

7/136 . . from non-buoyant support (E21B 7/124 takes precedence) **[3]**

7/14 . Drilling by use of heat, e.g. flame drilling

7/15 . . of electrically generated heat **[3]**

7/16 . Applying separate balls or pellets by the pressure of the drill, so-called shot-drilling

7/18 . Drilling by liquid or gas jets, with or without entrained pellets (E21B 7/14 takes precedence; hydraulic monitors E21C 45/00) **[5]**

7/20 . Driving or forcing casings or pipes into boreholes, e.g. sinking; Simultaneously drilling and casing boreholes (surface means for applying to-and-fro rotation movements to the casing E21B 3/025; placing piles E02D 7/00; sinking shafts while moving the lining downwards E21D 1/08) **[3]**

7/24 . Drilling using vibrating or oscillating means, e.g. out-of-balance masses (percussion drilling E21B 1/00) **[3]**

7/26 . Drilling without earth removal, e.g. with self-propelled burrowing devices (E21B 7/30 takes precedence; down-hole drives E21B 4/00) **[3,6]**

7/28 . Enlarging drilled holes, e.g. by counterboring (drill bits for enlarging the borehole E21B 10/26) **[3]**

7/30 . . without earth removal **[6]**

Drilling tools

10/00 Drill bits (specially adapted for deflecting the direction of boring E21B 7/08; with means for collecting substances E21B 27/00) **[3,8]**

10/02 . Core bits (characterised by wear resisting parts E21B 10/46; obtaining undisturbed cores E21B 25/00) **[3]**

10/04 . . with core destroying means **[3]**

10/06 . . Roller core bits **[3]**

10/08 . Roller bits (roller core bits E21B 10/06; with leading portion E21B 10/26; characterised by wear resisting parts E21B 10/46) **[3]**

10/10 . . with roller axle supported at both ends (with disc cutters E21B 10/12) **[3]**

10/12 . . with disc cutters **[3]**

10/14 . . combined with non-rolling cutters other than of leading-portion type **[3]**

10/16 . . characterised by tooth form or arrangement **[3]**

10/18 . . characterised by conduits or nozzles for drilling fluids (drilling fluid supply to the bearings E21B 10/23) **[3,8]**

10/20 . . characterised by detachable or adjustable parts, e.g. legs or axles (cross axle roller bits E21B 10/10) **[3]**

10/22 . . characterised by bearing, lubrication or sealing details **[3,8]**

10/23 . . . with drilling fluid supply to the bearings **[8]**

10/24 . . . characterised by lubricating details (E21B 10/23 takes precedence) **[3,8]**

10/25 . . . characterised by sealing details **[8]**

10/26 . Drill bits with leading portion, i.e. drill bits with a pilot cutter; Drill bits for enlarging the borehole, e.g. reamers (percussion drill bits with leading portion E21B 10/40; augers with leading portion E21B 10/44) **[3]**

10/28 . . with non-expansible roller cutters **[3]**

10/30 . . . Longitudinal axis roller reamers, e.g. reamer stabilisers **[3]**

10/32 . . with expansible cutting tools **[3]**

10/34 . . . of roller-cutter type **[3]**

10/36 . Percussion drill bits (characterised by wear resisting parts E21B 10/46) **[3]**

10/38 . . characterised by conduits or nozzles for drilling fluids **[3]**

10/40 . . with leading portion **[3]**

10/42 . Rotary drag type drill bits with teeth, blades or like cutting elements, e.g. fork-type bits, fish tail bits (characterised by wear resisting parts E21B 10/46, by conduits or nozzles for drilling fluid E21B 10/60, by detachable parts E21B 10/62) **[3,8]**

10/43 . . characterised by the arrangement of teeth or other cutting elements **[8]**

10/44 . Bits with helical conveying portion, e.g. screw type bits; Augers with leading portion or with detachable parts (E21B 10/42 takes precedence; drilling rods with helical structure E21B 17/22) **[3,8]**

10/46 . characterised by wear resisting parts, e.g. diamond inserts **[3]**

10/48 . . the bit being of core type **[3]**

10/50 . . the bit being of roller type **[3]**

10/52 . . . with chisel- or button-type inserts **[3]**

10/54 . . the bit being of the rotary drag type, e.g. fork-type bits **[3,8]**

10/55 . . . with preformed cutting elements (inserts per se E21B 10/56, E21B 10/58) **[8]**

10/56 . . Button-type inserts (E21B 10/52 takes precedence) **[3]**

10/567 . . . with preformed cutting elements mounted on a distinct support, e.g. polycrystalline inserts **[8]**

10/573 . . . . characterised by support details, e.g. the substrate construction or the interface between the substrate and the cutting element **[8]**

10/58 . . Chisel-type inserts (E21B 10/52, E21B 10/54 take precedence) **[3]**

10/60 . characterised by conduits or nozzles for drilling fluids (for roller bits E21B 10/18; for percussion drill bits E21B 10/38) **[3]**

10/61 . . characterised by nozzle structure **[8]**

10/62 . characterised by parts, e.g. cutting elements, which are detachable or adjustable (E21B 10/64 takes precedence; for roller bits E21B 10/20; for augers E21B 10/44) **[3,8]**

10/627 . . with plural detachable cutting elements **[8]**

10/633 . . . independently detachable **[8]**

10/64 . characterised by the whole or part thereof being insertable into or removable from the borehole without withdrawing the drilling pipe (retrievable core receivers E21B 25/02) **[3]**

10/66 . . the cutting element being movable through the drilling pipe and laterally shiftable **[3]**

11/00 Other drilling tools

11/02 . Boring rams (percussion drives used in the borehole E21B 4/06; percussion drill bits E21B 10/36)

11/04 . Boring grabs

11/06 . with driven cutting chains or similarly-driven tools

12/00 Accessories for drilling tools [3]

12/02 . Wear indicators **[3]**

12/04 . Drill bit protectors **[3]**

12/06 . Mechanical cleaning devices **[3]**

Other equipment or details for drilling; **Well equipment or well maintenance**

15/00 Supports for the drilling machine, e.g. derricks or masts [1,7]

15/02 . specially adapted for underwater drilling (E21B 15/04 takes precedence; floating drilling platforms B63B 35/44; drilling platforms on legs E02B 17/00) **[3]**

15/04 . specially adapted for directional drilling, e.g. slant hole rigs **[3]**

17/00 Drilling rods or pipes; **Flexible drill strings**; **Kellies**; **Drill collars**; **Sucker rods**; **Casings**; **Tubings** (rod couplings in general F16D; tubes or tube couplings in general F16L)

17/01 . Risers (riser connectors E21B 33/038) **[3]**

17/02 . Couplings; Joints

17/03 . . between drilling rod or pipe and drill motor, e.g. between drilling rod and hammer **[7]**

17/04 . . between rod and bit, or between rod and rod

17/042 . . . threaded

17/043 . . . . with locking means

17/046 . . . with ribs, pins, or jaws, and complementary grooves or the like, e.g. bayonet catches

17/05 . . . Swivel joints

17/06 . . . Releasing-joints, e.g. safety joints

17/07 . . . Telescoping joints for varying drill string lengths; Shock absorbers (heave compensators in the derrick E21B 19/09; releasing-jars E21B 31/107) **[3]**

17/08 . . Casing joints

17/10 . Wear protectors; Centralising devices (drives used in the borehole with anchoring means E21B 4/18; guiding or centralising devices outside the borehole E21B 19/24)

17/12 . . Devices for placing or drawing out wear protectors

17/14 . Casing shoes

17/16 . Drill collars **[3]**

17/18 . Pipes provided with plural fluid passages (circulation of drilling fluid by means of such pipes E21B 21/12) **[3]**

17/20 . Flexible or articulated drilling pipes **[3]**

17/22 . Rods or pipes with helical structure (drill bits with helical conveying portion E21B 10/44) **[3]**

19/00 Handling rods, casings, tubes or the like outside the borehole, e.g. in the derrick; **Apparatus for feeding the rods or cables** (surface drives E21B 1/02, E21B 3/02)

19/02 . Rod or cable suspensions (load-engaging elements for hoisting or lowering purposes in general B66C 1/00; crown blocks or pulley blocks B66D; cable guides B66D 1/36)

19/04 . . Hooks

19/06 . . Elevators, i.e. rod- or tube-gripping devices

19/07 . . . Slip-type elevators (slips in rotary tables E21B 19/10)

19/08 . Apparatus for feeding the rods or cables (E21B 19/22 takes precedence; automatic feed E21B 44/02; hoisting drums B66D); Apparatus for increasing or decreasing the pressure on the drilling tool; Apparatus for counterbalancing the weight of the rods **[3,7]**

19/081 . . Screw-and-nut feed mechanisms **[7]**

19/083 . . Cam, rack or like feed mechanisms **[7]**

19/084 . . with flexible drawing means, e.g. cables **[7]**

19/086 . . with a fluid-actuated cylinder (E21B 19/084, E21B 19/087, E21B 19/09 take precedence) **[7]**

19/087 . . by means of a swinging arm **[7]**

19/089 . . with a spring or an additional weight **[7]**

19/09 . . specially adapted for drilling underwater formations from a floating support using heave compensators supporting the drill string (drilling-pipe telescoping joints E21B 17/07) **[3]**

19/10 . Slips; Spiders

19/12 . Rope clamps (rope clamps in general F16G 11/00)

19/14 . Racks, ramps, troughs or bins, for holding the lengths of rod singly or connected; Handling between storage place and borehole (E21B 19/20, E21B 19/22 take precedence) **[3]**

19/15 . . Racking of rods in horizontal position; Handling between horizontal and vertical position **[3]**

19/16 . Connecting or disconnecting pipe couplings or joints (E21B 19/20 takes precedence; pipe wrenches or the like B25B) **[3]**

19/18 . Connecting or disconnecting drill bit and drilling pipe **[3]**

19/20 . Combined feeding from rack and connecting, e.g. automatically **[3]**

19/22 . Handling reeled pipe or rod units, e.g. flexible drilling pipes **[3]**

19/24 . Guiding or centralising devices for drilling rods or pipes **[7]**

21/00 Methods or apparatus for flushing boreholes, e.g. by use of exhaust air from motor (freeing objects stuck in boreholes by flushing E21B 31/03; well drilling compositions C09K 8/02) **[2,7]**

21/01 . Arrangements for handling drilling fluids or cuttings outside the borehole, e.g. mud boxes (arrangements for treating drilling fluids E21B 21/06) **[7]**

21/015 . . Means engaging the bore entrance, e.g. hoods for collecting dust **[7]**

21/02 . Swivel joints in hose lines

21/06 . Arrangements for treating drilling fluids outside the borehole (treating steps per se, see the relevant subclasses) **[3]**

21/07 . . for treating dust-laden gaseous fluids **[7]**

21/08 . Controlling or monitoring pressure or flow of drilling fluid, e.g. automatic filling of boreholes, automatic control of bottom pressure (valve arrangements therefor E21B 21/10) **[3]**

21/10 . Valves arrangements in drilling-fluid circulation systems (valves in general F16K) **[3]**

21/12 . using drilling pipes with plural fluid passages, e.g. closed circulation systems (pipes with plural fluid passages E21B 17/18) **[3]**

21/14 . using liquids and gases, e.g. foams **[3]**

21/16 . using gaseous fluids (E21B 21/14 takes precedence; arrangements for handling drilling fluids outside the borehole E21B 21/01; arrangements for treating drilling fluids E21B 21/06) **[7]**

21/18 . Preventing exhaust air from the drill motor from blowing-off towards the working face **[7]**

23/00 Apparatus for displacing, setting, locking, releasing or removing tools, packers or the like in boreholes or wells (setting of casings, screens, or liners E21B 43/10)

23/01 . for anchoring the tools or the like (E21B 23/02 to E21B 23/06 take precedence; anchoring of drives in the borehole E21B 4/18) **[6]**

23/02 . for locking the tools or the like in landing nipples or in recesses between adjacent sections of tubing (E21B 23/03 to E21B 23/06 take precedence) **[3]**

23/03 . for setting the tools into, or removing the tools from, laterally offset landing nipples or pockets **[3]**

23/04 . operated by fluid means, e.g. actuated by explosion (E21B 23/06, E21B 23/08 take precedence) **[3]**

23/06 . for setting packers

23/08 . Introducing or running tools by fluid pressure, e.g. through-the-flow-line tool systems (special provisions on heads therefor E21B 33/068; cementing plugs E21B 33/16; scrapers operated by fluid pressure E21B 37/04) **[3]**

23/10 . . Tools specially adapted therefor **[3]**

23/12 . . Tool diverters **[3]**

23/14 . for displacing a cable or a cable-operated tool, e.g. for logging or perforating operations in deviated wells (by fluid pressure E21B 23/08; provision on well heads for introducing or removing cable-operated tools E21B 33/072, E21B 33/076) **[6]**

25/00 Apparatus for obtaining or removing undisturbed cores, e.g. core barrels, core extractors (core bits E21B 10/02; using explosives or projectiles in boreholes E21B 49/04; side-wall sampling or coring E21B 49/06)

25/02 . the core receiver being insertable into, or removable from, the borehole without withdrawing the drilling pipe (retrievable drill bits E21B 10/64) **[3]**

25/04 . . the core receiver having a core forming cutting edge or element, e.g. punch type core barrels **[3]**

25/06 . the core receiver having a flexible liner or inflatable retaining means **[3]**

25/08 . Coating, freezing, consolidating cores (E21B 25/06 takes precedence); Recovering uncontaminated cores or cores at formation pressure **[3]**

25/10 . Formed core retaining or severing means (E21B 25/06, E21B 25/08 take precedence) **[3]**

25/12 . . of the sliding wedge type **[3]**

25/14 . . mounted on pivot transverse to core axis **[3]**

25/16 . for obtaining oriented cores **[3]**

25/18 . the core receiver being specially adapted for operation under water **[3]**

27/00 Containers for collecting or depositing substances in boreholes or wells, e.g. bailers for collecting mud or sand; **Drill bits with means for collecting substances, e.g. valve drill bits [6,8]**

27/02 . Dump bailers, i.e. containers for depositing substances, e.g. cement or acids **[6,8]**

27/04 . where the collecting or depositing means include helical conveying means **[8]**

28/00 Vibration generating arrangements for boreholes or wells, e.g. for stimulating production (for drilling E21B 7/24; for transmitting measuring-signals E21B 47/14; for geophysical measurements G01V 1/02) **[6]**

29/00 Cutting or destroying pipes, packers, plugs, or wire lines, located in boreholes or wells, e.g. cutting of damaged pipes, of windows (perforators E21B 43/11); **Deforming of pipes in boreholes or wells**; **Reconditioning of well casings while in the ground**

29/02 . by explosives or by thermal or chemical means (destroying objects in boreholes or wells by explosives E21B 31/16)

29/04 . Cutting of wire lines or the like (E21B 29/02 takes precedence) **[3]**

29/06 . Cutting windows, e.g. directional window cutters for whipstock operations (E21B 29/08 takes precedence; whipstocks E21B 7/08) **[3]**

29/08 . Cutting or deforming pipes to control fluid flow (blow-out preventers E21B 33/06) **[3]**

29/10 . Reconditioning of well casings, e.g. straightening **[3]**

29/12 . specially adapted for underwater installations (E21B 29/08 takes precedence) **[3]**

31/00 Fishing for or freeing objects in boreholes or wells (provisions on well heads for introducing or removing objects E21B 33/068; locating or determining the position of objects in boreholes or wells E21B 47/09)

31/03 . Freeing by flushing **[3]**

31/06 . using magnetic means **[3]**

31/08 . using junk baskets or the like **[3]**
31/107 . using impact means for releasing stuck parts, e.g. jars (telescoping joints E21B 17/07) **[3]**
31/113 . . hydraulically operated **[3]**
31/12 . Grappling tools, e.g. tongs or grabs
31/14 . . with means deflecting the direction of the tool, e.g. by use of knuckle joints (apparatus for deflecting the boring E21B 7/08) **[3]**
31/16 . . combined with cutting or destroying means (cutting or destroying means per se E21B 29/00) **[3]**
31/18 . . gripping externally, e.g. overshot **[3]**
31/20 . . gripping internally, e.g. fishing spears **[3]**

33/00 Sealing or packing boreholes or wells
33/02 . Surface sealing or packing
33/03 . . Well heads; Setting-up thereof (valve arrangements therefor E21B 34/02)
33/035 . . . specially adapted for underwater installations (E21B 33/043, E21B 33/064, E21B 33/076 take precedence) **[3]**
33/037 . . . . Protective housings therefor **[3]**
33/038 . . . . Connectors used on well heads, e.g. for connecting blow-out preventer and riser (connecting a production flow line to an underwater well head E21B 43/013) **[3]**
33/04 . . . Casing heads; Suspending casings or tubings in well heads (setting of casings in wells E21B 43/10)
33/043 . . . . specially adapted for underwater well heads (E21B 33/047 takes precedence) **[3]**
33/047 . . . . for plural tubing strings **[3]**
33/05 . . . . Cementing-heads, e.g. having provision for introducing cementing plugs
33/06 . . . Blow-out preventers **[3]**
33/064 . . . . specially adapted for underwater well heads (connectors therefor E21B 33/038) **[3]**
33/068 . . . having provision for introducing objects or fluids into, or removing objects from, wells (cementing-heads E21B 33/05) **[3]**
33/072 . . . . for cable-operated tools (E21B 33/076 takes precedence) **[3]**
33/076 . . . . specially adapted for underwater installations **[3]**
33/08 . . Wipers; Oil savers
33/10 . in the borehole
33/12 . . Packers; Plugs (used for cementing E21B 33/134, E21B 33/16)
33/122 . . . Multiple-string packers
33/124 . . . Units with longitudinally-spaced plugs for isolating the intermediate space
33/126 . . . with fluid-pressure-operated elastic cup or skirt (E21B 33/122, E21B 33/124 take precedence)
33/127 . . . with inflatable sleeve (E21B 33/122, E21B 33/124 take precedence)
33/128 . . . with a member expanded radially by axial pressure (E21B 33/122, E21B 33/124 take precedence)
33/129 . . . with mechanical slips for hooking into the casing (E21B 33/122, E21B 33/124 take precedence)
33/1295 . . . . actuated by fluid pressure **[6]**
33/13 . . Methods or devices for cementing, for plugging holes, crevices, or the like (dump bailers E21B 27/02; chemical compositions therefor C09K 8/00) **[1,8]**
33/134 . . . Bridging plugs
33/136 . . . Baskets, e.g. of umbrella type
33/138 . . . Plastering the borehole wall; Injecting into the formation
33/14 . . . for cementing casings into boreholes
33/16 . . . . using plugs for isolating cement charge; Plugs therefor

34/00 Valve arrangements for boreholes or wells (in drilling fluid circulation systems E21B 21/10; blow-out preventers E21B 33/06; oil flow regulating apparatus E21B 43/12; valves in general F16K) **[3]**
34/02 . in well heads **[3]**
34/04 . . in underwater well heads **[3]**
34/06 . in wells **[3]**
34/08 . . responsive to flow or pressure of the fluid obtained (E21B 34/10 takes precedence) **[3]**
34/10 . . operated by control fluid supplied from outside the borehole (control means being outside the borehole E21B 34/16) **[3]**
34/12 . . operated by movement of casings or tubings **[3]**
34/14 . . operated by movement of tools, e.g. sleeve valves operated by pistons or wire line tools **[3]**
34/16 . Control means therefor being outside the borehole **[3]**

35/00 Methods or apparatus for preventing or extinguishing fires (cutting or deforming pipes to control fluid flow E21B 29/08; controlling flow of fluid to or in wells E21B 43/12; fire fighting in general A62C, A62D)

36/00 Heating, cooling, or insulating arrangements for boreholes or wells, e.g. for use in permafrost zones (drilling by use of heat E21B 7/14; secondary recovery methods using heat E21B 43/24) **[3]**
36/02 . using burners **[3]**
36/04 . using electrical heaters **[3]**

37/00 Methods or apparatus for cleaning boreholes or wells (E21B 21/00 takes precedence; cleaning pipes in general B08B 9/02)
37/02 . Scrapers specially adapted therefor
37/04 . . operated by fluid pressure, e.g. free-piston scrapers (operating other tools by fluid pressure E21B 23/08) **[3]**
37/06 . using chemical means for preventing or limiting the deposition of paraffins or like substances (chemical compositions therefor C09K 8/52) **[3,8]**
37/08 . cleaning in situ of down-hole filters, screens, or gravel packs (E21B 37/06 takes precedence) **[3]**
37/10 . Well swabs **[3]**

40/00 Tubing catchers, automatically arresting the fall of oil-well tubing

41/00 Equipment or details not covered by groups E21B 15/00 to E21B 40/00
41/02 . in situ inhibition of corrosion in boreholes or wells (dump bailers E21B 27/02; chemical compositions therefor C09K 8/54; inhibiting corrosion in general C23F) **[3,6,8]**
41/04 . Manipulators for underwater operations, e.g. temporarily connected to well heads (manipulators in general B25J) **[3]**
41/06 . Work chambers for underwater operations, e.g. temporarily connected to well heads (in general B63C 11/00) **[3]**
41/08 . Underwater guide bases, e.g. drilling templates; Levelling thereof **[7]**
41/10 . Guide posts, e.g. releasable; Attaching guide lines to underwater guide bases **[7]**

Obtaining fluids from wells [3]

43/00 Methods or apparatus for obtaining oil, gas, water, soluble or meltable materials or a slurry of minerals from wells (applicable only to water E03B; obtaining oil-bearing deposits or soluble or meltable materials by mining techniques E21C 41/00; pumps F04)

43/01 . specially adapted for obtaining from underwater installations (underwater well heads E21B 33/035)

43/013 . . Connecting a production flow line to an underwater well head **[3]**

43/017 . . Production satellite stations, i.e. underwater installations comprising a plurality of satellite well heads connected to a central station (underwater separating arrangements E21B 43/36) **[3]**

43/02 . Subsoil filtering (E21B 43/11 takes precedence; chemical compositions for consolidating loose sand or the like around wells C09K 8/56) **[1,8]**

43/04 . . Gravelling of wells

43/08 . . Screens or liners

43/10 . . Setting of casings, screens or liners in wells (driving or forcing casings into boreholes, simultaneously drilling and casing boreholes E21B 7/20; setting of tools, packers or the like E21B 23/00; suspending casings in well heads E21B 33/04)

43/11 . Perforators; Permeators

43/112 . . Perforators with extendable perforating members, e.g. actuated by fluid means

43/114 . . Perforators using direct fluid action, e.g. abrasive jets

43/116 . . Gun or shaped-charge perforators

43/117 . . . Shaped-charge perforators (E21B 43/118 takes precedence)

43/118 . . . characterised by lowering in vertical position and subsequent tilting to operating position

43/1185 . . . Ignition systems **[3]**

43/119 . . Details, e.g. for locating perforating place or direction

43/12 . Methods or apparatus for controlling the flow of the obtained fluid to or in wells (E21B 43/25 takes precedence; valve arrangements E21B 34/00)

43/14 . Obtaining from a multiple-zone well

43/16 . Enhanced recovery methods for obtaining hydrocarbons (fracturing E21B 43/26; obtaining slurry E21B 43/29; reclamation of contaminated soil in situ B09C)

43/17 . . Interconnecting two or more wells by fracturing or otherwise attacking the formation (E21B 43/247 takes precedence) **[3]**

43/18 . . Repressuring or vacuum methods

43/20 . . Displacing by water

43/22 . . Use of chemicals or bacterial activity (E21B 43/27 takes precedence; chemical or bacterial compositions therefor C09K 8/58; chemical features in extracting oils from oil sands or shales C10G) **[1,8]**

43/24 . . using heat, e.g. steam injection (heating, cooling or insulating wells E21B 36/00)

43/241 . . . combined with solution mining of non-hydrocarbon minerals, e.g. solvent pyrolysis of oil shale **[5]**

43/243 . . . Combustion in situ **[3]**

43/247 . . . . in association with fracturing processes **[3]**

43/248 . . . . . using explosives **[5]**

43/25 . Methods for stimulating production (dump bailers E21B 27/02; vibration generating arrangements E21B 28/00; chemical compositions therefor C09K 8/60) **[1,8]**

43/26 . . by forming crevices or fractures

43/263 . . . using explosives **[3]**

43/267 . . . reinforcing fractures by propping **[3]**

43/27 . . . by use of eroding chemicals, e.g. acids

43/28 . Dissolving minerals other than hydrocarbons, e.g. by an alkaline or acid leaching agent (E21B 43/241 takes precedence) **[5]**

43/285 . Melting minerals, e.g. sulfur (E21B 43/24 takes precedence; heating, cooling or insulating arrangements for wells E21B 36/00) **[5]**

43/29 . Obtaining a slurry of minerals, e.g. by using nozzles **[5]**

43/295 . Gasification of minerals, e.g. for producing mixtures of combustible gases (E21B 43/243 takes precedence) **[5]**

43/30 . Specific pattern of wells, e.g. optimizing the spacing of wells (production satellite stations E21B 43/017) **[3]**

43/32 . Preventing gas- or water-coning phenomena, i.e. the formation of a conical column of gas or water around wells **[3]**

43/34 . Arrangements for separating materials produced by the well (separating apparatus per se, see the relevant subclasses) **[3]**

43/36 . . Underwater separating arrangements (E21B 43/38 takes precedence) **[3]**

43/38 . . in the well **[3]**

43/40 . . Separation associated with re-injection of separated materials **[3]**

Automatic control; Surveying or testing [3]

44/00 Automatic control systems specially adapted for drilling operations, i.e. self-operating systems which function to carry out or modify a drilling operation without intervention of a human operator, e.g. computer-controlled drilling systems (for non-automatic drilling control, see the operation controlled; automatic feeding from rack and connecting of drilling pipes E21B 19/20; controlling pressure or flow of drilling fluid E21B 21/08); **Systems specially adapted for monitoring a plurality of drilling variables or conditions** (means for transmitting measuring-signals from the well to the surface E21B 47/12) **[3]**

44/02 . Automatic control of the tool feed (E21B 44/10 takes precedence) **[7]**

44/04 . . in response to the torque of the drive **[7]**

44/06 . . in response to the flow or pressure of the motive fluid of the drive **[7]**

44/08 . . in response to the amplitude of the movement of the percussion tool, e.g. jump or recoil **[7]**

44/10 . Arrangements for automatic stopping when the tool is lifted from the working face **[7]**

Surveying or testing

45/00 Measuring the drilling time or rate of penetration

47/00 **Survey of boreholes or wells** (monitoring pressure or flow of drilling fluid E21B 21/08; geophysical logging G01V)

47/01 . Devices for supporting measuring instruments on a drill pipe, rod or wireline (setting or locking tools in boreholes or wells E21B 23/00); Protecting measuring instruments in boreholes against heat, shock, pressure or the like **[6]**

47/02 . Determining slope or direction (clinometers or direction meters G01C)

47/022 . . of the borehole

47/024 . . of devices in the borehole (E21B 47/022 takes precedence)

47/026 . . of penetrated ground layers (apparatus for obtaining oriented cores E21B 25/16; formation testing E21B 49/00)

47/04 . Measuring depth or liquid level (measuring liquid level in general G01F)

47/06 . Measuring temperature or pressure (measuring temperature in general G01K; measuring pressure in general G01L)

47/08 . Measuring diameter (measuring diameter in general G01B)

47/09 . Locating or determining the position of objects in boreholes or wells; Identifying the free or blocked portions of pipes (measuring depth E21B 47/04; measuring diameter E21B 47/08) **[3]**

47/10 . Locating fluid leaks, intrusions, or movements

47/12 . Means for transmitting measuring-signals from the well to the surface, e.g. for logging while drilling (remote signalling in general G08)

47/14 . . using acoustic waves **[6]**

47/16 . . . through the drill string or casing **[6]**

47/18 . . . through the well fluid **[6]**

49/00 **Testing the nature of borehole walls**; **Formation testing**; **Methods or apparatus for obtaining samples of soil or well fluids, specially adapted to earth drilling or wells** (sampling in general G01N 1/00)

49/02 . by mechanically taking samples of the soil (apparatus for obtaining undisturbed cores E21B 25/00; investigation of foundation soil in situ E02D 1/00)

49/04 . . using explosives in boreholes; using projectiles penetrating the wall **[3]**

49/06 . . using side-wall drilling tools or scrapers

49/08 . Obtaining fluid samples or testing fluids, in boreholes or wells **[3]**

49/10 . . using side-wall fluid samplers or testers **[3]**

E21C MINING OR QUARRYING

Subclass index

Cutting; **Slitting**; **Dislodging**

25/00 **Cutting machines, i.e. for making slits approximately parallel or perpendicular to the seam** (dislodging machines with slitting means E21C 27/02, E21C 27/10, E21C 27/18)

25/02 . Machines slitting solely by one or more percussive tools moved through the seam

25/04 . . Cutting crowns or other tools (percussion drill bits E21B 10/36)

25/06 . Machines slitting solely by one or more cutting rods or cutting drums which rotate, move through the seam, and may or may not reciprocate

25/08 . . Mountings for the rods or drums

25/10 . . Rods; Drums **[6]**

25/14 . . with equipment for cleaning the slit (associated with cutter chain machines E21C 25/50)

25/16 . Machines slitting solely by one or more rotating saws, cutting discs, or wheels

25/18 . . Saws; Discs; Wheels

25/20 . Machines slitting solely by one or more reciprocating sawing implements or reciprocating cutter chains; Shaker conveyers with cutting means

25/22 . Machines slitting solely by one or more cutter chains moving unidirectionally along jibs

25/24 . . with flat jibs only

25/26 . . with curved jibs only

25/28 . . Chains or chain guides **[6]**

25/30 . . . Chain guides

25/32 . . . . specially adapted for curved jibs

25/34 . . . Chains

25/36 . . . . Couplings for links

25/40 . . . . having links with integrally formed picks

25/50 . . with equipment for cleaning the slit (associated with rotary-rod or rotary-drum machines E21C 25/14)

25/52 . Machines incorporating two or more of the slitting means according to groups E21C 25/02, E21C 25/06, E21C 25/16, E21C 25/20 and E21C 25/22

25/54 . Slitting by unguided cutter cables or cutter chains or by unguided tools drawn along the working face by cables or the like (dislodging by planing means E21C 27/32; propulsion by haulage cables E21C 29/14)

25/56 . Slitting by cutter cables or cutter chains or by tools drawn along the working face by cables or the like, in each case guided parallel to the face, e.g. by a conveyer, by a guide parallel to a conveyer (pressing the conveyer equipped with tools toward the working face E21C 35/14)

25/58 . Machines slitting by drilling hole on hole

25/60 . Slitting by jets of water or other liquid (picks with arrangement of fluid-spraying nozzles E21C 35/187; distribution of spraying fluids in rotating cutter-heads E21C 35/23) **[6]**
25/62 . Machines for making slits approximately perpendicular to the seams either level with, or above or below the level of, the machine
25/64 . Slitting machines guided solely by hand and either carried by hand or mounted on supports (hand-held power-operated tools E21C 37/22)
25/66 . Machines for making slits with additional arrangements for drilling
25/68 . Machines for making slits combined with equipment for removing, e.g. by loading, material won by other means (slitting machines combined with planing means E21C 27/18; removing chippings E21C 35/20)

27/00 Machines which completely free the mineral from the seam

27/01 . specially adapted for removing overhanging coal
27/02 . solely by slitting (rods, drums, for same E21C 25/10; saws, discs, wheels E21C 25/18; chains, chain guides, for same E21C 25/28)
27/04 . . by a single chain guided on a frame with or without auxiliary slitting means
27/06 . . . with a slewing frame
27/08 . . with additional means for cutting the mineral into blocks
27/10 . by both slitting and breaking-down
27/12 . . breaking-down effected by acting on the vertical face of the mineral, e.g. by percussive tools
27/14 . . breaking-down effected by force or pressure applied to side of slit, e.g. by wedges (breaking-down by means inserted in boreholes E21C 37/00)
27/16 . . . with means for both slitting and breaking-down
27/18 . by both slitting and planing
27/20 . Mineral freed by means not involving slitting
27/22 . . by rotary drills with breaking-down means, e.g. wedge-shaped drills
27/24 . . by milling means acting on the full working face
27/26 . . by closely adjacent cutter chains acting on the full working face
27/28 . . by percussive drills with breaking-down means, e.g. wedge-shaped tools
27/30 . . by jaws, buckets, or scoops that scoop-out the mineral
27/32 . . by adjustable or non-adjustable planing means with or without loading arrangements (by percussed planing means E21C 27/46)
27/34 . . . Machine propelled along the working face by cable or chain
27/35 . . . . Ram-ploughs
27/36 . . . Machine self-propelled along the working face
27/38 . . . Machine stationary while planing in an arc
27/40 . . . Machine and its planing tool making alternative step-wise movements along the working face
27/42 . . . combined with scraper or collector box
27/44 . . . Planing knives (mining picks E21C 35/18)
27/46 . . by percussed planing means

29/00 Propulsion of machines for slitting or completely freeing the mineral from the seam

29/02 . by means on the machine exerting a thrust against fixed supports
29/04 . by cable or chains
29/06 . . anchored at one or both ends to the mine working face
29/08 . . . Anchoring arrangements (for anchoring of conveyers only E21F 13/00)
29/10 . . . Cable or chain co-operating with a winch or the like on the machine
29/12 . . . Machines propelled by thrust or pull against a part alternately anchored to, and released from, a cable or chain
29/14 . . by haulage cable or chain pulling the machine along the working face
29/16 . . . Winches or other means for pulling cable or chain (winches in general B66D)
29/18 . . . Coupling and uncoupling machine to cable or chain
29/20 . . with safety devices operating in the event of breakage of the cable or chain
29/22 . by wheels, endless tracks, or the like
29/24 . . Trucks carrying the machine while working
29/26 . . . with means for adjustably positioning the machine on the truck
29/28 . . . . adjusting the height of the whole machine

31/00 Driving means incorporated in machines for slitting or completely freeing the mineral from the seam

31/02 . for cutting or breaking-down devices
31/04 . . imparting both a rotary and reciprocating motion
31/06 . . actuated by an endless cable or chain
31/08 . for adjusting parts of the machines
31/10 . for slewing parts of the machines
31/12 . Component parts

33/00 Trucks or other devices for transporting machines for slitting or completely freeing the mineral from the seam

33/02 . with equipment for loading or unloading the machine on to, or from, the truck

35/00 Details of, or accessories for, machines for slitting or completely freeing the mineral from the seam, not provided for in groups E21C 25/00 to E21C 33/00, E21C 37/00 or E21C 39/00

35/02 . Locking equipment for slewable parts
35/04 . Safety devices (operating in the event of breakage of a haulage cable or chain E21C 29/20)
35/06 . Equipment for positioning the whole machine in relation to its sub-structure
35/08 . Guiding the machine
35/10 . . by feelers contacting the working face
35/12 . . along a conveyer for the cut material
35/14 . . . Equipment for pressing the conveyer towards the working face
35/16 . . by making use of the timbering, filling, or other supports
35/18 . Mining picks; Holders therefor (planing knives E21C 27/44) **[6]**
35/183 . . with inserts or layers of wear-resisting material **[6]**
35/187 . . with arrangement of fluid-spraying nozzles (supply of fluid to the nozzles E21C 35/22) **[6]**
35/19 . . Means for fixing picks or holders **[6]**
35/193 . . . using bolts as main fixing elements **[6]**
35/197 . . . using sleeves, rings or the like, as main fixing elements **[6]**
35/20 . General features of equipment for removal of chippings, e.g. for loading on conveyer
35/22 . Equipment for preventing the formation of, or for removal of, dust (picks with arrangement of fluid-spraying nozzles E21C 35/187; methods or apparatus for flushing boreholes E21B 21/00)

35/23 . . Distribution of spraying-fluids in rotating cutter-heads **[6]**

35/24 . Remote control specially adapted for machines for slitting or completely freeing the mineral (control in general G05)

37/00 Other methods or devices for dislodging with or without loading (breaking-down by means inserted in slits E21C 27/14)

37/02 . by wedges

37/04 . by devices with parts pressed mechanically against the wall of a borehole

37/06 . by making use of hydraulic or pneumatic pressure in a borehole

37/08 . . Devices with pistons, plungers, or the like pressed locally against the wall of the borehole

37/10 . . Devices with expanding elastic casings

37/12 . . by injecting into the borehole a liquid, either initially at high pressure or subsequently subjected to high pressure, e.g. by pulses, by explosive cartridges acting on the liquid (slitting by jets of water E21C 25/60; blasting by explosives F42D)

37/14 . . by compressed air; by gas blast; by gasifying liquids

37/16 . by fire-setting or by similar methods based on a heat effect (drilling by use of heat E21B 7/14)

37/18 . by electricity

37/20 . by ultrasonics

37/22 . Hand tools or hand-held power-operated tools specially adapted for dislodging minerals (slitting machines guided solely by hand E21C 25/64)

37/24 . . Pick hammers (pneumatic hammers in general B25D; percussion drilling E21B 1/00)

37/26 . Chisels or other cutting tools not mentioned before

39/00 Devices for testing <u>in situ</u> the hardness or other properties of minerals, e.g. for giving information as to the selection of suitable mining tools

<u>Methods of mining or quarrying</u>; **<u>Open-pit mining</u>**; **<u>Layouts therefor</u>**

41/00 Methods of underground or surface mining (E21C 45/00 takes precedence); **Layouts therefor** (for peat E21C 49/00) **[5]**

41/16 . Methods of underground mining (winning machines therefor E21C 25/00 to E21C 39/00); Layouts therefor **[5]**

41/18 . . for brown or hard coal **[5]**

41/20 . . for rock salt or potash salt **[5]**

41/22 . . for ores, e.g. mining placers **[5]**

41/24 . . for oil-bearing deposits **[5]**

41/26 . Methods of surface mining (machines for obtaining, or the removal of, materials in open-pit mines E21C 47/00); Layouts therefor **[5]**

41/28 . . for brown or hard coal **[5]**

41/30 . . for ores, e.g. mining placers **[5]**

41/32 . Reclamation of surface-mined areas (machines or methods for treating or working soil for agricultural purposes A01B 77/00, A01B 79/00; machines for back-filling E02F 5/22) **[5]**

45/00 Methods of hydraulic mining; **Hydraulic monitors** (E21C 25/60 takes precedence) **[5]**

45/02 . Means for generating pulsating fluid jets **[5]**

45/04 . . by use of highly pressurised liquid **[5]**

45/06 . . by use of compressed gases **[5]**

45/08 . Automatic or remote control of hydraulic monitors **[5]**

47/00 Machines for obtaining, or the removal of, materials in open-pit mines (obtaining peat E21C 49/00)

47/02 . for coal, brown coal, or the like (dredgers or soil-shifting machines in general E02F) **[3]**

47/04 . . Conveyer bridges used in co-operation with the winning apparatus **[3]**

47/06 . . Cableway conveyers used in co-operation with the winning apparatus (underground hauling E21F 13/00)

47/08 . . Devices for cutting-out partings, e.g. layers of sand between seams of coal

47/10 . for quarrying stone, sand, gravel, or clay

49/00 Obtaining peat; **Machines therefor** (treating peat C10F)

49/02 . by excavating

49/04 . by digging in the form of peat sods

50/00 Obtaining minerals from underwater, not otherwise provided for (suction dredgers or component parts thereof E02F 3/88; equipment for conveying or separating excavated material E02F 7/00; dippers G01N 1/12) **[5]**

50/02 . dependent on the ship movements (vessels or floating structures adapted for special purposes B63B 35/00) **[5]**

51/00 Apparatus for, or methods of, winning materials from extraterrestrial sources (cosmonautics B64G) **[2]**

E21D SHAFTS; **TUNNELS**; **GALLERIES**; **LARGE UNDERGROUND CHAMBERS** (soil-conditioning or soil-stabilising materials C09K 17/00; cutting machines for mining or quarrying E21C; safety devices, transport, rescue, ventilation or drainage E21F) **[2,6]**

(1) This subclass <u>covers</u> methods or apparatus for making or lining tunnels, galleries or large underground chambers, using underground mining methods only, i.e. not involving disturbance of the ground surface. **[6]**

(2) This subclass <u>does not cover</u> underground spaces made by foundation engineering, i.e. involving disturbance of the ground surface, which are covered by subclass E02D. **[6]**

<u>Subclass index</u>

Shafts

1/00 **Sinking shafts**
1/02 . by hand
1/03 . mechanically (E21D 1/08 takes precedence)
1/04 . . with grabs
1/06 . . with shaft-boring cutters (drilling machines E21B)
1/08 . while moving the lining downwards
1/10 . Preparation of the ground
1/12 . . by freezing
1/14 . . . Freezing apparatus
1/16 . . by petrification (grouting anchoring-bolts E21D 20/02)

3/00 **Raising shafts, i.e. working upwards from the bottom**

5/00 **Lining shafts**; **Linings therefor** (E21D 11/00 takes precedence) **[3]**
5/01 . using prefabricated lining lowered into a hole filled with liquid or viscous mass
5/012 . Use of fluid-tight or anti-friction material on outside of, or between, lining layers
5/016 . Bearer curbs
5/02 . with wood (E21D 5/01, E21D 5/012, E21D 5/016 take precedence)
5/04 . with brick, concrete, stone, or similar building materials (E21D 5/01, E21D 5/012, E21D 5/016 take precedence)
5/06 . with iron or steel (E21D 5/01, E21D 5/012, E21D 5/016 take precedence)
5/08 . . in the form of profiled parts
5/10 . . in the form of tubbing
5/11 . with combinations of different materials, e.g. wood, metal, concrete (E21D 5/01, E21D 5/012, E21D 5/016 take precedence)
5/12 . Accessories for making shaft linings, e.g. suspended cradles, shutterings

7/00 **Shaft equipment, e.g. timbering within the shaft**
7/02 . Arrangement of guides for cages in shafts; Connection of guides for cages to shaft walls (guideways or guides for elevators B66B 7/02)

8/00 **Shafts not provided for in groups E21D 1/00 to E21D 7/00 [8]**

Tunnels; **Galleries**; **Large underground chambers**; **Linings therefor** **[3,6]**

9/00 **Tunnels or galleries, with or without linings**; **Methods or apparatus for making thereof** (linings per se E21D 11/00; galleries protecting against falling rocks or avalanches E01F 7/04); **Layout of tunnels or galleries [3]**
9/01 . Methods or apparatus for enlarging or restoring the cross-section of tunnels, e.g. by restoring the floor to its original level **[7]**
9/02 . Driving inclined tunnels or galleries **[3]**
9/04 . Driving tunnels or galleries through loose materials; Apparatus therefor not otherwise provided for
9/06 . Making by using a driving shield **[2]**
9/08 . . with additional boring or cutting means **[2]**
9/087 . . . with a rotary drilling-head cutting simultaneously the whole cross-section, i.e. full-face machines **[7]**
9/093 . . Control of the driving shield **[7]**
9/10 . Making by using boring or cutting machines (E21D 9/08 takes precedence; similar machines for mining E21C 27/20; mining picks E21C 35/18) **[3]**
9/11 . . with a rotary drilling-head cutting simultaneously the whole cross-section, i.e. full-face machines **[7]**
9/12 . Devices for removing or hauling away excavated material or spoil; Working or loading platforms (underground transport E21F 13/00) **[2]**
9/13 . . using hydraulic or pneumatic conveying means **[7]**
9/14 . Layout of tunnels or galleries; Constructional features of tunnels or galleries, not otherwise provided for, e.g. portals, day-light attenuation at tunnel openings **[3]**

11/00 **Lining tunnels, galleries or other underground cavities, e.g. large underground chambers**; **Linings therefor**; **Making such linings in situ, e.g. by assembling** (E21D 15/00 to E21D 23/00 take precedence; specially for shafts E21D 5/00; lining pressure water galleries, linings therefor E02B 9/06) **[2]**
11/02 . Lining predominantly with wood **[2]**
11/03 . . using timber-setting machines
11/04 . Lining with building materials (E21D 11/02, E21D 11/14 take precedence) **[2]**
11/05 . . using compressible insertions
11/06 . . with bricks
11/07 . . . using brick-laying machines
11/08 . . with preformed concrete slabs
11/10 . . with concrete cast in situ; Shuttering or other equipment adapted therefor
11/12 . . Temporary supports for use during building; Accessories
11/14 . Lining predominantly with metal **[2]**
11/15 . . Plate linings; Laggings, i.e. linings designed for holding back formation material or for transmitting the load to main supporting members (insulation E21D 11/38) **[2]**
11/18 . . Arch members
11/20 . . . Special cross-sections, e.g. corrugated
11/22 . . . Clamps or other yieldable means for interconnecting adjacent arch members either rigidly, or allowing arch member parts to slide when subjected to excessive pressure
11/24 . . . Knuckle joints or links between arch members
11/26 . . . Shoes for connecting arch members to longitudinal struts
11/28 . . Longitudinal struts
11/30 . . Bases for lower arch members (for props E21D 15/54)
11/34 . . Joints between vertical props and horizontal top bars (end caps forming part of the props E21D 15/54)
11/36 . . Linings or supports specially shaped for tunnels or galleries of irregular cross-section **[2,3]**
11/38 . Waterproofing (in general E02D 31/00); Heat insulating; Soundproofing; Electric insulating (for building constructions in general E04B 1/62) **[2]**
11/40 . Devices or apparatus specially adapted for handling or placing units of linings for tunnels or galleries **[2]**

13/00 **Large underground chambers**; **Methods or apparatus for making them** (lining E21D 11/00) **[6]**
13/02 . Methods
13/04 . Special equipment; Accessories

Working-face supports

15/00 **Props** (in the building art E04G 25/00); **Chocks**
15/02 . Non-telescopic props
15/04 . . with wooden prop parts joined by double conical connectors
15/06 . . with parts joined by a lock, with or without slight axial adjustability
15/08 . . . with toggle joint connection
15/10 . . . with dog-clutch or pin-and-hole connection
15/12 . . . with locking devices located near head or foot
15/14 . Telescopic props (general means for fixing telescopic parts together F16B)
15/15 . . Means counteracting entry of dirt; Built-in cleaning devices
15/16 . . with parts held together by positive means, with or without relative sliding movement when the prop is subject to excessive pressure
15/18 . . . with one part resting on a supporting medium, e.g. rubber, sand, bitumen, lead, located in the other part, with or without expulsion or displacement of the medium upon excessive pressure
15/20 . . . with pawl, pin, cross-piece, or the like engaging with ratchet teeth, notches, holes, or the like spaced apart at intervals
15/22 . . . with member, pin, cross-piece, or the like ruptured, sheared through, or permanently deformed upon excessive pressure
15/24 . . . with axial screw-and-nut, rack-and-worm, or like mechanism
15/26 . . . . with screw, worm, or the like not self-locking but normally prevented from rotation by friction members which slip upon excessive pressure
15/28 . . with parts held relatively to each other by friction or gripping, e.g. using wedges
15/30 . . . by means expanded or contracted by pressure applied through the medium of a fluid or quasi-fluid, e.g. rubber
15/32 . . . by a deformable collar
15/34 . . . by axially-moving balls, rollers, or the like
15/36 . . . by a tiltable collar surrounding one or both parts
15/38 . . . with longitudinally-divided upper or lower prop parts, e.g. interfitting laminations
15/40 . . . Collar or other support gripped to one or both parts by toggle-action, cam, or other member pivoted or similarly mounted
15/42 . . . with special parts to influence the friction
15/43 . . . Details of wedges (friction linings or pads E21D 15/42)
15/44 . . Hydraulic, pneumatic, or hydraulic-pneumatic props
15/45 . . . having closed fluid system, e.g. with built-in pumps or accumulators
15/46 . . with load-measuring devices; with alarm devices
15/48 . Chocks or the like
15/50 . Component parts or details of props (E21D 15/43, E21D 15/58, E21D 15/60 take precedence)
15/502 . . Prop bodies characterised by their shape, e.g. of specified cross-section
15/51 . . specially adapted to hydraulic, pneumatic, or hydraulic-pneumatic props, e.g. arrangements of relief valves
15/52 . . Extensible units located above or below standard props
15/54 . . Details of the ends of props (for permitting step-by-step movement E21D 23/06)
15/55 . . . of prop heads
15/56 . . Details of locks of telescopic props
15/58 . Devices for setting props
15/582 . . for mechanical props
15/59 . . for hydraulic, pneumatic, or hydraulic-pneumatic props
15/60 . Devices for withdrawing props or chocks

17/00 **Caps for supporting mine roofs**
17/01 . characterised by the shape of the cap, e.g. of specified cross-section
17/02 . Cantilever extension or similar protecting devices
17/022 . . Auxiliary devices for temporary support of roof-supporting beams whilst assembling
17/03 . . Brackets for roof-supporting bars
17/04 . . for use in longwall working
17/05 . . . hydraulically extensible
17/054 . . . hydraulically pivotable
17/06 . . for use in drifting galleries
17/08 . . Cap joints for obtaining a coal-face free of pit-props
17/082 . . . of sliding type
17/086 . . . of articulated type
17/10 . Details of mine caps for engaging the tops of pit-props, with or without retaining-plates; Retaining-plates

19/00 **Provisional protective covers for working space** (E21D 9/06, E21D 23/00 take precedence) **[3]**
19/02 . for use in longwall working
19/04 . for use in drifting galleries
19/06 . Arrangements for applying the covers **[6]**

20/00 **Setting anchoring-bolts** (anchoring bolts for shafts, tunnels or galleries E21D 21/00; means for anchoring structural elements or bulkheads specially adapted to foundation engineering E02D 5/74; dowels or other devices fastened in walls or the like by inserting them in holes made therein for that purpose F16B 13/00) **[5]**
20/02 . with provisions for grouting

21/00 **Anchoring-bolts for roof, floor, or shaft-lining protection** (dowels or other devices fastened in walls or the like by inserting them in holes made therein for that purpose F16B 13/00) **[5]**
21/02 . having means for indicating tension (screwed connections specially modified for indicating tensile load F16B 31/02)

23/00 **Mine roof supports for step-by-step movement, e.g. in combination with provisions for shifting of conveyers, mining machines, or guides therefor** (shifting of mine conveyers at the working face, per se E21F 13/08)
23/03 . having protective means, e.g. shields, for preventing or impeding entry of loose material into the working space or support **[4]**
23/04 . Structural features of the supporting construction, e.g. linking members between adjacent frames or sets of props; Means for counteracting lateral sliding on inclined floor (E21D 23/14 takes precedence)

23/06 . . Special mine caps or special tops of pit-props for permitting step-by-step movement
23/08 . Advancing mechanisms (E21D 23/16 takes precedence)
23/10 . . with advancing devices separate from the supporting construction
23/12 . Control, e.g. using remote control (E21D 23/16 takes precedence)
23/14 . . Effecting automatic sequential movement of supports, e.g. one behind the other
23/16 . Hydraulic or pneumatic features, e.g. circuits, arrangement or adaptation of valves, setting or retracting devices
23/18 . . of advancing mechanisms
23/20 . . . for sequential movement, e.g. one behind the other
23/22 . . . incorporated in mine caps
23/24 . . . the advancing mechanisms being separate from the supporting construction
23/26 . . Hydraulic or pneumatic control

E21F SAFETY DEVICES, TRANSPORT, FILLING-UP, RESCUE, VENTILATION, OR DRAINAGE IN OR OF MINES OR TUNNELS [2]

Subclass index

Ventilation of mines or tunnels

1/00 Ventilation of mines or tunnels; **Distribution of ventilating currents** (ventilating rooms or spaces in general F24F) **[2]**
1/02 . Test models (analogue computers therefor G06G 7/50)
1/04 . Air ducts (suspension devices E21F 17/02)
1/06 . . Duct connections (tube connections in general F16L)
1/08 . Ventilation arrangements in connection with air ducts, e.g. arrangements for mounting ventilators (ventilators per se F04D)
1/10 . Air doors (doors in general E06B)
1/12 . . Devices for automatically opening air doors
1/14 . Air partitions; Air locks (dams E21F 17/103; air locks for foundations E02D) **[6]**
1/16 . Shaft covers
1/18 . Gravity-flow ventilation (E21F 1/02 to E21F 1/16 take precedence) **[2]**

3/00 Cooling or drying of air (air-conditioning rooms or spaces in general F24F)

Safety devices; **Rescue devices**

5/00 Means or methods for preventing, binding, depositing or removing dust; **Preventing explosions or fires** (dams E21F 17/103; applying liquids or other fluent materials to surfaces in general B05; flue-gas indicators G01N) **[6]**
5/02 . by wetting or spraying
5/04 . . Spraying barriers (spray nipples, spraying in general B05B, B05D; picks with arrangement of fluid-spraying nozzles E21C 35/187)
5/06 . . Fluids used for spraying
5/08 . Rock dusting; Depositing other protective substances
5/10 . . Devices for rock dusting
5/12 . . Composition of rock dust
5/14 . Fluid barriers or rock dusters made to work by, or at the same time as, shots or explosions
5/16 . Layers of hygroscopic or other salts deposited on floors, walls, or the like, for binding dust; Deposition of such layers (dust-absorbing materials in general C09K 3/22)
5/18 . Impregnating walls, or the like, with liquids for binding dust
5/20 . Drawing-off or depositing dust (methods or apparatus for flushing boreholes E21B 21/00; while slitting E21C 35/22) **[1,7]**

7/00 Methods or devices for drawing-off gases with or without subsequent use of the gas for any purpose

9/00 Devices preventing sparking of machines or apparatus (preventing sparking of electric machines or apparatus H01K, H02K)

11/00 Rescue devices or other safety devices, e.g. safety chambers, escape ways (breathing aids for curative purposes A61H 31/00; respiratory apparatus A62B 7/00; revival apparatus A62B 33/00)

13/00 Transport specially adapted to underground conditions (mine cars B61D; transport in general, loading B65G)
13/02 . in galleries
13/04 . in gravity inclines; in staple or inclined shafts
13/06 . at or adjacent to the working face
13/08 . Shifting conveyers or other transport devices from one location at the working face to another (guiding mining machines along conveyers for the cut mineral E21C 35/12; in combination with mine roof supports for step-by-step movement E21D 23/00)
13/10 . Anchorings for conveyers **[2]**

15/00 Methods or devices for placing filling-up materials in underground workings (dams E21F 17/103) **[6]**
15/02 . Supporting means, e.g. shuttering, for filling-up materials
15/04 . . Stowing mats; Goaf wire netting; Partition walls
15/06 . Filling-up mechanically
15/08 . Filling-up hydraulically or pneumatically (hydraulic or pneumatic transport devices B65G; pipes, pipe couplings F16L)
15/10 . . Hydraulic or pneumatic filling-up machines

16/00 **Drainage** (keeping dry foundation sites or other areas in the ground E02D 19/00) **[2]**

16/02 . of tunnels **[2]**

17/00 **Methods or devices for use in mines or tunnels, not covered elsewhere** (mine lighting F21, H05B) **[2]**

17/02 . Suspension devices for tubes or the like, e.g. for ventilating ducts (supporting pipes, cables or protective tubing in general F16L 3/00 to F16L 7/00)

17/04 . Distributing means for power supply **[2]**

17/06 . . Distributing electric power; Cable networks; Conduits for cables (circuit arrangements for supplying or distributing electric power in general H02J)

17/08 . . Distributing hydraulic power; Pipe networks for hydraulic liquid (pipe-line systems in general F17D)

17/10 . . Distributing pneumatic power; Pipe networks for compressed air (pipe-line systems in general F17D)

17/103 . Dams, e.g. for ventilation **[6]**

17/107 . . inflatable **[6]**

17/12 . . Dam doors

17/16 . Modification of mine passages or chambers for storage purposes, especially for liquids or gases (storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00)

17/18 . Special adaptations of signalling or alarm devices (for elevators, escalators or moving walkways B66B; gas-sensitive devices per se G01N)

E99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

E99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION F – MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

ENGINES OR PUMPS

Guide to the use of this subsection (classes F01 to F04)

The following notes are meant to assist in the use of this part of the classification scheme.

(1) In this subsection, subclasses or groups designating "engines" or "pumps" cover methods of operating the same, unless otherwise specifically provided for.

(2) In this subsection, the following terms or expressions are used with the meanings indicated:

- "engine" means a device for continuously converting fluid energy into mechanical power. Thus, this term includes, for example, steam piston engines or steam turbines, per se, or internal-combustion piston engines, but it excludes single-stroke devices. "Engine" also includes the fluid-motive portion of a meter unless such portion is particularly adapted for use in a meter;
- "pump" means a device for continuously raising, forcing, compressing, or exhausting fluid by mechanical or other means. Thus, this term includes fans or blowers;
- "machine" means a device which could equally be an engine and a pump, and not a device which is restricted to an engine or one which is restricted to a pump;
- "positive displacement" means the way the energy of a working fluid is transformed into mechanical energy, in which variations of volume created by the working fluid in a working chamber produce equivalent displacements of the mechanical member transmitting the energy, the dynamic effect of the fluid being of minor importance, and vice versa;
- "non-positive displacement" means the way the energy of a working fluid is transformed into mechanical energy, by transformation of the energy of the working fluid into kinetic energy, and vice versa;
- "oscillating-piston machine" means a positive-displacement machine in which a fluid-engaging work-transmitting member oscillates. This definition applies also to engines and pumps;
- "rotary-piston machine" means a positive-displacement machine in which a fluid-engaging work-transmitting member rotates about a fixed axis or about an axis moving along a circular or similar orbit. This definition applies also to engines and pumps;
- "rotary piston" means the work-transmitting member of a rotary-piston machine and may be of any suitable form, e.g., like a toothed gear;
- "cooperating members" means the "oscillating piston" or "rotary piston" and another member, e.g., the working-chamber wall, which assists in the driving or pumping action;
- "movement of the co-operating members" is to be interpreted as relative, so that one of the "co-operating members" may be stationary, even though reference may be made to its rotational axis, or both may move;
- "teeth or tooth equivalents" include lobes, projections or abutments;
- "internal-axis type" means that the rotational axes of the inner and outer co-operating members remain at all times within the outer member, e.g., in a similar manner to that of a pinion meshing with the internal teeth of a ring gear;
- "free piston" means a piston of which the length of stroke is not defined by any member driven thereby;
- "cylinders" means positive-displacement working chambers in general. Thus, this term is not restricted to cylinders of circular cross-section;
- "main shaft" means the shaft which converts reciprocating piston motion into rotary motion or vice versa;
- "plant" means an engine together with such additional apparatus as is necessary to run the engine. For example, a steam engine plant includes a steam engine and means for generating the steam;
- "working fluid" means the driven fluid in a pump or the driving fluid in an engine. The working fluid can be in a compressible, gaseous state, called elastic fluid, e.g. steam; in a liquid state; or in a state where there is coexistence of an elastic fluid and liquid phase.
- "steam" includes condensable vapours in general, and "special vapour" is used when steam is excluded;
- "reaction type" as applied to non-positive-displacement machines or engines means machines or engines in which pressure/velocity transformation takes place wholly or partly in the rotor. Machines or engines with no, or only slight, pressure/velocity transformation in the rotor are called "impulse type".

(3) In this subsection:

- cyclically operating valves, lubricating, gas-flow silencers or exhaust apparatus, or cooling are classified in subclasses F01L, F01M, F01N, F01Pirrespective of their stated application, unless their classifying features are peculiar to their application, in which case they are classified only in the relevant subclass of classes F01 to F04;
- lubricating, gas-flow silencers or exhaust apparatus, or cooling of machines or engines are classified in subclasses F01M, F01N, F01P except for those peculiar to steam engines which are classified in subclass F01B.

(4) For use of this subsection with a good understanding, it is essential to remember, so far as subclasses F01B, F01C, F01D, F03B, and F04B, F04C, F04D, which form its skeleton, are concerned:

- the principle which resides in their elaboration,
- the classifying characteristics which they call for, and
- their complementarity.

(i) Principle

This concerns essentially the subclasses listed above. Other subclasses, notably those of class F02, which cover better-defined matter, are not considered here.

Each subclass covers fundamentally a genus of apparatus (engine or pump) and by extension covers equally "machines" of the same kind. Two different subjects, one having a more general character than the other, are thus covered by the same subclass.

Subclasses F01B, F03B, F04B, beyond the two subjects which they cover, have further a character of generality in relation to other subclasses concerning the different species of apparatus in the genus concerned.

This generality applies as well for the two subjects dealt with, without these always being in relation to the same subclasses.

Thus, subclass F03B, in its part dealing with "machines", should be considered as being the general class relating to subclasses F04B, F04C, and in its part dealing with "engines" as being general in relation to subclass F03C.

(ii) Characteristics

(a) The principal classifying characteristic of the subclass is that of genera of apparatus, of which there are three possible: Machines; engines; pumps.

(b) As stated above, "machines" are always associated with one of the other two genera. These main genera are subdivided according to the general principles of operation of the apparatus:
Positive displacement; non-positive displacement.

(c) The positive displacement apparatus are further subdivided according to the ways of putting into effect the principle of operation, that is, to the kind of apparatus:
Simple reciprocating piston; rotary or oscillating piston; other kind.

(d) Another classifying characteristic is that of the working fluid, in respect of which three kinds of apparatus are possible, namely:
Liquid and elastic fluid; elastic fluid; liquid.

(iii) Complementarity

This resides in association of pairs of the subclasses listed above, according to the characteristics under consideration in respect of kind of apparatus or working fluid.

The subclasses concerned with the various principles, characteristics and complementarity are shown in the subsection index below.

It is seen from this index that:

– For the same kind of apparatus in a given genus, the characteristics of "working fluid" associates:
F01B and F04B to Machines
F01C and F04C to Machines
F01D and F03B to Machines
F01B and F03C to Engines
F01C and F03C to Engines
F01D and F03B to Engines

– For the same kind of working fluid, the "apparatus" characteristic relates subclasses in the same way as considerations of relative generality.

Subsection index

MACHINES
- positive displacement
  - rotary or oscillating piston
    - liquid and elastic fluid or elastic fluid F01C
    - liquid only F04C
  - reciprocating piston or other
    - liquid and elastic fluid or elastic fluid F01B
    - liquid only F04B
- non-positive displacement
  - liquid and elastic fluid or elastic fluid F01D
  - liquid only F03B

ENGINES
- positive displacement
  - rotary or oscillating piston
    - liquid and elastic fluid or elastic fluid F01C
    - liquid only F03C
  - reciprocating piston or other
    - liquid and elastic fluid or elastic fluid F01B
    - liquid only F03C
- non-positive displacement
  - liquid and elastic fluid or elastic fluid F01D
  - liquid only F03B

PUMPS
- positive displacement
  - rotary or oscillating piston F04C
  - reciprocating piston or other F04B
- non-positive displacement F04D

F01 MACHINES OR ENGINES IN GENERAL; ENGINE PLANTS IN GENERAL; STEAM ENGINES

F01B **MACHINES OR ENGINES, IN GENERAL OR OF POSITIVE-DISPLACEMENT TYPE, E.G. STEAM ENGINES** (of rotary-piston or oscillating-piston type F01C; of non-positive-displacement type F01D; combustion engines F02; internal-combustion aspects of reciprocating-piston engines F02B 57/00, F02B 59/00; machines for liquids F03, F04; crankshafts, crossheads, connecting-rods F16C; flywheels F16F; gearings for interconverting rotary motion and reciprocating motion in general F16H; pistons, piston-rods, cylinders, for engines in general F16J)

(1) This subclass covers, with the exception of the matter provided for in subclasses F01C to F01P:
- engines for elastic fluids, e.g. steam engines;
- engines for liquids and elastic fluids;
- machines for elastic fluids;
- machines for liquids and elastic fluids.

(2) Attention is drawn to the Notes preceding class F01, especially as regards the definitions of “steam” and “special vapour”.

Subclass index

1/00 **Reciprocating-piston machines or engines characterised by number or relative disposition of cylinders or by being built-up from separate cylinder-crankcase elements** (F01B 3/00, F01B 5/00 take precedence) **[2]**

1/01 . with one single cylinder **[2]**

1/02 . with cylinders all in one line

1/04 . with cylinders in V-arrangement

1/06 . with cylinders in star or fan arrangement

1/08 . with cylinders arranged oppositely relative to main shaft and of “flat” type

1/10 . with more than one main shaft, e.g. coupled to common output shaft (combinations of two or more machines or engines F01B 21/00)

1/12 . Separate cylinder-crankcase elements coupled together to form a unit

3/00 **Reciprocating-piston machines or engines with cylinder axes coaxial with, or parallel or inclined to, main shaft axis**

3/02 . with wobble-plate

3/04 . the piston motion being transmitted by curved surfaces

3/06 . . by multi-turn helical surfaces and automatic reversal

3/08 . . . the helices being arranged on the pistons

3/10 . Control of working-fluid admission or discharge peculiar thereto (suitable for more general application F01L)

5/00 **Reciprocating-piston machines or engines with cylinder axes arranged substantially tangentially to a circle centred on main shaft axis**

7/00 **Machines or engines with two or more pistons reciprocating within same cylinder or within essentially coaxial cylinders** (in opposite arrangement relative to main shaft F01B 1/08)

7/02 . with oppositely reciprocating pistons

7/04 . . acting on same main shaft

7/06 . . . using only connecting-rods for conversion of reciprocatory into rotary motion or vice versa

7/08 . . . . with side rods

7/10 . . . . having piston-rod of one piston passed through other piston

7/12 . . . using rockers and connecting-rods

7/14 . . acting on different main shafts

7/16 . with pistons synchronously moving in tandem arrangement

7/18 . with differential piston (F01B 7/20 takes precedence)

7/20 . with two or more pistons reciprocating one within another, e.g. one piston forming cylinder of the other

9/00 **Reciprocating-piston machines or engines characterised by connections between pistons and main shafts and not specific to groups F01B 1/00 to F01B 7/00** (connections disengageable during idling F01B 31/24)

9/02 . with crankshaft

9/04 . with rotary main shaft other than crankshaft

9/06 . . the piston motion being transmitted by curved surfaces

9/08 . . with ratchet and pawl

11/00 **Reciprocating-piston machines or engines without rotary main shaft, e.g. of free-piston type**

11/02 . Equalising or cushioning devices

11/04 . Engines combined with reciprocatory driven devices, e.g. hammers (with pumps F01B 23/08; predominating aspects of driven devices, see the relevant classes for the devices)
11/06 . . for generating vibration only
11/08 . with direct fluid transmission link (F01B 11/02 takes precedence)

13/00 Reciprocating-piston machines or engines with rotating cylinders in order to obtain the reciprocating-piston motion (machines or engines of flexible-wall type F01B 19/00) **[2]**
13/02 . with one cylinder only
13/04 . with more than one cylinder
13/06 . . in star arrangement

15/00 Reciprocating-piston machines or engines with movable cylinders other than provided for in group F01B 13/00 (with movable cylinder sleeves for working-fluid control F01L)
15/02 . with reciprocating cylinders (with one piston within another F01B 7/20)
15/04 . with oscillating cylinder
15/06 . . Control of working-fluid admission or discharge peculiar thereto

17/00 Reciprocating-piston machines or engines characterised by use of uniflow principle
17/02 . Engines
17/04 . . Steam engines

19/00 Positive-displacement machines or engines of flexible-wall type
19/02 . with plate-like flexible members
19/04 . with tubular flexible members

21/00 Combinations of two or more machines or engines (F01B 23/00 takes precedence; combinations of two or more pumps F04; fluid gearing F16H; regulating or controlling, see the relevant groups)
21/02 . the machines or engines being all of reciprocating-piston type
21/04 . the machines or engines being not all of reciprocating-piston type, e.g. of reciprocating steam engine with steam turbine

23/00 Adaptations of machines or engines for special use; **Combinations of engines with devices driven thereby** (F01B 11/00 takes precedence; fluid gearing F16H; aspects predominantly concerning driven devices, see the relevant classes for these devices; regulating or controlling, see the relevant groups)
23/02 . Adaptations for driving vehicles, e.g. locomotives (arrangements in vehicles, see the relevant classes for vehicles)
23/04 . . the vehicles being waterborne vessels
23/06 . Adaptations for driving, or combinations with, hand-held tools or the like
23/08 . Adaptations for driving, or combinations with, pumps
23/10 . Adaptations for driving, or combinations with, electric generators
23/12 . Adaptations for driving rolling mills or other heavy reversing machinery

25/00 Regulating, controlling, or safety means (regulating or controlling in general G05)
25/02 . Regulating or controlling by varying working-fluid admission or exhaust, e.g. by varying pressure or quantity (distributing or expansion valve gear F01L)
25/04 . . Sensing elements
25/06 . . . responsive to speed
25/08 . . Final actuators
25/10 . . . Arrangements or adaptations of working-fluid admission or discharge valves (valves in general F16K)
25/12 . . Devices dealing with sensing elements or final actuators or transmitting means between them, e.g. power-assisted (sensing elements alone F01B 25/04; final actuators alone F01B 25/08)
25/14 . . peculiar to particular kinds of machines or engines
25/16 . Safety means responsive to specific conditions (against water hammer or the like in steam engines F01B 31/34)
25/18 . . preventing rotation in wrong direction
25/20 . Checking operation of safety devices
25/22 . Braking by redirecting working fluid
25/24 . . thereby regenerating energy
25/26 . Warning devices

27/00 Starting of machines or engines (starting combustion engines F02N)
27/02 . of reciprocating-piston engines
27/04 . . by directing working-fluid supply, e.g. by aid of by-pass steam conduits
27/06 . . . specially for compound engines
27/08 . . Means for moving crank off dead-centre (turning-gear in general F16H)

29/00 Machines or engines with pertinent characteristics other than those provided for in main groups F01B 1/00 to F01B 27/00
29/02 . Atmospheric engines, i.e. atmosphere acting against vacuum
29/04 . characterised by means for converting from one type to a different one
29/06 . . from steam engine into combustion engine
29/08 . Reciprocating-piston machines or engines not otherwise provided for
29/10 . . Engines (refrigeration machines F25B)
29/12 . . . Steam engines (toy steam engines A63H 25/00)

31/00 Component parts, details, or accessories not provided for in, or of interest apart from, other groups (machine or engine casings, other than those peculiar to steam engines, F16M)
31/02 . De-icing means for engines having icing phenomena
31/04 . Means for equalising torque in reciprocating-piston machines or engines (compensation of inertial forces, suppression of vibration in systems F16F)
31/06 . Means for compensating relative expansion of component parts
31/08 . Cooling of steam engines (cooling of fluid machines or engines in general F01P); Heating; Heat insulation (heat insulation in general F16L 59/00)
31/10 . Lubricating arrangements of steam engines (of fluid machines or engines in general F01M)
31/12 . Arrangements of measuring or indicating devices (warning apparatus F01B 25/26; measuring instruments or the like per se G01)
31/14 . Changing of compression ratio
31/16 . Silencers specially adapted for steam engines (arrangements of exhaust pipes or tubes on steam engines F01B 31/30; gas-flow silencers or exhaust silencers for machines or engines in general F01N)
31/18 . Draining
31/20 . . of cylinders
31/22 . Idling devices, e.g. having by-passing valves

31/24 . . Disengagement of connections between pistons and main shafts
31/26 . Other component parts, details, or accessories, peculiar to steam engines
31/28 . . Cylinders or cylinder covers
31/30 . . Arrangements of steam conduits
31/32 . . Arrangements or adaptations of vacuum breakers
31/34 . . Safety means against water hammer or against the penetration of water (steam traps F16T)
31/36 . . . automatically cutting-off steam supply

F01C **ROTARY-PISTON OR OSCILLATING-PISTON MACHINES OR ENGINES** (combustion engines F02; internal-combustion aspects F02B 53/00, F02B 55/00; machines for liquids F03, F04)

(1) This subclass covers:
– rotary-piston or oscillating-piston engines for elastic fluids, e.g. steam;
– rotary-piston or oscillating-piston engines for liquids and elastic fluids;
– rotary-piston or oscillating-piston machines for elastic fluids;
– rotary-piston or oscillating-piston machines for liquids and elastic fluids.

(2) In this subclass, the following expression is used with the meaning indicated:
– "rotary-piston machine" includes the German expressions "Drehkolbenmaschinen", "Kreiskolbenmaschinen", and "Umlaufkolbenmaschinen".

(3) Attention is drawn to the Notes preceding class F01, especially as regards the definitions of "rotary-piston machine", "oscillating-piston machine", "rotary piston", "co-operating members", "movement of co-operating members", "teeth or tooth-equivalents" and "internal-axis".

Subclass index

1/00 **Rotary-piston machines or engines** (with axes of co-operating members non-parallel F01C 3/00; with the working-chamber walls at least partly resiliently deformable F01C 5/00; with fluid ring or the like F01C 7/00; rotary-piston machines or engines in which the working fluid is exclusively displaced by, or exclusively displaces, one or more reciprocating pistons F01B 13/00)

Note

Group F01C 1/30 takes precedence over groups F01C 1/02 to F01C 1/24.

1/02 . of arcuate-engagement type, i.e. with circular translatory movement of co-operating members, each member having the same number of teeth or tooth-equivalents
1/04 . . of internal-axis type
1/06 . . of other than internal-axis type (F01C 1/063 takes precedence)
1/063 . . with coaxially-mounted members having continuously-changing circumferential spacing between them **[3]**
1/067 . . . having cam-and-follower type drive **[3]**
1/07 . . . having crankshaft-and-connecting-rod type drive **[3]**
1/073 . . . having pawl-and-ratchet type drive **[3]**
1/077 . . . having toothed-gearing type drive **[3]**
1/08 . of intermeshing-engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing
1/10 . . of internal-axis type with the outer member having more teeth or tooth-equivalents, e.g. rollers, than the inner member
1/107 . . . with helical teeth **[3]**
1/113 . . . the inner member carrying rollers intermeshing with the outer member **[3]**
1/12 . . of other than internal-axis type
1/14 . . . with toothed rotary pistons
1/16 . . . . with helical teeth, e.g. chevron-shaped, screw type
1/18 . . . . with similar tooth forms (F01C 1/16 takes precedence)
1/20 . . . . with dissimilar tooth forms (F01C 1/16 takes precedence)
1/22 . of internal-axis type with equidirectional movement of co-operating members at the points of engagement, or with one of the co-operating members being stationary, the inner member having more teeth or tooth-equivalents than the outer member
1/24 . of counter-engagement type, i.e. the movement of co-operating members at the points of engagement being in opposite directions
1/26 . . of internal-axis type
1/28 . . of other than internal-axis type
1/30 . having the characteristics covered by two or more of groups F01C 1/02, F01C 1/08, F01C 1/22, F01C 1/24 or having the characteristics covered by one of these groups together with some other type of movement between co-operating members
1/32 . . having both the movement defined in group F01C 1/02 and relative reciprocation between the co-operating members

1/324 . . . with vanes hinged to the inner member and reciprocating with respect to the outer member **[3]**
1/328 . . . . and hinged to the outer member **[3]**
1/332 . . . with vanes hinged to the outer member and reciprocating with respect to the inner member **[3]**
1/336 . . . . and hinged to the inner member **[3]**
1/34 . . having the movement defined in group F01C 1/08 or F01C 1/22 and relative reciprocation between the co-operating members
1/344 . . . with vanes reciprocating with respect to the inner member **[3]**
1/348 . . . . the vanes positively engaging, with circumferential play, an outer rotatable member **[3]**
1/352 . . . . the vanes being pivoted on the axis of the outer member **[3]**
1/356 . . . with vanes reciprocating with respect to the outer member **[3]**
1/36 . . having both the movements defined in groups F01C 1/22 and F01C 1/24
1/38 . . having the movement defined in group F01C 1/02 and having a hinged member (F01C 1/32 takes precedence) **[3]**
1/39 . . . with vanes hinged to the inner as well as to the outer member **[3]**
1/40 . . having the movement defined in group F01C 1/08 or F01C 1/22 and having a hinged member
1/44 . . . with vanes hinged to the inner member **[3]**
1/46 . . . with vanes hinged to the outer member **[3]**

3/00 Rotary-piston machines or engines with non-parallel axes of movement of co-operating members (with the working-chamber walls being at least partly resiliently deformable F01C 5/00)
3/02 . the axes being arranged at an angle of 90°
3/04 . . with axially-sliding vanes
3/06 . the axes being arranged otherwise than at an angle of 90°
3/08 . . of intermeshing-engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing

5/00 Rotary-piston machines or engines with the working-chamber walls at least partly resiliently deformable
5/02 . the resiliently-deformable wall being part of the inner member, e.g. of a rotary piston
5/04 . the resiliently-deformable wall being part of the outer member, e.g. of a housing
5/06 . the resiliently-deformable wall being a separate member
5/08 . . of tubular form, e.g. hose

7/00 Rotary-piston machines or engines with fluid ring or the like

9/00 Oscillating-piston machines or engines

11/00 Combinations of two or more machines or engines, each being of rotary-piston or oscillating-piston type (F01C 13/00 takes precedence; combinations of two or more pumps F04; fluid gearing F16H)

13/00 Adaptations of machines or engines for special use; **Combinations of engines with devices driven thereby** (aspects predominantly concerning driven devices, see the relevant classes for these devices)
13/02 . for driving hand-held tools or the like
13/04 . for driving pumps or compressors

17/00 Arrangements for drive of co-operating members, e.g. for rotary piston and casing
17/02 . of toothed-gearing type (F01C 1/077 takes precedence) **[3]**
17/04 . of cam-and-follower type (F01C 1/067 takes precedence) **[3]**
17/06 . using cranks, universal joints, or similar elements (F01C 1/07 takes precedence) **[3]**

19/00 Sealing arrangements in rotary-piston machines or engines (sealings in general F16J)
19/02 . Radially-movable sealings for working fluids
19/04 . . of rigid material
19/06 . . of resilient material
19/08 . Axially-movable sealings for working fluids
19/10 . Sealings for working fluids between radially and axially movable parts
19/12 . for other than working fluid

20/00 Control of, monitoring of, or safety arrangements for, machines or engines [8]
20/02 . specially adapted for several machines or engines connected in series or in parallel **[8]**
20/04 . specially adapted for reversible machines or engines **[8]**
20/06 . specially adapted for stopping, starting, idling or no-load operation **[8]**
20/08 . characterised by varying the rotational speed **[8]**
20/10 . characterised by changing the positions of the inlet or outlet openings with respect to the working chamber **[8]**
20/12 . . using sliding valves **[8]**
20/14 . . using rotating valves **[8]**
20/16 . . using lift valves **[8]**
20/18 . characterised by varying the volume of the working chamber (by changing the positions of inlet or outlet openings F01C 20/10) **[8]**
20/20 . . by changing the form of the inner or outer contour of the working chamber **[8]**
20/22 . . by changing the eccentricity between cooperating members **[8]**
20/24 . characterised by using valves regulating pressure or flow rate, e.g. discharge valves (F01C 20/10 takes precedence) **[8]**
20/26 . . using bypass channels **[8]**
20/28 . Safety arrangements; Monitoring **[8]**

21/00 Component parts, details, or accessories, not provided for in groups F01C 1/00 to F01C 20/00
21/02 . Arrangements of bearings (bearing constructions F16C)
21/04 . Lubrication (of machines or engines in general F01M)
21/06 . Heating; Cooling (of machines or engines in general F01P); Heat insulation (heat insulation in general F16L)

21/08 . Rotary pistons (reciprocating pistons in general F16J)

21/10 . Outer members for co-operation with rotary pistons; Casings (casings for rotary engines or machines in general F16M)

21/18 . Arrangements for admission or discharge of the working fluid, e.g. constructional features of the inlet or outlet **[8]**

F01D NON-POSITIVE-DISPLACEMENT MACHINES OR ENGINES, E.G. STEAM TURBINES (combustion engines F02; machines or engines for liquids F03, F04; non-positive-displacement pumps F04D)

(1) This subclass covers:
- non-positive-displacement engines for elastic fluids, e.g. steam turbines;
- non-positive-displacement engines for liquids and elastic fluids;
- non-positive-displacement machines for elastic fluids;
- non-positive-displacement machines for liquids and elastic fluids.

(2) Attention is drawn to the Notes preceding class F01, especially as regards the definitions of "reaction type", e.g. with airfoil-like blades, and "impulse type", e.g. bucket turbines.

Subclass index

1/00 Non-positive-displacement machines or engines, e.g. steam turbines (with working-fluid flows in opposite axial directions for balancing axial thrust F01D 3/02; with other than pure rotation F01D 23/00; turbines characterised by their use in special steam systems, cycles, or processes, regulating devices therefor F01K)

1/02 . with stationary working-fluid guiding means and bladed or like rotor (F01D 1/24 takes precedence; without working-fluid guiding means F01D 1/18) **[5]**

1/04 . . traversed by the working-fluid substantially axially

1/06 . . traversed by the working-fluid substantially radially

1/08 . . . having inward flow

1/10 . . having two or more stages subjected to working-fluid flow without essential intermediate pressure change, i.e. with velocity stages (F01D 1/12 takes precedence)

1/12 . . with repeated action on same blade ring

1/14 . . . traversed by the working-fluid substantially radially

1/16 . . characterised by having both reaction stages and impulse stages

1/18 . without working-fluid guiding means (F01D 1/24, F01D 1/32, F01D 1/34 take precedence) **[5]**

1/20 . . traversed by the working-fluid substantially axially

1/22 . . traversed by the working-fluid substantially radially

1/24 . characterised by counter-rotating rotors subjected to same working-fluid stream without intermediate stator blades or the like

1/26 . . traversed by the working-fluid substantially axially

1/28 . . traversed by the working-fluid substantially radially

1/30 . characterised by having a single rotor operable in either direction of rotation, e.g. by reversing of blades (combinations of machines or engines F01D 13/00)

1/32 . with pressure/velocity transformation exclusively in rotor, e.g. the rotor rotating under the influence of jets issuing from the rotor

1/34 . characterised by non-bladed rotor, e.g. with drilled holes (F01D 1/32 takes precedence; sirens G10K 7/00) **[5]**

1/36 . . using fluid friction

1/38 . . of the screw type **[5]**

3/00 Machines or engines with axial-thrust balancing effected by working fluid

3/02 . characterised by having one fluid flow in one axial direction and another fluid flow in the opposite direction

3/04 . axial thrust being compensated by thrust-balancing dummy piston or the like

5/00 Blades; **Blade-carrying members** (nozzle boxes F01D 9/02); **Heating, heat-insulating, cooling, or antivibration means on the blades or the members**

5/02 . Blade-carrying members, e.g. rotors (rotors of non-bladed type F01D 1/34; stators F01D 9/00)

5/03 . . Annular blade-carrying members having blades on the inner periphery of the annulus and extending inwardly radially, i.e. inverted rotors **[6]**

5/04 . . for radial-flow machines or engines

5/06 . . Rotors for more than one axial stage, e.g. of drum or multiple-disc type; Details thereof, e.g. shafts, shaft connections
5/08 . . Heating, heat-insulating, or cooling means
5/10 . . Antivibration means
5/12 . Blades (blade roots F01D 5/30; rotors with blades adjustable in operation F01D 7/00; stator blades F01D 9/02)
5/14 . . Form or construction (selecting particular materials, measures against erosion or corrosion F01D 5/28)
5/16 . . . for counteracting blade vibration
5/18 . . . Hollow blades; Heating, heat-insulating, or cooling means on blades
5/20 . . . Specially-shaped blade tips to seal space between tips and stator
5/22 . . Blade-to-blade connections, e.g. by shrouding
5/24 . . . using wire or the like
5/26 . . Antivibration means not restricted to blade form or construction or to blade-to-blade connections
5/28 . . Selecting particular materials; Measures against erosion or corrosion
5/30 . Fixing blades to rotors; Blade roots
5/32 . . Locking, e.g. by final locking-blades or keys
5/34 . Rotor-blade aggregates of unitary construction

7/00 Rotors with blades adjustable in operation; **Control thereof** (for reversing F01D 1/30)
7/02 . having adjustment responsive to speed

9/00 Stators (non-fluid guiding aspects of casings, regulating, controlling, or safety aspects, see the relevant groups)
9/02 . Nozzles; Nozzle boxes; Stator blades; Guide conduits
9/04 . . forming ring or sector
9/06 . Fluid supply conduits to nozzles or the like

11/00 Preventing or minimising internal leakage of working fluid, e.g. between stages (sealings in general F16J)
11/02 . by non-contact sealings, e.g. of labyrinth type (for sealing space between rotor blade tips and stator F01D 11/08)
11/04 . . using sealing fluid, e.g. steam
11/06 . . . Control thereof
11/08 . for sealing space between rotor blade tips and stator (specially-shaped blade tips therefor F01D 5/20)
11/10 . . using sealing fluid, e.g. steam
11/12 . . using a rubstrip, e.g. erodible, deformable or resiliently biased part **[6]**
11/14 . . Adjusting or regulating tip-clearance, i.e. distance between rotor-blade tips and stator casing (rotors with blades adjustable in operation F01D 7/00) **[6]**
11/16 . . . by self-adjusting means (F01D 11/12 takes precedence) **[6]**
11/18 . . . . using stator or rotor components with predetermined thermal response, e.g. selective insulation, thermal inertia, differential expansion **[6]**
11/20 . . . Actively adjusting tip-clearance **[6]**
11/22 . . . . by mechanically actuating the stator or rotor components, e.g. moving shroud sections relative to the rotor **[6]**
11/24 . . . . by selectively cooling or heating stator or rotor components **[6]**

13/00 Combinations of two or more machines or engines (F01D 15/00 takes precedence; combinations of two or more pumps F04; fluid gearing F16H; regulating or controlling, see the relevant groups)
13/02 . Working-fluid interconnection of machines or engines

15/00 Adaptations of machines or engines for special use; **Combinations of engines with devices driven thereby** (regulating or controlling, see the relevant groups; aspects predominantly concerning driven devices, see the relevant classes for the devices)
15/02 . Adaptations for driving vehicles, e.g. locomotives (arrangement in vehicles, see the relevant vehicle classes)
15/04 . . the vehicles being waterborne vessels
15/06 . Adaptations for driving, or combinations with, hand-held tools or the like
15/08 . Adaptations for driving, or combinations with, pumps
15/10 . Adaptations for driving, or combinations with, electric generators
15/12 . Combinations with mechanical gearing (driven by multiple engines F01D 13/00)

17/00 Regulating or controlling by varying flow (for reversing F01D 1/30; by varying rotor blade position F01D 7/00; specially for starting F01D 19/00; shutting-down F01D 21/00; regulating or controlling in general G05)
17/02 . Arrangement of sensing elements (sensing elements per se, see the relevant subclasses)
17/04 . . responsive to load
17/06 . . responsive to speed
17/08 . . responsive to condition of working fluid, e.g. pressure
17/10 . Final actuators (valves in general F16K)
17/12 . . arranged in stator parts
17/14 . . . varying effective cross-sectional area of nozzles or guide conduits
17/16 . . . . by means of nozzle vanes
17/18 . . . varying effective number of nozzles or guide conduits
17/20 . Devices dealing with sensing elements or final actuators or transmitting means between them, e.g. power-assisted (sensing elements alone F01D 17/02; final actuators alone F01D 17/10)
17/22 . . the operation or power assistance being predominantly non-mechanical
17/24 . . . electrical
17/26 . . . fluid, e.g. hydraulic

19/00 Starting of machines or engines; **Regulating, controlling, or safety means in connection therewith** (warming-up before starting F01D 25/10; turning or inching gear F01D 25/34)
19/02 . dependent on temperature of component parts, e.g. of turbine casing

21/00 Shutting-down of machines or engines, e.g. in emergency; **Regulating, controlling, or safety means not otherwise provided for**
21/02 . Shutting-down responsive to overspeed
21/04 . responsive to undesired position of rotor relative to stator, e.g. indicating such position
21/06 . . Shutting-down
21/08 . . Restoring position
21/10 . responsive to unwanted deposits on blades, in working-fluid conduits, or the like

21/12 . responsive to temperature
21/14 . responsive to other specific conditions
21/16 . Trip gear
21/18 . . involving hydraulic means
21/20 . Checking operation of shut-down devices

23/00 Non-positive-displacement machines or engines with movement other than pure rotation, e.g. of endless-chain type

25/00 Component parts, details, or accessories, not provided for in, or of interest apart from, other groups

25/02 . De-icing means for engines having icing phenomena
25/04 . Antivibration arrangements
25/06 . . for preventing blade vibration (means on blade-carrying members or blades F01D 5/00)
25/08 . Cooling (of machines or engines in general F01P); Heating; Heat insulation (of blade-carrying members, of blades F01D 5/00)
25/10 . . Heating, e.g. warming-up before starting
25/12 . . Cooling
25/14 . . Casings modified therefor (double casings F01D 25/26)
25/16 . Arrangement of bearings; Supporting or mounting bearings in casings (bearings per se F16C)
25/18 . Lubricating arrangements (of machines or engines in general F01M)
25/20 . . using lubrication pumps
25/22 . . using working fluid or other gaseous fluid as lubricant
25/24 . Casings (modified for heating or cooling F01D 25/14); Casing parts, e.g. diaphragms, casing fastenings (casings for rotary machines or engines in general F16M)
25/26 . . Double casings; Measures against temperature strain in casings
25/28 . Supporting or mounting arrangements, e.g. for turbine casing
25/30 . Exhaust heads, chambers, or the like
25/32 . Collecting of condensation water; Drainage
25/34 . Turning or inching gear
25/36 . . using electric motors

F01K STEAM ENGINE PLANTS; **STEAM ACCUMULATORS**; **ENGINE PLANTS NOT OTHERWISE PROVIDED FOR**; **ENGINES USING SPECIAL WORKING FLUIDS OR CYCLES** (gas-turbine or jet-propulsion plants F02; steam generation F22; nuclear power plants, engine arrangements therein G21D)

Note

Attention is drawn to the Notes preceding class F01, especially as regards the definitions of “steam” and “special vapour”.

Subclass index

1/00 Steam accumulators (use of accumulators in steam engine plants F01K 3/00)

1/02 . for storing steam otherwise than in a liquid
1/04 . for storing steam in a liquid, e.g. Ruth type (in alkali to increase steam pressure F22B 1/20)
1/06 . . Internal fittings facilitating steam distribution, steam formation, or circulation (acting during charging or discharging F01K 1/08; fittings facilitating circulation through multiple accumulators F01K 1/14)
1/08 . Charging or discharging of accumulators with steam (peculiar to multiple accumulators F01K 1/12)
1/10 . specially adapted for superheated steam
1/12 . Multiple accumulators; Charging, discharging, or regulating peculiar thereto
1/14 . . Circulation
1/16 . Other safety or regulating means
1/18 . . for steam pressure
1/20 . Other steam-accumulator parts, details, or accessories

Steam engine plants

3/00 Plants characterised by the use of steam or heat accumulators, or intermediate steam heaters, therein (regenerating exhaust steam F01K 19/00)

3/02 . Use of accumulators and specific engine types; Regulating thereof

3/04 . . the engine being of multiple-inlet-pressure type
3/06 . . the engine being of extraction or non-condensing type
3/08 . Use of accumulators, the plant being specially adapted for a specific use
3/10 . . for vehicle drive, e.g. for accumulator locomotives
3/12 . having two or more accumulators
3/14 . having both steam accumulator and heater, e.g. superheating accumulator (steam superheaters per se F22G)
3/16 . . Mutual arrangement of accumulator and heater
3/18 . having heaters (having both steam accumulator and heater F01K 3/14; steam heaters per se F22)
3/20 . . with heating by combustion gases of main boiler
3/22 . . . Controlling, e.g. starting, stopping
3/24 . . with heating by separately-fired heaters
3/26 . . with heating by steam

5/00 Plants characterised by use of means for storing steam in an alkali to increase steam pressure, e.g. of Honigmann or Koenemann type
5/02 . used in regenerative installation

7/00 Steam engine plants characterised by the use of specific types of engine (F01K 3/02 takes precedence); **Plants or engines characterised by their use of special steam systems, cycles, or processes** (reciprocating-piston engines using uniflow principle F01B 17/04); **Regulating means peculiar to such systems, cycles, or processes**; **Use of withdrawn or exhaust steam for feed-water heating**
7/02 . the engines being of multiple-expansion type (the engines being only of turbine type F01K 7/16; the engines using steam of critical or over-critical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)
7/04 . . Regulating means peculiar thereto
7/06 . the engines being of multiple-inlet-pressure type (F01K 7/02 takes precedence; the engines being only of turbine type F01K 7/16; the engines using steam of critical or over-critical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)
7/08 . . Regulating means peculiar thereto
7/10 . characterised by the engine exhaust pressure (the engines being only of turbine type F01K 7/16; the engines using steam of critical or over-critical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)
7/12 . . of condensing type
7/14 . . . Regulating means peculiar thereto
7/16 . the engines being only of turbine type (the engines using steam of critical or over-critical pressure F01K 7/32; the engines being of extraction or non-condensing type F01K 7/34)
7/18 . . the turbine being of multiple-inlet-pressure type
7/20 . . . Regulating means peculiar thereto
7/22 . . the turbines having inter-stage steam heating
7/24 . . . Regulating or safety means peculiar thereto
7/26 . . the turbines having inter-stage steam accumulation
7/28 . . . Regulating means peculiar thereto
7/30 . . the turbines using exhaust steam only
7/32 . the engines using steam of critical or over-critical pressure
7/34 . the engines being of extraction or non-condensing type; Use of steam for feed-water heating (feed-water heaters in general F22D)
7/36 . . the engines being of positive-displacement type
7/38 . . the engines being of turbine type
7/40 . . Use of two or more feed-water heaters in series
7/42 . . Use of desuperheaters for feed-water heating
7/44 . . Use of steam for feed-water heating and another purpose

9/00 Steam engine plants characterised by condensers arranged or modified to co-operate with the engines (by condensers structurally combined with engines F01K 11/00; steam condensers per se F28B)
9/02 . Arrangements or modifications of condensate or air pumps
9/04 . with dump valves to by-pass stages

11/00 Steam engine plants characterised by the engines being structurally combined with boilers or condensers
11/02 . the engines being turbines
11/04 . the boilers or condensers being rotated in use

13/00 General layout or general methods of operation, of complete steam engine plants
13/02 . Regulating, e.g. stopping or starting

15/00 Adaptations of steam engine plants for special use
15/02 . for driving vehicles, e.g. locomotives (arrangements in vehicles, see the relevant vehicle classes)
15/04 . . the vehicles being waterborne vessels

17/00 Use of steam or condensate extracted or exhausted from steam engine plant (for heating feed-water F01K 7/34; returning condensate to boiler F22D)
17/02 . for heating purposes, e.g. industrial, domestic (F01K 17/06 takes precedence; domestic- or space-heating systems, e.g. central-heating systems, in general F24D 1/00, F24D 3/00, F24D 9/00) **[3]**
17/04 . for specific purposes other than heating (F01K 17/06 takes precedence)
17/06 . Returning energy of steam, in exchanged form, to process, e.g. use of exhaust steam for drying solid fuel of plant

19/00 Regenerating or otherwise treating steam exhaust from steam engine plant (plants characterised by use of means for storing steam in an alkali to increase steam pressure F01K 5/00; returning condensate to boiler F22D)
19/02 . Regenerating by compression
19/04 . . in combination with cooling or heating
19/06 . . in engine cylinder
19/08 . . compression done by injection apparatus, jet blower, or the like
19/10 . Cooling exhaust steam other than by condenser; Rendering exhaust steam invisible

21/00 Steam engine plants not otherwise provided for
21/02 . with steam generation in engine cylinders
21/04 . using mixtures of steam and gas; Plants generating or heating steam by bringing water or steam into direct contact with hot gas (direct-contact steam generators in general F22B)
21/06 . Treating live steam, other than thermodynamically, e.g. for fighting deposits in engine

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23/00 Plants characterised by more than one engine delivering power external to the plant, the engines being driven by different fluids
23/02 . the engine cycles being thermally coupled

23/04 . . condensation heat from one cycle heating the fluid in another cycle
23/06 . . combustion heat from one cycle heating the fluid in another cycle
23/08 . . . with working fluid of one cycle heating the fluid in another cycle
23/10 . . . with exhaust fluid of one cycle heating the fluid in another cycle
23/12 . the engines being mechanically coupled (F01K 23/02 takes precedence)
23/14 . . including at least one combustion engine
23/16 . . all the engines being turbines (F01K 23/14 takes precedence)
23/18 . characterised by adaptation for specific use

25/00 Plants or engines characterised by use of special working fluids, not otherwise provided for; Plants operating in closed cycles and not otherwise provided for
25/02 . the fluid remaining in the liquid phase
25/04 . the fluid being in different phases, e.g. foamed
25/06 . using mixtures of different fluids (plants using mixtures of steam and gas F01K 21/04)
25/08 . using special vapours
25/10 . . the vapours being cold, e.g. ammonia, carbon dioxide, ether
25/12 . . the vapours being metallic, e.g. mercury
25/14 . . using industrial or other waste gases

27/00 Plants for converting heat or fluid energy into mechanical energy, not otherwise provided for
27/02 . Plants modified to use their waste heat, other than that of exhaust, e.g. engine-friction heat

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F01L CYCLICALLY OPERATING VALVES FOR MACHINES OR ENGINES (valves in general F16K)

(1) Groups F01L 1/00 to F01L 13/00 cover only valve-gear or valve arrangements without provision for variable fluid distribution. **[2009.01]**
(2) Valve gear or valve arrangements specially adapted for steam engines are covered by groups F01L 15/00 to F01L 35/00. **[2009.01]**
(3) Valve-gear or valve arrangements specially adapted for machines or engines with variable working-fluid distribution are covered by groups F01L 15/00 to F01L 35/00. **[2009.01]**
(4) Attention is drawn to the Notes preceding class F01, especially Note (3).
(5) As regards the above-mentioned Note (3), attention is drawn to F01B 3/10, F01B 15/06, F01C 20/20, F01C 21/18, F02B 53/06, F03C 1/08, F04B 1/18, F04B 7/00, F04B 39/08, F04B 39/10, F04C 14/00, F04C 15/06, F04C 28/00and F04C 29/12.

Subclass index

Valve-gear or valve arrangements for positive-displacement machines or engines other than steam engines, e.g. for internal-combustion piston engines, without provision for variable fluid distribution

1/00 Valve-gear or valve arrangements, e.g. lift-valve gear (lift valve and valve seat assemblies per se F01L 3/00; slide-valve gear F01L 5/00; actuated non-mechanically F01L 9/00; valve arrangements in working piston or piston-rod F01L 11/00; modifications of valve-gear to facilitate reversing, braking, starting, changing compression ratio, or other specific operations F01L 13/00)
1/02 . Valve drive (transmitting-gear between valve drive and valve F01L 1/12)
1/04 . . by means of cams, camshafts, cam discs, eccentrics, or the like (F01L 1/10 takes precedence)
1/047 . . . Camshafts **[6]**
1/053 . . . . overhead type **[6]**
1/06 . . . the cams, or the like, rotating at a higher speed than that corresponding to the valve cycle, e.g. operating four-stroke engine valves directly from crankshaft
1/08 . . . Shape of cams
1/10 . . by means of crank- or eccentric-driven rods
1/12 . Transmitting-gear between valve drive and valve (simultaneously operating two or more valves F01L 1/26)

1/14 . . Tappets; Push-rods
1/16 . . . Silencing impact; Reducing wear
1/18 . . Rocking arms or levers
1/20 . Adjusting or compensating clearance, i.e. lash adjustment
1/22 . . automatically
1/24 . . . by fluid means, e.g. hydraulically
1/245 . . . . Hydraulic tappets **[6]**
1/25 . . . . . between cam and valve stem **[6]**
1/255 . . . . . between cam and rocker arm **[6]**
1/26 . characterised by the provision of two or more valves operated simultaneously by same transmitting-gear; peculiar to machines or engines with more than two lift valves per cylinder (with coaxial valves F01L 1/28)
1/28 . characterised by the provision of coaxial valves; characterised by the provision of valves co-operating with both intake and exhaust ports
1/30 . characterised by the provision of positively opened and closed valves, i.e. desmodromic valves
1/32 . characterised by the provision of means for rotating lift valves, e.g. to diminish wear
1/34 . characterised by the provision of means for changing the timing of the valves without changing the duration of opening
1/344 . . changing the angular relationship between crankshaft and camshaft, e.g. using helicoidal gear **[6]**
1/348 . . . by means acting on timing belts or chains **[6]**
1/352 . . . using bevel or epicyclic gear **[6]**
1/356 . . . making the angular relationship oscillate **[6]**
1/36 . peculiar to machines or engines of specific type other than four-stroke cycle
1/38 . . for engines with other than four-stroke cycle, e.g. with two-stroke cycle (F01L 1/26, F01L 1/28 take precedence)
1/40 . . for engines with scavenging charge near top dead-centre position, e.g. by overlapping inlet and exhaust time (scavenging aspects F02B)
1/42 . . for machines or engines characterised by cylinder arrangement, e.g. star or fan
1/44 . Multiple-valve gear or arrangements, not provided for in preceding subgroups, e.g. with lift and different valves
1/46 . Component parts, details, or accessories, not provided for in preceding subgroups

3/00 Lift valves, i.e. cut-off apparatus with closure members having at least a component of their opening and closing motion perpendicular to the closing faces; Parts or accessories thereof

3/02 . Selecting particular materials for valve members or valve seats; Valve members or valve seats composed of two or more materials
3/04 . . Coated valve members or valve seats
3/06 . Valve members or valve seats with means for guiding or deflecting the medium controlled thereby, e.g. producing a rotary motion of the drawn-in cylinder charge (for rotating lift valves F01L 1/32)
3/08 . Valve guides; Sealing of valve stem, e.g. sealing by lubricant
3/10 . Connecting springs to valve members
3/12 . Cooling of valves
3/14 . . by means of a liquid or solid coolant, e.g. sodium, in a closed chamber in a valve
3/16 . . by means of a fluid flowing through or along valve, e.g. air (for sealing only F01L 3/08)
3/18 . . . Liquid cooling of valve
3/20 . Shapes or constructions of valve members, not provided for in preceding subgroups of this group
3/22 . Valve seats not provided for in preceding subgroups of this group; Fixing of valve seats
3/24 . Safety means or accessories, not provided for in preceding subgroups of this group

5/00 Slide-valve gear or valve arrangements (with pure rotary or oscillatory movement F01L 7/00)

5/02 . with other than cylindrical, sleeve, or part-annularly-shaped valves, e.g. with flat-type valves
5/04 . with cylindrical, sleeve, or part-annularly-shaped valves
5/06 . . surrounding working cylinder or piston
5/08 . . . Arrangements with several movements or several valves, e.g. one valve inside the other (with part-annularly-shaped valves F01L 5/12)
5/10 . . . . with reciprocating and other movement of same valve
5/12 . . . Arrangements with part-annularly-shaped valves
5/14 . characterised by the provision of valves with reciprocating and other movements (surrounding working cylinder or piston F01L 5/06)
5/16 . . with reciprocating and other movement of same valve, e.g. longitudinally and in cross direction of working cylinder
5/18 . . with reciprocatory valve and other slide valve
5/20 . specially for two-stroke engines (F01L 5/06, F01L 5/14 take precedence)
5/22 . Multiple-valve arrangements (with valves surrounding working cylinder or piston F01L 5/06; with reciprocatory and other slide valves F01L 5/18; specially for two-stroke engines F01L 5/20)
5/24 . Component parts, details, or accessories, not provided for in preceding subgroups of this group

7/00 Rotary or oscillatory slide-valve gear or valve arrangements (slide valves with combined rotary and non-rotary movements, combinations of rotary and non-rotary slide valves F01L 5/00)

7/02 . with cylindrical, sleeve, or part-annularly-shaped valves (of disc type F01L 7/06; of conical type F01L 7/08)
7/04 . . surrounding working cylinder or piston
7/06 . with disc-type valves
7/08 . with conically- or frusto-conically-shaped valves
7/10 . with valves of other specific shape, e.g. spherical
7/12 . specially for two-stroke engines (F01L 7/04 takes precedence)
7/14 . Multiple-valve arrangements (with valves surrounding working cylinder or piston F01L 7/04; specially for two-stroke engines F01L 7/12)
7/16 . Sealing or packing arrangements specially therefor
7/18 . Component parts, details, or accessories, not provided for in preceding subgroups of this group

9/00 Valve-gear or valve arrangements actuated non-mechanically

9/02 . by fluid means, e.g. hydraulic
9/04 . by electric means

11/00 Valve arrangements in working piston or piston-rod

11/02 . in piston
11/04 . . operated by movement of connecting-rod
11/06 . . . operating oscillatory valve

13/00 Modifications of valve-gear to facilitate reversing, braking, starting, changing compression ratio, or other specific operations

13/02 . for reversing

13/04 . for starting by means of fluid pressure

13/06 . for braking

13/08 . for decompression, e.g. during starting; for changing compression ratio

Valve-gear or valve arrangements specially adapted for steam engines, or specially adapted for other positive-displacement machines or engines with variable working-fluid distribution

(1) Groups F01L 15/00 to F01L 31/00 cover:
- valve drive or means external to valves for adjustment during operation;
- tripping-gear;
- reversing-gear;
- use of pistons or piston-rods as valves or as valve-supporting elements;
- valve-gear or valve arrangements peculiar to free-piston machines or engines.

(2) Groups F01L 15/00 to F01L 31/00 do not fully cover subject matter restricted to rotary, oscillatory, or lift-valve gear or valve arrangements, which is covered by group F01L 33/00 or F01L 35/00.

15/00 Valve-gear or valve arrangements, e.g. with reciprocatory slide valves, other than provided for in groups F01L 17/00 to F01L 29/00 (valve drive or external valve-adjustment during operation, see the relevant groups, e.g. F01L 31/00; tripping-gear or tripping of valves F01L 31/00)

15/02 . with valves other than cylindrical, sleeve, or part-annularly-shaped, e.g. flat D-valves

15/04 . . main valve being combined with auxiliary valve (of drag-valve type F01L 15/10)

15/06 . . . of Meyer or Rider type, i.e. in which the expansion is varied at the expansion valve itself

15/08 . with cylindrical, sleeve, or part-annularly-shaped valves; Such main valves combined with auxiliary valves

15/10 . with main slide valve and auxiliary valve dragged thereby

15/12 . characterised by having means for effecting pressure equilibrium between two different cylinder spaces at idling

15/14 . Arrangements with several co-operating main valves, e.g. reciprocatory and rotary

15/16 . . with reciprocatory slide valves only

15/18 . Valve arrangements not provided for in preceding subgroups of this group

15/20 . Component parts, details, or accessories, not provided for in preceding subgroups of this group

17/00 Slide-valve gear or valve arrangements with cylindrical, sleeve, or part-annularly-shaped valves surrounding working cylinder or piston

17/02 . Drive, or adjustment during operation, peculiar thereto, e.g. for reciprocating and oscillating movements or for several valves one inside the other

19/00 Slide-valve gear or valve arrangements with reciprocatory and other movement of same valve, other than provided for in group F01L 17/00, e.g. longitudinally and in cross direction of working cylinder

19/02 . Drive, or adjustment during operation, peculiar thereto

21/00 Use of working pistons or piston-rods as fluid-distributing valves or as valve-supporting elements, e.g. in free-piston machines

21/02 . Piston or piston-rod used as valve member

21/04 . Valves arranged in or on piston or piston-rod

23/00 Valves controlled by impact of piston, e.g. in free-piston machines

25/00 Drive, or adjustment during operation, of distribution or expansion valves by non-mechanical means

25/02 . by fluid means

25/04 . . by working fluid of machine or engine, e.g. free-piston machine

25/06 . . . Arrangements with main and auxiliary valves, at least one of them being fluid-driven

25/08 . by electric or magnetic means

27/00 Distribution or expansion-valve gear peculiar to free-piston machines or engines and not provided for in groups F01L 21/00 to F01L 25/00

27/02 . the machine or engine having rotary or oscillatory valves

27/04 . Delayed-action controls, e.g. of cataract- or dash-pot-type

29/00 Reversing-gear (equally usable for control of degree of working fluid admission, and reversing being of secondary importance F01L 31/00)

29/02 . by displacing eccentric

29/04 . by links or guide rods

29/06 . by interchanging inlet and exhaust ports

29/08 . specially for rotary or oscillatory valves

29/10 . Details, e.g. drive

29/12 . . Powered reverse gear

31/00 Valve drive, valve adjustment during operation, or other valve control, not provided for in groups F01L 15/00 to F01L 29/00 (sensing elements measuring the variable or condition to be controlled or regulated F01B)

31/02 . with tripping-gear (for oscillatory valves F01L 31/06); Tripping of valves

31/04 . . with positively-driven trip levers

31/06 . with tripping-gear specially for oscillatory valves; Oscillatory tripping-valves, e.g. of Corliss type

31/08 . Valve drive or valve adjustment, apart from tripping aspects; Positively-driven gear

31/10 . . the drive being effected by eccentrics (F01L 31/14 takes precedence)

31/12 . . . Valve adjustment by displacing eccentric

31/14 . . Valve adjustment by links or guide rods, e.g. in valve-gears with eccentric drive

31/16 . . the drive being effected by specific means other than eccentric, e.g. cams; Valve adjustment in connection with such drives

31/18 . . specially for rotary or oscillatory valves

31/20 . . . Valve adjustment

31/22 . . specially for lift valves

31/24 . . . Valve adjustment

Rotary or oscillatory slide-valve gear or lift-valve gear or such valve arrangements specially adapted for steam engines, or specially adapted for other positive-displacement machines or engines with variable working-fluid distribution

33/00 **Rotary or oscillatory slide-valve gear or valve arrangements, specially adapted for machines or engines with variable fluid distribution** (drive, adjustment during operation, tripping-gear, reversing-gear, use of working pistons or piston-rods as valves or as valve-supporting elements, valve-gear or valve arrangements peculiar to free-piston machines or engines F01L 15/00 to F01L 31/00)

33/02 . rotary

33/04 . oscillatory

35/00 **Lift-valve gear or valve arrangements specially adapted for machines or engines with variable fluid distribution** (drive, adjustment during operation, tripping-gear, reversing-gear, use of working pistons or piston-rods as valves or as valve-supporting elements, valve-gear or valve arrangements peculiar to free-piston machines or engines F01L 15/00 to F01L 31/00)

35/02 . Valves

35/04 . Arrangements of valves in the machine or engine, e.g. relative to working cylinder

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F01M LUBRICATING OF MACHINES OR ENGINES IN GENERAL; LUBRICATING INTERNAL-COMBUSTION ENGINES; CRANKCASE VENTILATING [2]

(1) Attention is drawn to the Notes preceding class F01, especially as regards Note (3).

(2) Attention is drawn to the following places, which cover lubrication of specific machines or engines: **[8]**

F01B	31/10	Steam engines
F01C	21/04	Rotary-piston or oscillating-piston machines or engines
F01D	25/18	Non-positive-displacement machines
F02C	7/06	Gas-turbine plants
F02F	1/20	Cylinders of combustion engines
F04B	39/02	Pumps for elastic fluids
F04C	29/02	Rotary-piston or oscillating-piston pumps for liquids
F04D	29/04	Non-positive-displacement pumps

Subclass index

1/00 **Pressure lubrication**

1/02 . using lubricating pumps

1/04 . using pressure in working cylinder or crankcase to operate lubricant-feeding devices

1/06 . Lubricating systems characterised by the provision therein of crankshafts or connecting-rods with lubricant passageways, e.g. bores

1/08 . Lubricating systems characterised by the provision therein of lubricant-jetting means

1/10 . Lubricating systems characterised by the provision therein of lubricant venting or purifying means, e.g. of filters (mounting of, connecting of, or constructional details of lubricant purifying means F01M 11/03)

1/12 . Closed-circuit lubricating systems not provided for in groups F01M 1/02 to F01M 1/10

1/14 . Timed lubrication (F01M 1/08 takes precedence)

1/16 . Controlling lubricant pressure or quantity

1/18 . Indicating or safety devices (concerning lubricant level F01M 11/06, F01M 11/12)

1/20 . . concerning lubricant pressure

1/22 . . . rendering machines or engines inoperative or idling on pressure failure

1/24 . . . . acting on engine fuel system

1/26 . . . . acting on engine ignition system

1/28 . . . . acting on engine combustion-air supply

3/00 **Lubrication specially adapted for engines with crankcase compression of fuel-air mixture, or for other engines in which lubricant is contained in fuel, combustion air, or fuel-air mixture** (separating lubricant from air or fuel-air mixture before entry into cylinder F01M 11/08)

3/02 . with variable proportion of lubricant to fuel, lubricant to air, or lubricant to fuel-air mixture

3/04 . for upper cylinder lubrication only

5/00 **Heating, cooling, or controlling temperature of lubricant** (arrangement of lubricant coolers in engine cooling system F01P 11/08); **Lubrication means facilitating engine starting**

5/02 . Conditioning lubricant for aiding engine starting, e.g. heating

5/04 . . Diluting, e.g. with fuel

7/00 **Lubrication means specially adapted for machine or engine running-in**

9/00 **Lubrication means having pertinent characteristics not provided for in, or of interest apart from, groups F01M 1/00 to F01M 7/00**

9/02 . having means for introducing additives to lubricant

9/04 . Use of fuel as lubricant

9/06 . Dip or splash lubrication

9/08 . Drip lubrication

9/10 . Lubrication of valve gear or auxiliaries
9/12 . Non-pressurised lubrication, or non-closed-circuit lubrication, not otherwise provided for

11/00 Component parts, details, or accessories, not provided for in, or of interest apart from, groups F01M 1/00 to F01M 9/00

11/02 . Arrangements of lubricant conduits
11/03 . Mounting or connecting of lubricant purifying means relative to the machine or engine; Details of lubricant purifying means **[3]**
11/04 . Filling or draining lubricant of or from machines or engines
11/06 . Means for keeping lubricant level constant or for accommodating movement or position of machines or engines
11/08 . Separating lubricant from air or fuel-air mixture before entry into cylinder
11/10 . Indicating devices; Other safety devices
11/12 . . concerning lubricant level

13/00 Crankcase ventilating or breathing [2]

13/02 . by means of additional source of positive or negative pressure **[2]**
13/04 . having means for purifying air before leaving crankcase, e.g. removing oil **[2]**
13/06 . specially adapted for submersible engines, e.g. of armoured vehicles **[2]**

F01N GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR MACHINES OR ENGINES IN GENERAL; **GAS-FLOW SILENCERS OR EXHAUST APPARATUS FOR INTERNAL-COMBUSTION ENGINES** (arrangements in connection with gas exhaust of propulsion units in vehicles B60K 13/00; combustion-air intake silencers specially adapted for, or arranged on, internal-combustion engines F02M 35/00; protecting against, or damping, noise in general G10K 11/16)

Note

Attention is drawn to the Notes preceding class F01, especially as regards Note (3).

1/00 Silencing apparatus characterised by method of silencing

1/02 . by using resonance
1/04 . . having sound-absorbing materials in resonance chambers
1/06 . by using interference effect
1/08 . by reducing exhaust energy by throttling or whirling
1/10 . . in combination with sound-absorbing materials
1/12 . . using spirally- or helically-shaped channels (F01N 1/10 takes precedence; cyclones B04C)
1/14 . by adding air to exhaust gases
1/16 . by using movable parts
1/18 . . having rotary movement
1/20 . . having oscillating or vibrating movement (the parts being resilient walls F01N 1/22)
1/22 . . the parts being resilient walls
1/24 . by using sound-absorbing materials (F01N 1/04, F01N 1/06, F01N 1/10, F01N 1/14, F01N 1/16 take precedence)

3/00 Exhaust or silencing apparatus having means for purifying, rendering innocuous, or otherwise treating exhaust (electric control F01N 9/00; monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00) **[4]**

3/01 . by means of electric or electrostatic separators **[7]**
3/02 . for cooling, or for removing solid constituents of, exhaust (by means of electric or electrostatic separators F01N 3/01) **[1,7]**
3/021 . . by means of filters **[7]**
3/022 . . . characterised by specially adapted filtering structure, e.g. honeycomb, mesh or fibrous **[7]**
3/023 . . . using means for regenerating the filters, e.g. by burning trapped particles **[7]**
3/025 . . . . using fuel burner or by adding fuel to exhaust **[7]**
3/027 . . . . using electric or magnetic heating **[7]**
3/028 . . . . . using microwaves **[7]**
3/029 . . . . by adding non-fuel substances to exhaust **[7]**
3/031 . . . having means for by-passing filters, e.g. when clogged or during cold engine start **[7]**
3/032 . . . . during filter regeneration only **[7]**
3/033 . . . in combination with other devices **[7]**
3/035 . . . . with catalytic reactors **[7]**
3/037 . . by means of inertial or centrifugal separators, e.g. associated with agglomerators **[7]**
3/038 . . by means of perforated plates defining expansion chambers associated with condensation and collection chambers **[7]**
3/04 . . by means of liquids
3/05 . . by means of air, e.g. by mixing exhaust with air (silencers working by addition of air to exhaust F01N 1/14; arrangements for the supply of additional air for the thermal or catalytic conversion of noxious components of exhaust F01N 3/30) **[7]**
3/06 . for extinguishing sparks
3/08 . for rendering innocuous (using electric or electrostatic separators F01N 3/01; chemical aspects B01D 53/92) **[1,7]**
3/10 . . by thermal or catalytic conversion of noxious components of exhaust **[3]**
3/18 . . . characterised by methods of operation; Regulation **[3]**
3/20 . . . . specially adapted for catalytic conversion (F01N 3/22 takes precedence) **[3]**
3/22 . . . . Regulation of additional air supply only, e.g. using by-passes or variable air pump drives **[3]**
3/24 . . . characterised by constructional aspects of converting apparatus (filtering in combination with catalytic reactors F01N 3/035) **[3,7]**
3/26 . . . . Construction of thermal reactors **[3]**
3/28 . . . . Construction of catalytic reactors **[3]**
3/30 . . . . Arrangements for supply of additional air (regulation, e.g. using by-passes or variable air pump drives, F01N 3/22) **[3]**

3/32 . . . . . using air pumps (using jet air pumps F01N 3/34; pumps in general F04) **[3]**

3/34 . . . . . using air conduits or jet air pumps, e.g. near the engine exhaust port **[3]**

3/36 . . . . Arrangements for supply of additional fuel **[3]**

3/38 . . . . Arrangements for igniting **[3]**

5/00 Exhaust or silencing apparatus combined or associated with devices profiting by exhaust energy (using kinetic or wave energy of exhaust gases in exhaust systems for charging F02B; predominant aspects of such devices, see the relevant classes for the devices)

5/02 . the devices using heat

5/04 . the devices using kinetic energy

9/00 Electrical control of exhaust gas treating apparatus (monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00; conjoint electrical control of two or more combustion engine functions F02D 43/00) **[4]**

11/00 Monitoring or diagnostic devices for exhaust-gas treatment apparatus [7]

13/00 Exhaust or silencing apparatus characterised by constructional features [2010.01]

13/02 . having two or more separate silencers in series **[2010.01]**

13/04 . having two or more silencers in parallel, e.g. having interconnections for multi-cylinder engines **[2010.01]**

13/06 . specially adapted for star-arrangement of cylinders, e.g. exhaust manifolds **[2010.01]**

13/08 . Other arrangements or adaptations of exhaust conduits **[2010.01]**

13/10 . . of exhaust manifolds **[2010.01]**

13/12 . specially adapted for submerged exhausting **[2010.01]**

13/14 . having thermal insulation **[2010.01]**

13/16 . Selection of particular materials **[2010.01]**

13/18 . Construction facilitating manufacture, assembly or disassembly **[2010.01]**

13/20 . having flared outlets, e.g. of fish-tail shape **[2010.01]**

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

F01P COOLING OF MACHINES OR ENGINES IN GENERAL; **COOLING OF INTERNAL-COMBUSTION ENGINES** (arrangements in connection with cooling of propulsion units in vehicles B60K 11/00; heat-transfer, heat-exchange or heat-storage materials C09K 5/00; heat-exchange in general, radiators F28)

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
- "air" also includes other gaseous cooling fluids;
- "liquid cooling" also includes cooling where liquid is used as the heat-transferring fluid between parts to be cooled and the air, e.g. using radiators;
- "air cooling" means direct air cooling and thus excludes indirect air cooling occurring in liquid cooling systems as explained under liquid cooling above;
- "cooling-air" includes directly- or indirectly-acting cooling-air.

(2) Attention is drawn to the Notes preceding class F01, especially as regards Note (3).

(3) Cooling by lubricant is classified in subclass F01M when the lubrication aspect predominates, and in subclass F01P when the cooling aspect predominates.

Air cooling; **Liquid cooling**

1/00 Air cooling (propelling cooling-air or liquid coolants F01P 5/00; controlling supply or circulation of coolants F01P 7/00)

1/02 . Arrangements for cooling cylinders or cylinder heads, e.g. ducting cooling-air from its pressure source to cylinders or along cylinders

1/04 . Arrangements for cooling pistons

1/06 . Arrangements for cooling other engine or machine parts

1/08 . . for cooling intake or exhaust valves

1/10 . . for cooling fuel injectors or sparking-plugs

3/00 Liquid cooling (propelling cooling-air or liquid coolants F01P 5/00; controlling supply or circulation of coolants F01P 7/00)

3/02 . Arrangements for cooling cylinders or cylinder heads

3/04 . . Liquid-to-air heat-exchangers combined with, or arranged on, cylinders or cylinder heads

3/06 . Arrangements for cooling pistons

3/08 . . Cooling of piston exterior only, e.g. by jets

3/10 . . Cooling by flow of coolant through pistons

3/12 . Arrangements for cooling other engine or machine parts

3/14 . . for cooling intake or exhaust valves

3/16 . . for cooling fuel injectors or sparking-plugs

3/18 . Arrangement or mounting of liquid-to-air heat-exchangers (such arrangements on cylinders or cylinder heads F01P 3/04; relative to vehicles B60K 11/04)

3/20 . Cooling circuits not specific to a single part of engine or machine (F01P 3/22 takes precedence)

3/22 . characterised by evaporation and condensation of coolant in closed cycles (other cooling by evaporation F01P 9/02); characterised by the coolant reaching higher temperatures than normal atmospheric boiling-point

Pumping cooling-air or liquid coolants; **Controlling circulation or supply of coolants**

5/00 **Pumping cooling-air or liquid coolants** (controlling circulation or supply of coolants by influencing drive of pumps F01P 7/00)

5/02 . Pumping cooling-air; Arrangements of cooling-air pumps, e.g. fans or blowers

5/04 . . Pump-driving arrangements

5/06 . . Guiding or ducting air to or from ducted fans

5/08 . . Use of engine exhaust gases for pumping cooling-air

5/10 . Pumping liquid coolant; Arrangements of coolant pumps

5/12 . . Pump-driving arrangements

5/14 . Safety means against, or active at, failure of coolant-pump drives, e.g. shutting engine down; Means for indicating functioning of coolant pumps

7/00 **Controlling of coolant flow**

7/02 . the coolant being cooling-air

7/04 . . by varying pump speed, e.g. by changing pump-drive gear ratio

7/06 . . by varying blade pitch

7/08 . . by cutting in or out of pumps

7/10 . . by throttling amount of air flowing through liquid-to-air heat-exchangers

7/12 . . . by thermostatic control

7/14 . the coolant being liquid

7/16 . . by thermostatic control

9/00 **Cooling having pertinent characteristics not provided for in, or of interest apart from, groups F01P 1/00 to F01P 7/00** (profiting from waste heat of combustion-engine cooling F02G 5/00)

9/02 . Cooling by evaporation, e.g. by spraying water on to cylinders (evaporation and condensation of liquid coolant in closed cycles F01P 3/22)

9/04 . by simultaneous or alternative use of direct air cooling and liquid cooling (F01P 9/02 takes precedence)

9/06 . by use of refrigerating apparatus, e.g. of compressor or absorber type

11/00 **Component parts, details, or accessories, not provided for in, or of interest apart from, groups F01P 1/00 to F01P 9/00**

11/02 . Liquid-coolant overflow, venting, or draining devices (automatic draining during freezing conditions F01P 11/20)

11/04 . Arrangements of liquid pipes or hoses

11/06 . Cleaning (in general B08B); Combating corrosion (in general C23F)

11/08 . Arrangements of lubricant coolers (in lubrication apparatus F01M)

11/10 . Guiding or ducting cooling-air to or from liquid-to-air heat-exchangers

11/12 . Filtering, cooling, or silencing cooling-air

11/14 . Indicating devices; Other safety devices

11/16 . . concerning coolant temperature (F01P 11/20 takes precedence)

11/18 . . concerning coolant pressure, coolant flow, or liquid-coolant level

11/20 . . concerning atmospheric freezing conditions, e.g. automatically draining or heating during frosty weather

F02 COMBUSTION ENGINES; HOT-GAS OR COMBUSTION-PRODUCT ENGINE PLANTS

F02B **INTERNAL-COMBUSTION PISTON ENGINES**; **COMBUSTION ENGINES IN GENERAL** (cyclically operating valves therefor F01L; lubricating internal-combustion engines F01M; gas-flow silencers or exhaust apparatus therefor F01N; cooling of internal-combustion engines F01P; internal-combustion turbines F02C; plants in which engines use combustion products F02C, F02G)

(1) In this subclass, the following terms or expression are used with the meanings indicated:
- "positive ignition" means ignition by a source external to the working fluid, e.g. by spark or incandescent source;
- "charging" means forcing air or fuel-air mixture into engine cylinders, and thus includes supercharging;
- "scavenging" means forcing the combustion residues from the cylinders other than by movement of the working pistons, and thus includes tuned exhaust systems.

(2) Attention is drawn to the Notes preceding class F01, especially as regards Note (1).

(3) Engines with specified cycles or number of cylinders are classified in group F02B 75/02 or F02B 75/16, unless other classifying features predominate.

Subclass index

Engines characterised by the working fluid to be compressed or characterised by the type of ignition

1/00 **Engines characterised by fuel-air mixture compression** (characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition F02B 11/00; characterised by precombustion chambers F02B 19/00; characterised by air-storage chambers F02B 21/00; characterised by special shape or construction of combustion chambers F02B 23/00)

1/02 . with positive ignition (with non-timed positive ignition F02B 9/06)

1/04 . . with fuel-air mixture admission into cylinder

1/06 . . . Methods of operating

1/08 . . with separate admission of air and fuel into cylinder

1/10 . . . Methods of operating

1/12 . with compression ignition (with fuel-air charge ignited by compression ignition of an additional fuel F02B 7/00)

1/14 . . Methods of operating

3/00 **Engines characterised by air compression and subsequent fuel addition** (characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition F02B 11/00; characterised by precombustion chambers F02B 19/00; characterised by air-storage chambers F02B 21/00; characterised by special shape or construction of combustion chambers F02B 23/00)

3/02 . with positive ignition (with non-timed positive ignition F02B 9/06)

3/04 . . Methods of operating

3/06 . with compression ignition (F02B 13/02 takes precedence; with fuel-air charge ignited by compression ignition of an additional fuel F02B 7/00)

3/08 . . Methods of operating (F02B 3/12 takes precedence)
3/10 . . with intermittent fuel introduction
3/12 . . . Methods of operating

5/00 Engines characterised by positive ignition (F02B 1/02, F02B 3/02 take precedence; with non-timed positive ignition F02B 9/06; characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition F02B 11/00; characterised by precombustion chambers F02B 19/00; characterised by air-storage chambers F02B 21/00; characterised by special shape or construction of combustion chambers F02B 23/00)
5/02 . Methods of operating

7/00 Engines characterised by the fuel-air charge being ignited by compression ignition of an additional fuel (characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition F02B 11/00; characterised by precombustion chambers F02B 19/00; characterised by air-storage chambers F02B 21/00; characterised by special shape or construction of combustion chambers F02B 23/00)
7/02 . the fuel in the charge being liquid
7/04 . . Methods of operating
7/06 . the fuel in the charge being gaseous
7/08 . . Methods of operating

9/00 Engines characterised by other types of ignition (characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition F02B 11/00; characterised by precombustion chambers F02B 19/00; characterised by air-storage chambers F02B 21/00; characterised by special shape or construction of combustion chambers F02B 23/00)
9/02 . with compression ignition (F02B 1/12, F02B 3/06 take precedence)
9/04 . . Methods of operating
9/06 . with non-timed positive ignition, e.g. with hot-spots
9/08 . . with incandescent chambers
9/10 . . . Chamber shapes or constructions

11/00 Engines characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition, e.g. in different cylinders (characterised by precombustion chambers F02B 19/00; characterised by air-storage chambers F02B 21/00; characterised by special shape or construction of combustion chambers F02B 23/00)
11/02 . convertible from fuel-air mixture compression to air compression or vice versa

Engines characterised by the method of introducing liquid fuel into cylinders

13/00 Engines characterised by the introduction of liquid fuel into cylinders by use of auxiliary fluid
13/02 . Compression ignition engines using air or gas for blowing fuel into compressed air in cylinder
13/04 . . Arrangements or adaptations of pumps
13/06 . Engines having secondary air mixed with fuel in pump, compressed therein without ignition, and fuel-air mixture being injected into air in cylinder
13/08 . . Arrangements or adaptations of pumps
13/10 . Use of specific auxiliary fluids, e.g. steam, combustion gas

15/00 Engines characterised by the method of introducing liquid fuel into cylinders and not otherwise provided for
15/02 . having means for sucking fuel directly into cylinder

17/00 Engines characterised by means for effecting stratification of charge in cylinders

Engines characterised by precombustion chambers or air-storage chambers, or characterised by special shape or construction of combustion chambers to improve operation

19/00 Engines characterised by precombustion chambers (engines with incandescent chambers F02B 9/08)
19/02 . the chamber being periodically isolated from its cylinder
19/04 . . the isolation being effected by a protuberance on piston or cylinder head
19/06 . with auxiliary piston in chamber for transferring ignited charge to cylinder space
19/08 . the chamber being of air-swirl type
19/10 . with fuel introduced partly into pre-combustion chamber, and partly into cylinder (F02B 19/02 to F02B 19/08 take precedence)
19/12 . with positive ignition (F02B 19/02 to F02B 19/10 take precedence)
19/14 . with compression ignition (F02B 19/02 to F02B 19/10 take precedence)
19/16 . Chamber shapes or constructions not specific to groups F02B 19/02 to F02B 19/10
19/18 . . Transfer passages between chamber and cylinder

21/00 Engines characterised by air-storage chambers
21/02 . Chamber shapes or constructions

23/00 Other engines characterised by special shape or construction of combustion chambers to improve operation (engines with incandescent chambers F02B 9/08)
23/02 . with compression ignition
23/04 . . the combustion space being subdivided into two or more chambers (with pre-combustion chambers F02B 19/00)
23/06 . . the combustion space being arranged in working piston (F02B 23/04 takes precedence)
23/08 . with positive ignition
23/10 . . with separate admission of air and fuel into cylinder

Engines characterised by provision for charging or scavenging

25/00 Engines characterised by using fresh charge for scavenging cylinders (aspects characterised by provision of driven charging or scavenging pumps F02B 33/00 to F02B 39/00)
25/02 . using unidirectional scavenging
25/04 . . Engines having ports both in cylinder head and in cylinder wall near bottom of piston stroke
25/06 . . . the cylinder-head ports being controlled by working pistons, e.g. by sleeve-shaped extensions thereof
25/08 . . Engines with oppositely-moving reciprocating working pistons
25/10 . . . with one piston having a smaller diameter or shorter stroke than the other
25/12 . . Engines with U-shaped cylinders, having ports in each arm

25/14 . using reverse-flow scavenging, e.g. with both inlet and outlet ports arranged near bottom of piston stroke

25/16 . . the charge flowing upward essentially along cylinder wall opposite the inlet ports

25/18 . . the charge flowing upward essentially along cylinder wall adjacent the inlet ports, e.g. by means of deflection rib on piston

25/20 . Means for reducing the mixing of charge and combustion residues or for preventing escape of fresh charge through outlet ports, not provided for in, or of interest apart from, groups F02B 25/02 to F02B 25/18

25/22 . . by forming air cushion between charge and combustion residues

25/24 . . Inlet or outlet openings being timed asymmetrically relative to bottom dead-centre

25/26 . Multi-cylinder engines other than those provided for in, or of interest apart from, groups F02B 25/02 to F02B 25/24 (internal-combustion aspects of rotary engines with movable cylinders F02B 57/00)

25/28 . . with V-, fan-, or star-arrangement of cylinders

27/00 Use of kinetic or wave energy of charge in induction systems, or of combustion residues in exhaust systems, for improving quantity of charge or for increasing removal of combustion residues (aspects characterised by provision of driven charging or scavenging pumps F02B 33/00 to F02B 39/00, e.g. use of driven apparatus for immediate conversion of combustion gas pressure into pressure of fresh charge F02B 33/42)

27/02 . the systems having variable, i.e. adjustable, cross-sectional areas, chambers of variable volume, or like variable means (in exhaust systems only F02B 27/06)

27/04 . in exhaust systems only, e.g. for sucking-off combustion gases

27/06 . . the systems having variable, i.e. adjustable, cross-sectional areas, chambers of variable volume, or like variable means

29/00 Engines characterised by provision for charging or scavenging not provided for in groups F02B 25/00, F02B 27/00 or F02B 33/00 to F02B 39/00; Details thereof

29/02 . Other fluid-dynamic features of induction systems for improving quantity of charge (for also imparting a rotation to the charge in the cylinder F02B 31/00; structural features of induction systems F02M)

29/04 . Cooling of air intake supply

29/06 . After-charging, i.e. supplementary charging after scavenging

29/08 . Modifying distribution valve timing for charging purposes (F02B 29/06 takes precedence; valve-gear therefor F01L)

31/00 Modifying induction systems for imparting a rotation to the charge in the cylinder (structural features of induction systems F02M)

31/02 . in engines having inlet valves arranged eccentrically to cylinder axis (F02B 31/08 takes precedence) **[6]**

31/04 . by means within the induction channel, e.g. deflectors **[6]**

31/06 . . Movable means, e.g. butterfly valves **[6]**

31/08 . having multiple air inlets **[6]**

Engines characterised by provision of driven charging or scavenging pumps

33/00 Engines characterised by provision of pumps for charging or scavenging (characterised by the introduction of liquid fuel into cylinders by use of auxiliary fluid F02B 13/00; characterised by after-charging F02B 29/06; characterised by provision of pumps for sucking combustion residues from cylinders F02B 35/00; characterised by provision of exhaust-driven pumps F02B 37/00)

33/02 . Engines with reciprocating-piston pumps; Engines with crankcase pumps

33/04 . . with simple crankcase pumps, i.e. with the rear face of a non-stepped working piston acting as sole pumping member in co-operation with the crankcase

33/06 . . with reciprocating-piston pumps other than simple crankcase pumps

33/08 . . . with the working-cylinder head arranged between working and pumping cylinders

33/10 . . . with the pumping cylinder situated between working cylinder and crankcase, or with the pumping cylinder surrounding working cylinder

33/12 . . . . the rear face of working piston acting as pumping member and co-operating with a pumping chamber isolated from crankcase, the connecting-rod passing through the chamber and co-operating with movable isolating member

33/14 . . . . working and pumping pistons forming stepped piston

33/16 . . . . working and pumping pistons having differing movements

33/18 . . . with crankshaft being arranged between working and pumping cylinders

33/20 . . . with pumping-cylinder axis arranged at an angle to working-cylinder axis, e.g. at an angle of 90°

33/22 . . . with pumping cylinder situated at side of working cylinder, e.g. the cylinders being parallel

33/24 . . with crankcase pumps other than with reciprocating pistons only

33/26 . . Four-stroke engines characterised by having crankcase pumps

33/28 . . Component parts, details, or accessories of crankcase pumps not provided for in, or of interest apart from, groups F02B 33/02 to F02B 33/26

33/30 . . . Control of inlet or outlet ports (controlling only working-cylinder inlets F01L)

33/32 . Engines with pumps other than of reciprocating-piston type (with crankcase pumps F02B 33/02)

33/34 . . with rotary pumps (with cell-type pressure exchangers or the like F02B 33/42)

33/36 . . . of positive-displacement type

33/38 . . . . of Roots type

33/40 . . . of non-positive-displacement type

33/42 . . with driven apparatus for immediate conversion of combustion gas pressure into pressure of fresh charge, e.g. with cell-type pressure exchangers (pressure exchangers per se F04F 13/00)

33/44 . Passages conducting the charge from the pump to the engine inlet, e.g. reservoirs (cooling of charge after leaving pump F02B 29/04)

35/00 Engines characterised by provision of pumps for sucking combustion residues from cylinders

35/02 . using rotary pumps

37/00 Engines characterised by provision of pumps driven at least for part of the time by exhaust (characterised by the introduction of liquid fuel into cylinders by use of auxiliary fluid F02B 13/00; characterised by after-charging F02B 29/06; characterised by passages conducting the charge from the pump to the engine inlet F02B 33/44)

37/007 . with exhaust-driven pumps arranged in parallel **[6]**
37/013 . with exhaust-driven pumps arranged in series **[6]**
37/02 . Gas passages between engine outlet and pump drive, e.g. reservoirs
37/04 . Engines with exhaust drive and other drive of pumps, e.g. with exhaust-driven pump and mechanically-driven second pump
37/10 . . at least one pump being alternately driven by exhaust and other drive **[3]**
37/11 . . . driven by other drive at starting only **[6]**
37/12 . Control of the pumps **[3]**
37/14 . . of the alternation between exhaust drive and other drive of a pump, e.g. dependent on speed **[3]**
37/16 . . by bypassing charging air **[6]**
37/18 . . by bypassing exhaust **[6]**
37/20 . . by increasing exhaust energy, e.g. using combustion chambers **[6]**
37/22 . . by varying the cross-section of exhaust passages or air passages **[6]**
37/24 . . by using pumps or turbines with adjustable guide vanes **[6]**

39/00 Component parts, details, or accessories relating to driven charging or scavenging pumps, not provided for in groups F02B 33/00 to F02B 37/00

39/02 . Drives of pumps (exhaust drives or combined exhaust and other drives F02B 37/00); Varying pump drive gear ratio (control acting both on engine and on pump drive gear ratio F02D)
39/04 . . Mechanical drives; Variable-gear-ratio drives (non-mechanical pump drives having variable gear ratio F02B 39/08)
39/06 . . . the engine torque being divided by a differential gear for driving a pump and the engine output shaft
39/08 . . Non-mechanical drives, e.g. fluid drives having variable gear ratio
39/10 . . . electric
39/12 . . Drives characterised by use of couplings or clutches therein (using fluid slip couplings for varying gear ratio F02B 39/08)
39/14 . Lubrication of pumps; Safety measures therefor
39/16 . Other safety measures for, or other control of, pumps

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41/00 Engines characterised by special means for improving conversion of heat or pressure energy into mechanical power

41/02 . Engines with prolonged expansion
41/04 . . in main cylinders
41/06 . . in compound cylinders
41/08 . . . Two-stroke compound engines
41/10 . . using exhaust turbines (use of exhaust turbines for charging F02B 37/00; turbine constructions F01D; gas-turbine plants F02C)

Engines operating on non-liquid fuels; Plants including such engines, i.e. combinations of the engine with fuel-generating apparatus

43/00 Engines characterised by operating on gaseous fuels; Plants including such engines (engines characterised by the gas-air charge being ignited by compression ignition of an additional fuel F02B 7/06; engines convertible from gas to other fuel consumption F02B 69/04)

43/02 . Engines characterised by means for increasing operating efficiency
43/04 . . for improving efficiency of combustion
43/06 . . for enlarging charge
43/08 . Plants characterised by the engines using gaseous fuel generated in the plant from solid fuel, e.g. wood
43/10 . Engines or plants characterised by use of other specific gases, e.g. acetylene, oxyhydrogen
43/12 . . Methods of operating

45/00 Engines characterised by operating on non-liquid fuels other than gas; Plants including such engines (plants involving generation of gaseous fuel from solid fuel F02B 43/08; engines convertible from gas to other fuel consumption F02B 69/04)

45/02 . operating on powdered fuel, e.g. powdered coal (operating on fuel containing oxidant F02B 45/06)
45/04 . . Plants, e.g. having coal-grinding apparatus
45/06 . operating on fuel containing oxidant
45/08 . operating on other solid fuels
45/10 . operating on mixtures of liquid and non-liquid fuels, e.g. in pasty or foamed state

Methods of operating engines involving specific pre-treating of, or adding specific substances to, combustion air, fuel or fuel-air mixture of the engines, and not otherwise provided for

47/00 Methods of operating engines involving adding non-fuel substances or anti-knock agents to combustion air, fuel, or fuel-air mixtures of engines

47/02 . the substances being water or steam
47/04 . the substances being other than water or steam only
47/06 . . the substances including non-airborne oxygen (F02B 47/10 takes precedence)
47/08 . . the substances including exhaust gas
47/10 . . . Circulation of exhaust gas in closed or semi-closed circuits, e.g. with simultaneous addition of oxygen

49/00 Methods of operating air-compressing compression-ignition engines involving introduction of small quantities of fuel in the form of a fine mist into the air in the engine's intake

51/00 Other methods of operating engines involving pre-treating of, or adding substances to, combustion air, fuel, or fuel-air mixture of the engines

51/02 . involving catalysts
51/04 . involving electricity or magnetism
51/06 . involving rays or sound waves

Internal-combustion aspects of rotary-piston or oscillating-piston engines

53/00 Internal-combustion aspects of rotary-piston or oscillating-piston engines (internal-combustion aspects of rotary pistons or outer members for co-operation therewith F02B 55/00)

53/02 . Methods of operating

53/04 . Charge admission or combustion-gas discharge
53/06 . . Valve control therefor
53/08 . . Charging, e.g. by means of rotary-piston pump
53/10 . Fuel supply; Introducing fuel to combustion space
53/12 . Ignition
53/14 . Adaptations of engines for driving, or engine combinations with, other devices (aspects predominantly concerning such devices, see the relevant classes for the devices)

55/00 Internal-combustion aspects of rotary pistons; **Outer members for co-operation with rotary pistons**
55/02 . Pistons
55/04 . . Cooling thereof
55/06 . . . by air or other gas
55/08 . Outer members for co-operation with rotary pistons; Casings
55/10 . . Cooling thereof
55/12 . . . by air or other gas
55/14 . Shapes or constructions of combustion chambers
55/16 . Admission or exhaust passages in pistons or outer members

Internal-combustion aspects of reciprocating-piston engines with movable cylinders

57/00 Internal-combustion aspects of rotary engines in which the combusted gases displace one or more reciprocating pistons
57/02 . Fuel or combustion-air supply (cylinder-charge admission or exhaust control F02B 57/04)
57/04 . Control of cylinder-charge admission or exhaust (peculiar to two-stroke engines or to other engines with working-piston-controlled charge admission or exhaust F02B 57/06)
57/06 . Two-stroke engines or other engines with working-piston-controlled cylinder-charge admission or exhaust (with combustion space in centre of star F02B 57/10)
57/08 . Engines with star-shaped cylinder arrangements
57/10 . . with combustion space in centre of star

59/00 Internal-combustion aspects of other reciprocating-piston engines with movable, e.g. oscillating, cylinders (with yieldable walls F02B 75/38)

Adaptations of engines for special use; **Combinations of engines with devices other than engine parts or auxiliaries**

61/00 Adaptations of engines for driving vehicles or for driving propellers; **Combinations of engines with gearing** (the engine torque being divided by a differential gear for driving a scavenging or charging pump and the engine output shaft F02B 39/06; adaptations or combinations of rotary-piston or oscillating-piston engines F02B 53/14; arrangements in vehicles, see the relevant classes for vehicles)
61/02 . for driving cycles
61/04 . for driving propellers
61/06 . Combinations of engines with mechanical gearing (F02B 61/02, F02B 61/04 take precedence)

63/00 Adaptations of engines for driving pumps, hand-held tools or electric generators; **Portable combinations of engines with engine-driven devices** (of rotary-piston or oscillating-piston engines F02B 53/14)
63/02 . for hand-held tools
63/04 . for electric generators
63/06 . for pumps

65/00 Adaptations of engines for special uses not provided for in groups F02B 61/00 or F02B 63/00; **Combinations of engines with other devices, e.g. with non-driven apparatus** (of rotary-piston or oscillating-piston engines F02B 53/14; combinations of prime-movers consisting of electric motors and internal combustion engines for mutual or common propulsion B60K 6/20)

Engines with pertinent characteristics other than those provided for in, or of interest apart from, preceding main groups

67/00 Engines characterised by the arrangement of auxiliary apparatus not being otherwise provided for, e.g. the apparatus having different functions; **Driving auxiliary apparatus from engines, not otherwise provided for**
67/04 . of mechanically-driven auxiliary apparatus
67/06 . . driven by means of chains, belts, or like endless members
67/08 . of non-mechanically driven auxiliary apparatus
67/10 . of charging or scavenging apparatus **[5]**

69/00 Internal-combustion engines convertible into other combustion-engine type, not provided for in group F02B 11/00; **Internal-combustion engines of different types characterised by constructions facilitating use of same main engine-parts in different types**
69/02 . for different fuel types, other than engines indifferent to fuel consumed, e.g. convertible from light to heavy fuel
69/04 . . for gaseous and non-gaseous fuels
69/06 . for different cycles, e.g. convertible from two-stroke to four-stroke

71/00 Free-piston engines; **Engines without rotary main shaft**
71/02 . Starting
71/04 . Adaptations of such engines for special use; Combinations of such engines with apparatus driven thereby (aspects predominantly concerning driven apparatus, see the relevant classes for such apparatus)
71/06 . . Free-piston combustion gas generators

73/00 Combinations of two or more engines, not otherwise provided for

75/00 Other engines, e.g. single-cylinder engines
75/02 . Engines characterised by their cycles, e.g. six-stroke
75/04 . Engines with variable distances between pistons at top dead-centre positions and cylinder heads
75/06 . Engines with means for equalising torque (compensations of inertial forces, suppression of vibration in systems F16F)
75/08 . Engines with means for preventing corrosion in gas-swept spaces
75/10 . Engines with means for rendering exhaust gases innocuous (apparatus for rendering exhaust gases innocuous per se F01N 3/08)
75/12 . Other methods of operation
75/16 . Engines characterised by number of cylinders, e.g. single-cylinder engines (F02B 75/26 takes precedence)
75/18 . . Multi-cylinder engines (scavenging aspects F02B 25/00)
75/20 . . . with cylinders all in one line
75/22 . . . with cylinders in V-, fan-, or star-arrangement

75/24 . . . with cylinders arranged oppositely relative to main shaft and of "flat" type
75/26 . Engines with cylinder axes coaxial with, or parallel or inclined to, main-shaft axis; Engines with cylinder axes arranged substantially tangentially to a circle centred on main-shaft axis
75/28 . Engines with two or more pistons reciprocating within same cylinder or within essentially coaxial cylinders (arranged oppositely relative to main shaft F02B 75/24)
75/30 . . with one working piston sliding inside another
75/32 . Engines characterised by connections between pistons and main shafts and not specific to preceding main groups
75/34 . Ultra-small engines, e.g. for driving models
75/36 . Engines with parts of combustion- or working-chamber walls resiliently yielding under pressure
75/38 . . Reciprocating-piston engines (F02B 75/04 takes precedence; with resiliently-urged auxiliary piston in pre-combustion chamber F02B 19/06)
75/40 . Other reciprocating-piston engines

77/00 Component parts, details, or accessories, not otherwise provided for
77/02 . Surface coverings of combustion-gas-swept parts (of pistons or cylinders only F02F)
77/04 . Cleaning of, preventing corrosion or erosion in, or preventing unwanted deposits in, combustion engines
77/08 . Safety, indicating, or supervising devices (thermal insulation F02B 77/11; monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00)
77/10 . . Safety means relating to crankcase explosions
77/11 . Thermal or acoustic insulation **[3]**
77/13 . . Acoustic insulation **[3]**
77/14 . Engine-driven auxiliary devices combined into units

79/00 Running-in of internal-combustion engines (lubrication thereof F01M)

F02C GAS-TURBINE PLANTS; **AIR INTAKES FOR JET-PROPULSION PLANTS**; **CONTROLLING FUEL SUPPLY IN AIR-BREATHING JET-PROPULSION PLANTS** (construction of turbines F01D; jet-propulsion plants F02K; construction of compressors or fans F04; combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles F23C 10/00; generating combustion products of high pressure or high velocity F23R; using gas turbines in compression refrigeration plants F25B 11/00; using gas-turbine plants in vehicles, see the relevant vehicle classes)

(1) This subclass covers:
– combustion product or hot gas turbine plants;
– internal combustion turbines or turbine plants;
– turbine plants in which the working fluid is an unheated, pressurised gas.
(2) This subclass does not cover:
– steam turbine plants, which are covered by subclass F01K;
– special vapour plants, which are covered by subclass F01K.
(3) In this subclass, the following expression is used with the meaning indicated:
– "gas-turbine plants" covers all the subject matter of Note (1) above and covers also features of jet-propulsion plants common to gas-turbine plants.
(4) Attention is drawn to the Notes preceding class F01.

1/00 Gas-turbine plants characterised by the use of hot gases or unheated pressurised gases, as the working fluid (by the use of combustion products F02C 3/00, F02C 5/00) **[3]**
1/02 . the working fluid being an unheated pressurised gas **[3]**
1/04 . the working fluid being heated indirectly **[3]**
1/05 . . characterised by the type or source of heat, e.g. using nuclear or solar energy **[3]**
1/06 . . . using reheated exhaust gas (F02C 1/08 takes precedence) **[3]**
1/08 . . Semi-closed cycles **[3]**
1/10 . . Closed cycles **[3]**

3/00 Gas-turbine plants characterised by the use of combustion products as the working fluid (generated by intermittent combustion F02C 5/00)
3/02 . using exhaust-gas pressure in a pressure exchanger to compress combustion-air (pressure exchangers per se F04F 13/00)
3/04 . having a turbine driving a compressor (power transmission arrangements F02C 7/36; control of working fluid flow F02C 9/16) **[5]**
3/045 . . having compressor and turbine passages in a single rotor (F02C 3/073 takes precedence) **[3]**
3/05 . . . the compressor and the turbine being of the radial flow type **[3]**
3/055 . . the compressor being of the positive-displacement type **[3]**
3/06 . . the compressor comprising only axial stages (F02C 3/10 takes precedence) **[3]**
3/067 . . . having counter-rotating rotors (F02C 3/073 takes precedence) **[3]**
3/073 . . . the compressor and turbine stages being concentric **[3]**
3/08 . . the compressor comprising at least one radial stage (F02C 3/10 takes precedence) **[3]**
3/09 . . . of the centripetal type **[3]**
3/10 . . with another turbine driving an output shaft but not driving the compressor

3/107 . . with two or more rotors connected by power transmission **[5]**

3/113 . . . with variable power transmission between rotors **[5]**

3/13 . . having variable working fluid interconnections between turbines or compressors or stages of different rotors **[5]**

3/14 . characterised by the arrangement of the combustion chamber in the plant (combustion chambers per se F23R) **[3]**

3/16 . . the combustion chambers being formed at least partly in the turbine rotor

3/20 . using a special fuel, oxidant, or dilution fluid to generate the combustion products **[3]**

3/22 . . the fuel or oxidant being gaseous at standard temperature and pressure (F02C 3/28 takes precedence) **[3]**

3/24 . . the fuel or oxidant being liquid at standard temperature and pressure **[3]**

3/26 . . the fuel or oxidant being solid or pulverulent, e.g. in slurry or suspension

3/28 . . . using a separate gas producer for gasifying the fuel before combustion **[3]**

3/30 . . Adding water, steam or other fluids to the combustible ingredients or to the working fluid before discharge from the turbine (heating of air intakes to prevent icing F02C 7/047) **[3]**

3/32 . Inducing air flow by fluid jet, e.g. ejector action **[3]**

3/34 . with recycling of part of the working fluid, i.e. semi-closed cycles with combustion products in the closed part of the cycle **[3]**

3/36 . Open cycles **[3]**

5/00 Gas-turbine plants characterised by the working fluid being generated by intermittent combustion

5/02 . characterised by the arrangement of the combustion chamber in the plant (combustion chambers per se F23R) **[3]**

5/04 . . the combustion chambers being formed at least partly in the turbine rotor

5/06 . the working fluid being generated in an internal-combustion gas generator of the positive-displacement type having essentially no mechanical power output (internal-combustion engines with prolonged expansion using exhaust gas turbines F02B)

5/08 . . the gas generator being of the free-piston type

5/10 . the working fluid forming a resonating or oscillating gas column, i.e. the combustion chambers having no positively actuated valves, e.g. using Helmholtz effect **[3]**

5/11 . . using valveless combustion chambers **[3]**

5/12 . the combustion chambers having inlet or outlet valves, e.g. Holzwarth gas-turbine plants

6/00 Plural gas-turbine plants; **Combinations of gas-turbine plants with other apparatus** (aspects predominantly concerning such apparatus, see the relevant classes for the apparatus); **Adaptations of gas-turbine plants for special use [3]**

6/02 . Plural gas-turbine plants having a common power output **[3]**

6/04 . Gas-turbine plants providing heated or pressurised working fluid for other apparatus, e.g. without mechanical power output (F02C 6/18 takes precedence) **[3]**

6/06 . . providing compressed gas (F02C 6/10 takes precedence) **[3]**

6/08 . . . the gas being bled from the gas-turbine compressor **[3]**

6/10 . . supplying working fluid to a user, e.g. a chemical process, which returns working fluid to a turbine of the plant **[3]**

6/12 . . . Turbochargers, i.e. plants for augmenting mechanical power output of internal-combustion piston engines by increase of charge pressure **[3]**

6/14 . Gas-turbine plants having means for storing energy, e.g. for meeting peak loads **[3]**

6/16 . . for storing compressed air **[3]**

6/18 . using the waste heat of gas-turbine plants outside the plants themselves, e.g. gas-turbine power heat plants (using waste heat as source of energy for refrigeration plants F25B 27/02) **[3]**

6/20 . Adaptations of gas-turbine plants for driving vehicles **[3]**

7/00 Features, component parts, details or accessories, not provided for in, or of interest apart from, groups F02C 1/00 to F02C 6/00; **Air intakes for jet-propulsion plants** (controlling F02C 9/00) **[3]**

7/04 . Air intakes for gas-turbine plants or jet-propulsion plants **[3]**

7/042 . . having variable geometry **[3]**

7/045 . . having provisions for noise suppression **[3]**

7/047 . . Heating to prevent icing **[3]**

7/05 . . having provisions for obviating the penetration of damaging objects or particles **[3]**

7/052 . . . with dust-separation devices **[3]**

7/055 . . . with intake grids, screens or guards **[3]**

7/057 . . Control or regulation (conjointly with fuel supply control F02C 9/50, with nozzle area control F02K 1/16) **[3]**

7/06 . Arrangement of bearings (bearings F16C); Lubricating (of engines in general F01M) **[3]**

7/08 . Heating air supply before combustion, e.g. by exhaust gases

7/10 . . by means of regenerative heat-exchangers

7/105 . . . of the rotary type (rotary heat exchangers per se F28D) **[3]**

7/12 . Cooling of plants (of component parts, see the relevant subclasses, e.g. F01D; cooling of engines in general F01P)

7/14 . . of fluids in the plant

7/141 . . . of working fluid (F02C 3/30 takes precedence) **[3]**

7/143 . . . . before or between the compressor stages **[3]**

7/16 . . characterised by cooling medium

7/18 . . . the medium being gaseous, e.g. air

7/20 . Mounting or supporting of plant; Accommodating heat expansion or creep

7/22 . Fuel supply systems

7/224 . . Heating fuel before feeding to the burner **[3]**

7/228 . . Dividing fuel between various burners **[3]**

7/232 . . Fuel valves; Draining valves or systems (valves in general F16K) **[3]**

7/236 . . Fuel delivery systems comprising two or more pumps **[3]**

7/24 . Heat or noise insulation (air intakes having provisions for noise suppression F02C 7/045; turbine exhaust heads, chambers, or the like F01D 25/30; silencing nozzles of jet-propulsion plants F02K 1/00) **[3]**

7/25 . . Fire protection or prevention (in general A62) **[3]**

7/26 . Starting; Ignition

7/262 . . Restarting after flame-out **[3]**
7/264 . . Ignition **[3]**
7/266 . . . Electric (sparking plugs H01T) **[3]**
7/268 . . Starting drives for the rotor **[3]**
7/27 . . . Fluid drives (turbine starters F02C 7/277) **[3]**
7/272 . . . . generated by cartridges **[3]**
7/275 . . . Mechanical drives **[3]**
7/277 . . . . the starter being a turbine **[3]**
7/28 . Arrangement of seals
7/30 . Preventing corrosion in gas-swept spaces
7/32 . Arrangement, mounting, or driving, of auxiliaries
7/36 . Power transmission between the different shafts of the gas-turbine plant, or between the gas-turbine plant and the power user (F02C 7/32 takes precedence; couplings for transmitting rotation F16D; gearing in general F16H) **[3]**

9/00 Controlling gas-turbine plants; **Controlling fuel supply in air-breathing jet-propulsion plants** (controlling air intakes F02C 7/057; controlling turbines F01D; controlling compressors F04D 27/00) **[3]**

9/16 . Control of working fluid flow (F02C 9/48 takes precedence; control of air-intake flow F02C 7/057) **[3]**
9/18 . . by bleeding, by-passing or acting on variable working fluid interconnections between turbines or compressors or their stages **[3,5]**
9/20 . . by throttling; by adjusting vanes **[3]**
9/22 . . . by adjusting turbine vanes **[3]**
9/24 . . Control of the pressure level in closed cycles **[3]**
9/26 . Control of fuel supply (F02C 9/48 takes precedence; fuel valves F02C 7/232) **[3]**
9/28 . . Regulating systems responsive to plant or ambient parameters, e.g. temperature, pressure, rotor speed (F02C 9/30 to F02C 9/38, F02C 9/44 take precedence) **[3]**
9/30 . . characterised by variable fuel pump output **[3]**
9/32 . . characterised by throttling of fuel (F02C 9/38 takes precedence) **[3]**
9/34 . . . Joint control of separate flows to main and auxiliary burners **[3]**
9/36 . . characterised by returning of fuel to sump (F02C 9/38 takes precedence) **[3]**
9/38 . . characterised by throttling and returning of fuel to sump **[3]**
9/40 . . specially adapted to the use of a special fuel or a plurality of fuels **[3]**
9/42 . . specially adapted for the control of two or more plants simultaneously **[3]**
9/44 . . responsive to the speed of aircraft, e.g. Mach number control, optimisation of fuel consumption **[3]**
9/46 . . Emergency fuel control **[3]**
9/48 . Control of fuel supply conjointly with another control of the plant (with nozzle section control F02K 1/17) **[3]**
9/50 . . with control of working fluid flow **[3]**
9/52 . . . by bleeding or by-passing the working fluid **[3]**
9/54 . . . by throttling the working fluid, by adjusting vanes **[3]**
9/56 . . with power transmission control **[3]**
9/58 . . . with control of a variable-pitch propeller **[3]**

F02D CONTROLLING COMBUSTION ENGINES (vehicle fittings, acting on a single sub-unit only, for automatically controlling vehicle speed B60K 31/00; conjoint control of vehicle sub-units of different type or different function, road vehicle drive control systems for purposes other than the control of a single sub-unit B60W; cyclically operating valves for combustion engines F01L; controlling combustion engine lubrication F01M; cooling internal-combustion engines F01P; supplying combustion engines with combustible mixtures or constituents thereof, e.g. carburettors, injection pumps, F02M; starting of combustion engines F02N; controlling of ignition F02P; controlling gas-turbine plants, jet-propulsion plants, or combustion-product engine plants, see the relevant subclasses for these plants) **[4,8]**

(1) In this subclass, the following term or expression is used with the meanings indicated:
– "fuel injection" means the introduction of a combustible substance into a space, e.g. cylinder, by means of a pressure source, e.g. a pump, continuously or cyclically acting behind the substance;
– "supercharging" means supplying to the working space, e.g. cylinder, combustion-air pressurised by means of a pressure source, e.g. a pump.
(2) Attention is drawn to the Notes preceding class F01.
(3) In this subclass, electrical aspects of control arrangements are classified in groups F02D 41/00 to F02D 45/00. **[4]**

Subclass index

Controlling, e.g. regulating, fuel injection

1/00 **Controlling fuel-injection pumps, e.g. of high-pressure injection type** (F02D 3/00 takes precedence) **[2]**
1/02 . not restricted to adjustment of injection timing, e.g. varying amount of fuel delivered
1/04 . . by mechanical means dependent on engine speed, e.g. using centrifugal governors (F02D 1/08 takes precedence)
1/06 . . by means dependent on pressure of engine working fluid (F02D 1/08 takes precedence)
1/08 . . Transmission of control impulse to pump control, e.g. with power drive or power assistance
1/10 . . . mechanical
1/12 . . . non-mechanical, e.g. hydraulic
1/14 . . . . pneumatic
1/16 . Adjustment of injection timing (F02D 1/02 takes precedence)
1/18 . . with non-mechanical means for transmitting control impulse; with amplification of control impulse

3/00 **Controlling low-pressure fuel injection, i.e. where the air-fuel mixture containing fuel thus injected will be substantially compressed by the compression stroke of the engine, by means other than controlling only an injection pump** (carburettors F02M) **[2]**

Note

When the control apparatus or system forms part of the low-pressure fuel-injection apparatus it is classified in group F02M 69/00. **[5]**

3/02 . with continuous injection or continuous flow upstream of the injection nozzle **[2]**
3/04 . Controlling fuel injection and carburation, e.g. of alternative systems

7/00 **Other non-electrical fuel injection control [4]**
7/02 . Controlling fuel injection where fuel is injected by compressed air

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9/00 **Controlling engines by throttling air or fuel-and-air induction conduits or exhaust conduits**
9/02 . concerning induction conduits (throttle valves, or arrangements thereof in conduits F02D 9/08)
9/04 . concerning exhaust conduits (throttle valves, or arrangements thereof in conduits F02D 9/08)
9/06 . . Exhaust brakes
9/08 . Throttle valves specially adapted therefor; Arrangements of such valves in conduits (throttle valves modified for use in, or arranged in, carburettors F02M; throttle valves in general F16K)
9/10 . . having pivotally-mounted flaps
9/12 . . having slidably-mounted valve-members; having valve-members movable longitudinally of conduit
9/14 . . . the members being slidable transversely of conduit
9/16 . . . the members being rotatable
9/18 . . having elastic-wall valve-members

11/00 **Arrangements for, or adaptations to, non-automatic engine control initiation means, e.g. operator initiated** (specially for reversing F02D 27/00; arrangement or mounting of prime-mover control devices in vehicles B60K 26/00) **[2,5]**
11/02 . characterised by hand, foot, or like operator controlled initiation means **[5]**
11/04 . characterised by mechanical control linkages (with power drive or assistance F02D 11/06) **[5]**
11/06 . characterised by non-mechanical control linkages, e.g. fluid control linkages or by control linkages with power drive or assistance **[5]**
11/08 . . of the pneumatic type **[5]**
11/10 . . of the electric type **[5]**

13/00 **Controlling the engine output power by varying inlet or exhaust valve operating characteristics, e.g. timing** (modifying valve gear F01L)
13/02 . during engine operation
13/04 . . using engine as brake
13/06 . . Cutting-out cylinders
13/08 . for rendering engine inoperative or idling

15/00 **Varying compression ratio** (modifying valve-gear F01L)
15/02 . by alteration or displacement of piston stroke
15/04 . by alteration of volume of compression space without changing piston stroke

17/00 **Controlling engines by cutting-out individual cylinders**; **Rendering engines inoperative or idling** (controlling or rendering inoperative by varying inlet or exhaust valve operating characteristics F02D 13/00)
17/02 . Cutting-out (cutting-out engines in multiple-engine arrangements F02D 25/04)
17/04 . rendering engines inoperative or idling, e.g. caused by abnormal conditions (dependent on lubricating conditions F01M 1/22; dependent on cooling F01P 5/14)

Controlling peculiar to specified types or adaptations of engines

19/00 **Controlling engines characterised by their use of non-liquid fuels, pluralities of fuels, or non-fuel substances added to the combustible mixtures** (the non-fuel substances being gaseous F02D 21/00)
19/02 . peculiar to engines working with gaseous fuels (apparatus, or control parts thereof, for mixing gas and air F02M)

19/04 . peculiar to engines working with solid fuels, e.g. pulverised coal

19/06 . peculiar to engines working with pluralities of fuels, e.g. alternatively with light and heavy fuel oil, other than engines indifferent to the fuel consumed

19/08 . . simultaneously using pluralities of fuels (F02D 19/12 takes precedence)

19/10 . . . peculiar to compression-ignition engines in which the main fuel is gaseous

19/12 . peculiar to engines working with non-fuel substances or with anti-knock agents, e.g. with anti-knock fuel (apparatus, or control parts thereof, for delivering such substances or agents F02M)

21/00 Controlling engines characterised by their being supplied with non-airborne oxygen or other non-fuel gas

21/02 . peculiar to oxygen-fed engines

21/04 . . with circulation of exhaust gases in closed or semi-closed circuits

21/06 . peculiar to engines having other non-fuel gas added to combustion-air

21/08 . . the other gas being the exhaust gas of engine (circulation of exhaust gas in oxygen-fed engines F02D 21/04)

21/10 . . having secondary air added to fuel-air mixture (apparatus, or control parts thereof, for delivering secondary air F02M)

23/00 Controlling engines characterised by their being supercharged

23/02 . the engines being of fuel-injection type

25/00 Controlling two or more co-operating engines

25/02 . to synchronise speed

25/04 . by cutting-out engines

27/00 Controlling engines characterised by their being reversible

27/02 . by performing a programme

28/00 Programme-control of engines (programme-control specific to a type or purpose covered by one of the groups of this subclass, except groups F02D 29/00, F02D 39/00, or by one group of another subclass, e.g. of F01L, see that group) **[2]**

29/00 Controlling engines, such controlling being peculiar to the devices driven thereby, the devices being other than parts or accessories essential to engine operation, e.g. controlling of engines by signals external thereto [2]

29/02 . peculiar to engines driving vehicles; peculiar to engines driving variable-pitch propellers **[2]**

29/04 . peculiar to engines driving pumps

29/06 . peculiar to engines driving electric generators

Other non-electrical control of combustion engines [4]

31/00 Use of non-electrical speed-sensing governors to control combustion engines, not otherwise provided for

33/00 Non-electrical control of delivery of fuel or combustion-air, not otherwise provided for

33/02 . of combustion-air

35/00 Non-electrical control of engines, dependent on conditions exterior or interior to engines, not otherwise provided for

35/02 . on interior conditions

37/00 Non-electrical conjoint control of two or more functions of engines, not otherwise provided for

37/02 . one of the functions being ignition (ignition control per se F02P)

39/00 Other non-electrical control [4]

39/02 . for four-stroke engines

39/04 . for engines with other cycles than four-stroke, e.g. two-stroke

39/06 . for engines adding the fuel substantially at end of compression stroke

39/08 . for engines adding the fuel substantially before compression stroke

39/10 . for free-piston engines; for engines without rotary main shaft

Electrical control of combustion engines [4]

(1) Groups F02D 41/00 to F02D 45/00 cover electrical aspects of electrically controlled devices. **[6]**

(2) Groups F02D 41/00 to F02D 45/00 do not cover: **[6]**
- non-electrical aspects of electrically controlled devices, which are covered by groups F02D 1/00 to F02D 39/00 or by subclass F02M; **[6]**
- both electrical and non-electrical aspects of electrically controlled devices, which are covered by groups F02D 1/00 to F02D 39/00 or by subclass F02M. **[4,6]**

41/00 Electrical control of supply of combustible mixture or its constituents (F02D 43/00 takes precedence) **[4]**

41/02 . Circuit arrangements for generating control signals **[4]**

41/04 . . Introducing corrections for particular operating conditions (F02D 41/14 takes precedence) **[4]**

41/06 . . . for engine starting or warming up **[4]**

41/08 . . . for idling (F02D 41/06, F02D 41/16 take precedence) **[4]**

41/10 . . . for acceleration **[4]**

41/12 . . . for deceleration **[4]**

41/14 . . Introducing closed-loop corrections **[4]**

41/16 . . . for idling **[4]**

41/18 . . by measuring intake air flow (measuring flow, in general G01F) **[4]**

41/20 . Output circuits, e.g. for controlling currents in command coils (current control in inductive loads in general H03K 17/64) **[4]**

41/22 . Safety or indicating devices for abnormal conditions **[4]**

41/24 . characterised by the use of digital means **[4]**

41/26 . . using computer, e.g. microprocessor **[4]**

41/28 . . . Interface circuits **[4]**

41/30 . Controlling fuel injection **[4]**

41/32 . . of the low pressure type **[4]**

41/34 . . . with means for controlling injection timing or duration (ignition timing F02P 5/00) **[4]**

41/36 . . . with means for controlling distribution (arrangement of ignition distributors F02P 7/00) **[4]**

41/38 . . of the high pressure type **[4]**

41/40 . . . with means for controlling injection timing or duration **[4]**

43/00 **Conjoint electrical control of two or more functions, e.g. ignition, fuel-air mixture, recirculation, supercharging, exhaust-gas treatment** (electrical control of exhaust gas treating apparatus per se F01N 9/00) **[4]**

43/02 . using only analogue means **[4]**

43/04 . using only digital means **[4]**

45/00 **Electrical control not provided for in groups F02D 41/00 to F02D 43/00** (electrical control of exhaust gas treating apparatus F01N 9/00; electrical control of one of the functions: ignition, lubricating, cooling, starting, intake-heating, see the relevant subclasses for such functions) **[4]**

F02F **CYLINDERS, PISTONS, OR CASINGS FOR COMBUSTION ENGINES**; **ARRANGEMENTS OF SEALINGS IN COMBUSTION ENGINES** (specially adapted for rotary-piston or oscillating-piston internal-combustion engines F02B; specially adapted for gas-turbine plants F02C; specially adapted for jet-propulsion plants F02K) **[2]**

(1) Attention is drawn to the Notes preceding class F01.

(2) Class F16 takes precedence over this subclass, except for subject matter specific to combustion engines.

1/00 **Cylinders**; **Cylinder heads** (in general F16J)

1/02 . having cooling means (cylinder heads F02F 1/26)

1/04 . . for air cooling

1/06 . . . Shape or arrangement of cooling fins; Finned cylinders

1/08 . . . . running-liner and cooling-part of cylinder being different parts or of different material

1/10 . . for liquid cooling

1/12 . . . Preventing corrosion of liquid-swept surfaces

1/14 . . . Cylinders with means for directing, guiding, or distributing liquid stream

1/16 . . . Cylinder liners of wet type

1/18 . Other cylinders

1/20 . . characterised by constructional features providing for lubrication

1/22 . . characterised by having ports in cylinder wall for scavenging or charging

1/24 . Cylinder heads

1/26 . . having cooling means

1/28 . . . for air cooling

1/30 . . . . Finned cylinder heads

1/32 . . . . . the cylinder heads being of overhead-valve type

1/34 . . . . . with means for directing or distributing cooling medium (F02F 1/32 takes precedence)

1/36 . . . for liquid cooling

1/38 . . . . the cylinder heads being of overhead-valve type

1/40 . . . . . cylinder heads with means for directing, guiding, or distributing liquid stream (F02F 1/38 takes precedence)

1/42 . . Shape or arrangement of intake or exhaust channels in cylinder heads

3/00 **Pistons** (in general F16J)

3/02 . having means for accommodating or controlling heat expansion

3/04 . . having expansion-controlling inserts

3/06 . . . the inserts having bimetallic effect

3/08 . . . the inserts being ring-shaped

3/10 . having surface coverings (F02F 3/02 takes precedence)

3/12 . . on piston heads

3/14 . . . within combustion chambers

3/16 . having cooling means

3/18 . . the means being a liquid or solid coolant, e.g. sodium, in a closed chamber in piston

3/20 . . the means being a fluid flowing through or along piston

3/22 . . . the fluid being liquid

3/24 . having means for guiding gases in cylinders, e.g. for guiding scavenging charge in two-stroke engines

3/26 . having combustion chamber in piston head (the surface thereof being covered F02F 3/14)

3/28 . Other pistons with specially-shaped head

5/00 **Piston rings, e.g. associated with piston crown**

7/00 **Casings, e.g. crankcases** (engine casings in general F16M)

11/00 **Arrangements of sealings in combustion engines** (piston rings F02F 5/00; sealings per se F16J)

F02G **HOT-GAS OR COMBUSTION-PRODUCT POSITIVE-DISPLACEMENT ENGINE PLANTS** (steam engine plants, special vapour plants, plants operating on either hot gas or combustion-product gases together with other fluid F01K; gas-turbine plants F02C; jet-propulsion plants F02K); **USE OF WASTE HEAT OF COMBUSTION ENGINES, NOT OTHERWISE PROVIDED FOR**

Note

Attention is drawn to the Notes preceding class F01.

1/00 **Hot gas positive-displacement engine plants** (positive-displacement engine plants characterised by the working gas being generated by combustion in the plant F02G 3/00) **[3]**

1/02 . of open-cycle type

1/04 . of closed-cycle type

1/043 . . the engine being operated by expansion and contraction of a mass of working gas which is heated and cooled in one of a plurality of constantly communicating expansible chambers, e.g. Stirling cycle type engines **[3]**

1/044 . . . having at least two working members, e.g. pistons, delivering power output **[3]**

1/045 . . . Controlling **[3]**

1/047 . . . . by varying the heating or cooling **[3]**

1/05 . . . . by varying the rate of flow or quantity of the working gas **[3]**

1/053 . . . Component parts or details **[3]**

1/055 . . . . Heaters or coolers **[3]**

1/057 . . . . Regenerators **[3]**

1/06 . Controlling

3/00 **Positive-displacement engine plants characterised by the working gas being generated by combustion in the plant [3]**

3/02 . with reciprocating-piston engines

5/00 **Profiting from waste heat of combustion engines, not otherwise provided for**

5/02 . Profiting from waste heat of exhaust gases

5/04 . . in combination with other waste heat from combustion engines

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F02K **JET-PROPULSION PLANTS** (arrangement or mounting of jet-propulsion plants in land vehicles or vehicles in general B60K; arrangement or mounting of jet-propulsion plants in waterborne vessels B63H; controlling aircraft attitude, flight direction, or altitude by jet reaction B64C; arrangement or mounting of jet-propulsion plants in aircraft B64D; plants characterised by the power of the working fluid being divided between jet propulsion and another form of propulsion, e.g. propeller, F02B, F02C; features of jet-propulsion plants common to gas-turbine plants, air intakes or fuel supply control of air-breathing jet-propulsion plants F02C)

(1) In this subclass, the following expression is used with the meaning indicated:
– "jet-propulsion plants" means plants using combustion to produce a fluid stream from which a propulsive thrust on the plants is obtained on the reaction principle.

(2) Attention is drawn to the Notes preceding class F01.

Subclass index

1/00 **Plants characterised by the form or arrangement of the jet pipe or nozzle**; **Jet pipes or nozzles peculiar thereto** (rocket nozzles F02K 9/97)

1/04 . Mounting of an exhaust cone in the jet pipe

1/06 . Varying effective area of jet pipe or nozzle (F02K 1/30 takes precedence) **[3]**

1/08 . . by axially moving or transversely deforming an internal member, e.g. the exhaust cone

1/09 . . by axially moving an external member, e.g. a shroud (F02K 1/12 takes precedence) **[3]**

1/10 . . by distorting the jet pipe or nozzle

1/11 . . by means of pivoted eyelids **[3]**

1/12 . . by means of pivoted flaps

1/15 . . Control or regulation **[3]**

1/16 . . . conjointly with another control **[3]**

1/17 . . . . with control of fuel supply **[3]**

1/18 . . . automatic **[3]**

1/28 . using fluid jets to influence the jet flow **[3]**

1/30 . . for varying effective area of jet pipe or nozzle **[3]**

1/32 . . for reversing thrust **[3]**

1/34 . . for attenuating noise **[3]**

1/36 . having an ejector **[3]**

1/38 . Introducing air inside the jet (F02K 1/28 takes precedence) **[3]**

1/40 . Nozzles having means for dividing the jet into a plurality of partial jets or having an elongated cross-section outlet **[3]**

1/42 . . the means being movable into an inoperative position **[3]**
1/44 . Nozzles having means, e.g. a shield, reducing sound radiation in a specified direction (F02K 1/40 takes precedence) **[3]**
1/46 . Nozzles having means for adding air to the jet or for augmenting the mixing region between the jet and the ambient air, e.g. for silencing (F02K 1/28, F02K 1/36, F02K 1/38 take precedence) **[3]**
1/48 . . Corrugated nozzles **[3]**
1/50 . . Deflecting outwardly a portion of the jet by retractable scoop-like baffles **[3]**
1/52 . Nozzles specially constructed for positioning adjacent to another nozzle or to a fixed member, e.g. fairing **[3]**
1/54 . Nozzles having means for reversing jet thrust (F02K 1/32 takes precedence) **[3]**
1/56 . . Reversing jet main flow **[3]**
1/58 . . . Reversers mounted on the inner cone or the nozzle housing **[3]**
1/60 . . . by blocking the rearward discharge by means of pivoted eyelids or clamshells, e.g. target-type reversers **[3]**
1/62 . . . by blocking the rearward discharge by means of flaps **[3]**
1/64 . . Reversing fan flow **[3]**
1/66 . . . using reversing fan blades **[3]**
1/68 . . . Reversers mounted on the engine housing downstream of the fan exhaust section **[3]**
1/70 . . . using thrust reverser flaps or doors mounted on the fan housing **[3]**
1/72 . . . . the aft end of the fan housing being movable to uncover openings in the fan housing for the reversed flow **[3]**
1/74 . . Reversing at least one flow in relation to at least one other flow in a plural-flow engine **[3]**
1/76 . . Control or regulation of thrust reversers **[3]**
1/78 . Other construction of jet pipes **[3]**
1/80 . . Couplings or connections **[3]**
1/82 . . Jet pipe walls, e.g. liners **[3]**

3/00 Plants including a gas turbine driving a compressor or a ducted fan

3/02 . in which part of the working fluid by-passes the turbine and combustion chamber
3/04 . . the plant including ducted fans, i.e. fans with high volume, low-pressure outputs, for augmenting jet thrust, e.g. of double-flow type
3/06 . . . with front fan
3/062 . . . with aft fan **[3]**
3/065 . . . with front and aft fans **[3]**
3/068 . . . being characterised by a short axial length relative to diameter **[3]**
3/072 . . . with counter-rotating rotors **[3]**
3/075 . . . controlling flow ratio between flows **[3]**
3/077 . . . the plant being of the multiple flow type, i.e. having three or more flows **[3]**
3/08 . with supplementary heating of the working fluid (after-burners, combustion chambers F23R); Control thereof (control of fuel supply therefor F02C 9/26) **[3]**
3/10 . . by after-burners (F02K 3/105 takes precedence) **[3]**
3/105 . . Heating the by-pass flow **[3]**
3/11 . . . by means of burners or combustion chambers **[3]**
3/115 . . . by means of indirect heat exchange **[3]**
3/12 . characterised by having more than one gas turbine

5/00 Plants including an engine, other than a gas turbine, driving a compressor or a ducted fan

5/02 . the engine being of the reciprocating-piston type

7/00 Plants in which the working-fluid is used in a jet only, i.e. the plants not having a turbine or other engine driving a compressor or a ducted fan; **Control thereof** (rocket-engine plants F02K 9/00)

7/02 . the jet being intermittent, i.e. pulse jet
7/04 . . with resonant combustion chambers
7/06 . . with combustion chambers having valves
7/067 . . . having aerodynamic valves **[3]**
7/075 . . with multiple pulse-jet engines **[3]**
7/08 . the jet being continuous
7/10 . characterised by having ram-action compression, i.e. aero-thermo-dynamic-ducts or ram-jet engines
7/12 . . Injection-induction jet engines **[3]**
7/14 . . with external combustion, e.g. scram-jet engines **[3]**
7/16 . . Composite ram-jet/turbo-jet engines **[3]**
7/18 . . Composite ram-jet/rocket engines **[3]**
7/20 . . Composite ram-jet/pulse-jet engines **[3]**

9/00 Rocket-engine plants, i.e. plants carrying both fuel and oxidant therefor; **Control thereof** (chemical composition of propellants C06B, C06D) **[3]**

9/08 . using solid propellants (F02K 9/72 takes precedence; using semi-solid or pulverulent propellants F02K 9/70) **[3]**
9/10 . . Shape or structure of solid propellant charges **[3]**
9/12 . . . made of two or more portions burning at different rates **[3]**
9/14 . . . made from sheet-like materials, e.g. of carpet-roll type, of layered structure **[3]**
9/16 . . . of honeycomb structure **[3]**
9/18 . . . of the internal-burning type having a star or like shaped internal cavity **[3]**
9/20 . . . of the external-burning type **[3]**
9/22 . . . of the front-burning type **[3]**
9/24 . . Charging rocket engines with solid propellants; Methods or apparatus specially adapted for working solid propellant charges **[3]**
9/26 . . Burning control **[3]**
9/28 . . having two or more propellant charges with the propulsion gases exhausting through a common nozzle **[3]**
9/30 . . with the propulsion gases exhausting through a plurality of nozzles **[3]**
9/32 . . Constructional parts; Details (shape or structure of solid propellant charges F02K 9/10; starting or ignition means or arrangements F02K 9/95; rocket nozzles F02K 9/97) **[3]**
9/34 . . . Casings; Combustion chambers; Liners thereof **[3]**
9/36 . . . Propellant charge supports **[3]**
9/38 . . . Safety devices, e.g. to prevent accidental ignition **[3]**
9/40 . . . Cooling arrangements **[3]**
9/42 . using liquid or gaseous propellants (F02K 9/72 takes precedence) **[3]**
9/44 . . Feeding propellants **[3]**
9/46 . . . using pumps (pumps <u>per se</u> F04) **[3]**
9/48 . . . . driven by a gas turbine fed by propellant combustion gases **[3]**

9/50 . . . using pressurised fluid to pressurize the propellants **[3]**
9/52 . . . Injectors (in general B05B) **[3]**
9/54 . . . Leakage detectors; Purging systems; Filtration systems (filters per se B01D) **[3]**
9/56 . . . Control **[3]**
9/58 . . . . Propellant feed valves (valves in general F16K) **[3]**
9/60 . . Constructional parts; Details (starting or ignition means or arrangements F02K 9/95; rocket nozzles F02K 9/97) **[3]**
9/62 . . . Combustion or thrust chambers **[3]**
9/64 . . . . having cooling arrangements **[3]**
9/66 . . . . of the rotary type **[3]**
9/68 . . . Decomposition chambers **[3]**
9/70 . using semi-solid or pulverulent propellants **[3]**
9/72 . using liquid and solid propellants, i.e. hybrid rocket-engine plants **[3]**
9/74 . combined with another jet-propulsion plant **[3]**
9/76 . . with another rocket-engine plant; Multistage rocket-engine plants **[3]**
9/78 . . with an air-breathing jet-propulsion plant (with a ram-jet engine F02K 7/18) **[3]**
9/80 . characterised by thrust or thrust vector control (F02K 9/26, F02K 9/56, F02K 9/94 take precedence) **[3]**
9/82 . . by injection of a secondary fluid into the rocket exhaust gases **[3]**
9/84 . . using movable nozzles **[3]**
9/86 . . using nozzle throats of adjustable cross-section **[3]**
9/88 . . using auxiliary rocket nozzles **[3]**
9/90 . . using deflectors (F02K 9/82 takes precedence) **[3]**
9/92 . . incorporating means for reversing or terminating thrust **[3]**
9/94 . Re-ignitable or restartable rocket-engine plants; Intermittently operated rocket-engine plants **[3]**
9/95 . characterised by starting or ignition means or arrangements (safety devices F02K 9/38) **[3]**
9/96 . characterised by specially adapted arrangements for testing or measuring **[3]**
9/97 . Rocket nozzles (thrust or thrust vector control F02K 9/80) **[3]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

F02M SUPPLYING COMBUSTION ENGINES IN GENERAL WITH COMBUSTIBLE MIXTURES OR CONSTITUENTS THEREOF (charging such engines F02B)

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
– "carburettors" means essentially apparatus for mixing fuel with air, the fuel being brought into mixing contact with the air by lowering the air pressure, e.g. in a venturi;
– "fuel-injection apparatus" means apparatus for introducing fuel into a space, e.g. engine cylinder, by pressurising the fuel, e.g. by a pump acting behind the fuel, and thus includes the so-called "solid-fuel injection" in which liquid fuel is introduced without any admixture of gas;
– "low-pressure fuel injection" means fuel injection in which the fuel-air mixture containing fuel thus injected will be substantially compressed in the compression stroke of the engine;
– "pumping element" means a single piston-cylinder unit in a reciprocating-piston fuel-injection pump or the equivalent unit in any other type of fuel-injection pump.

(2) Attention is drawn to the Notes preceding class F01.

Subclass index

Carburettors for liquid fuels

1/00 Carburettors with means for facilitating engine's starting or its idling below operational temperatures

1/02 . the means to facilitate starting or idling being chokes for enriching fuel-air mixture (automatic chokes F02M 1/08)

1/04 . the means to facilitate starting or idling being auxiliary carburetting apparatus able to be put into, and out of, operation, e.g. having automatically-operated disc valves

1/06 . . having axially-movable valves, e.g. piston-shaped

1/08 . the means to facilitate starting or idling becoming operative or inoperative automatically (in connection with auxiliary carburetting apparatus F02M 1/04)

1/10 . . dependent on engine temperature, e.g. having thermostat

1/12 . . . with means for electrically heating thermostat

1/14 . . dependent on pressure in combustion-air- or fuel-air-mixture intake (F02M 1/10 takes precedence)

1/16 . Other means for enriching fuel-air mixture during starting; Priming cups; using different fuels for starting and normal operation

1/18 . . Enriching fuel-air mixture by depressing float to flood carburettor

3/00 Idling devices for carburettors (with means for facilitating idling below operational temperatures F02M 1/00)

3/02 . Preventing flow of idling fuel

3/04 . . under conditions where engine is driven instead of driving, e.g. driven by vehicle running down hill

3/045 . . . Control of valves situated in the idling nozzle system, or the passage system, by electrical means or by a combination of electrical means with fluidic or mechanical means **[4]**

3/05 . . . Pneumatic or mechanical control, e.g. with speed regulation **[4]**

3/055 . . . Fuel flow cut-off by introducing air, e.g. brake air, into the idling fuel system **[4]**

3/06 . Increasing idling speed

3/07 . . by positioning the throttle flap stop, or by changing the fuel flow cross-sectional area, by electrical, electromechanical or electropneumatical means, according to engine speed **[4]**

3/08 . Other details of idling devices (fighting ice-formation by heating idling ports F02M 15/02)

3/09 . . Valves responsive to engine conditions, e.g. manifold vacuum (F02M 1/00, F02M 5/00 to F02M 33/00 take precedence) **[5]**

3/10 . . Fuel metering pins; Nozzles **[4]**

3/12 . . Passage way systems **[4]**

3/14 . . Location of idling system outlet relative to throttle valve **[4]**

5/00 Float-controlled apparatus for maintaining a constant fuel level in carburettors

5/02 . with provisions to meet variations in carburettor position, e.g. upside-down position in aircraft

5/04 . . with pivotally or rotatably mounted float chambers **[4]**

5/06 . having adjustable float mechanism, e.g. to meet dissimilarities in specific gravity of different fuels

5/08 . having means for venting float chambers

5/10 . having means for preventing vapour lock, e.g. insulated float chambers or forced fuel circulation through float chamber with engine stopped

5/12 . Other details, e.g. floats, valves, setting devices or tools (floats in general F16K 33/00)

5/16 . . Floats **[4]**

7/00 Carburettors with means for influencing, e.g. enriching or keeping constant, fuel/air ratio of charge under varying conditions (choke valves for starting F02M 1/00)

7/02 . Carburettors having aerated fuel spray nozzles (with valve control for amount of air for aerating fuel F02M 7/24)

7/04 . Means for enriching charge at high combustion-air flow

7/06 . Means for enriching charge on sudden throttle opening, i.e. at acceleration, e.g. storage means in passage way system

7/08 . . using pumps

7/087 . . . changing output according to temperature in engine **[4]**

7/093 . . . changing output according to intake vacuum **[4]**

7/10 . Other installations, without moving parts, for influencing fuel/air ratio, e.g. electrical means (F02M 7/23 takes precedence) **[4]**

7/11 . . Altering float-chamber pressure (enriching the fuel-air mixture during starting by depressing float to flood carburettor F02M 1/18) **[5]**

7/12 . Other installations, with moving parts, for influencing fuel/air ratio, e.g. having valves (F02M 7/24 takes precedence) **[4]**

7/127 . . Altering the float-chamber pressure (enriching the fuel-air mixture during starting by depressing float to flood carburettor F02M 1/18) **[5]**

7/133 . . Auxiliary jets, i.e. operating only under certain conditions, e.g. full power (F02M 7/04, F02M 7/06 take precedence) **[5]**

7/14 . . with means for controlling cross-sectional area of fuel spray nozzle (dependent on air-throttle valve position F02M 7/22)
7/16 . . . operated automatically, e.g. dependent on exhaust-gas analysis
7/17 . . . . by a pneumatically adjustable piston-like element, e.g. constant depression carburettors **[5]**
7/18 . . with means for controlling cross-sectional area of fuel-metering orifice (dependent on air-throttle position F02M 7/22)
7/20 . . . operated automatically, e.g. dependent on altitude
7/22 . . fuel flow cross-sectional area being controlled dependent on air-throttle-valve position (the throttle valve being slidably arranged transversely to air passage F02M 9/06)
7/23 . Fuel aerating devices **[4]**
7/24 . . Controlling flow of aerating air **[4]**
7/26 . . . dependent on position of optionally operable throttle means **[4]**
7/28 . . . dependent on temperature or pressure **[4]**

9/00 Carburettors having air or fuel-air mixture passage throttling valves other than of butterfly type (register-type carburettors F02M 11/00); **Carburettors having fuel-air mixing chambers of variable shape or position**

9/02 . having throttling valves, e.g. of piston shape, slidably arranged transversely to the passage
9/04 . . with throttling valves sliding in a plane inclined to the passage
9/06 . . with means for varying cross-sectional area of fuel spray nozzle dependent on throttle position (F02M 7/17 takes precedence) **[5]**
9/08 . having throttling valves rotatably mounted in the passage
9/10 . having valves, or like controls, of elastic-wall type for controlling the passage, or for varying cross-sectional area, of fuel-air mixing chambers
9/12 . having other specific means for controlling the passage, or for varying cross-sectional area, of fuel-air mixing chambers
9/127 . . Axially movable throttle valves concentric with the axis of the mixture passage **[5]**
9/133 . . . the throttle valves having mushroom-shaped bodies **[5]**
9/14 . having venturi and nozzle relatively displaceable essentially along the venturi axis

11/00 Multi-stage carburettors; **Register-type carburettors, i.e. with slidable or rotatable throttling valves in which a plurality of fuel nozzles, other than only an idling nozzle and a main one, are sequentially exposed to air stream by throttling valve**

11/02 . with throttling valve, e.g. of flap or butterfly type, in a later stage opening automatically
11/04 . . the later-stage valves having damping means
11/06 . Other carburettors with throttling valve of flap or butterfly type
11/08 . Register carburettors with throttling valve movable transversally to air passage
11/10 . Register carburettors with rotatable throttling valves

13/00 Arrangements of two or more separate carburettors (apparatus for testing, tuning, or synchronising carburettors F02M 19/01; re-atomising condensed fuel or homogenising fuel-air mixture F02M 29/00); **Carburettors using more than one fuel** (apparatus for adding small quantities of secondary fuel F02M 25/00)

13/02 . Separate carburettors
13/04 . . structurally united
13/06 . the carburettors using different fuels
13/08 . Carburettors adapted to use liquid and gaseous fuels, e.g. alternatively

15/00 Carburettors with heating, cooling, or thermal insulating means for combustion-air, fuel, or fuel-air mixture (heating, cooling, or thermally insulating float apparatus F02M 5/00; apparatus for thermally treating combustion-air, fuel, or fuel-air mixture, not being part of a carburettor F02M 31/00)

15/02 . with heating means, e.g. to combat ice-formation
15/04 . . the means being electrical
15/06 . Heat shieldings, e.g. from engine radiations

17/00 Carburettors having pertinent characteristics not provided for in, or of interest apart from, the apparatus of main groups F02M 1/00 to F02M 15/00 (apparatus for treating combustion-air, fuel, or fuel-air mixture by catalysts, electric means, magnetism, rays, sonic waves, or the like F02M 27/00; combinations of carburettors and low-pressure fuel-injection apparatus F02M 71/00)

17/02 . Floatless carburettors
17/04 . . having fuel inlet valve controlled by diaphragm
17/06 . . having overflow chamber determining constant fuel level
17/08 . Carburettors having one or more fuel passages opening in a valve-seat surrounding combustion-air passage, the valve being opened by passing air
17/09 . . the valve being of an eccentrically mounted butterfly type **[5]**
17/10 . Carburettors having one or more fuel passages opening in valve-member of air throttle
17/12 . . the valve-member being of butterfly type
17/14 . Carburettors with fuel-supply parts opened and closed in synchronism with engine stroke
17/16 . Carburettors having continuously-rotating bodies, e.g. surface carburettors (fuel injection by centrifugal forces F02M 69/06)
17/18 . Other surface carburettors
17/20 . . with fuel bath
17/22 . . . with air bubbling through bath
17/24 . . with wicks
17/26 . . with other wetted bodies
17/28 . . . fuel being drawn through a porous body
17/30 . Carburettors with fire-protecting devices, e.g. combined with fire-extinguishing apparatus
17/32 . . automatically closing fuel conduits on outbreak of fire
17/34 . Other carburettors combined or associated with other apparatus, e.g. air filters (predominant aspects of the apparatus, see the relevant classes for such apparatus)
17/36 . Carburettors having fitments facilitating their cleaning
17/38 . Controlling of carburettors, not otherwise provided for (external control gear F02M 19/12)
17/40 . Selection of particular materials for carburettors, e.g. sheet metal, plastic, or translucent materials
17/42 . Float-controlled carburettors not otherwise provided for

17/44 . Carburettors characterised by draught direction and not otherwise provided for
17/46 . . with down-draught
17/48 . . with up-draught
17/50 . Carburettors having means for combating ice-formation (thermally F02M 15/02)
17/52 . Use of cold, produced by carburettors, for other purposes (apparatus using the cold, see the relevant classes for such apparatus)

19/00 Details, component parts, or accessories of carburettors, not provided for in, or of interest apart from, the apparatus of groups F02M 1/00 to F02M 17/00 (measuring or testing apparatus in general G01)

19/01 . Apparatus for testing, tuning, or synchronising carburettors, e.g. carburettor flow stands **[3]**
19/02 . Metering-orifices, e.g. variable in diameter (variable during operation F02M 7/18)
19/025 . . Metering orifices not variable in diameter **[4]**
19/03 . Fuel atomising nozzles; Arrangement of emulsifying air conduits (atomising in general B05B) **[4]**
19/035 . . Mushroom-shaped atomising nozzles **[4]**
19/04 . Fuel-metering pins or needles
19/06 . Other details of fuel conduits
19/08 . Venturis
19/10 . . in multiple arrangement
19/12 . External control gear, e.g. having dash-pots (dampening means in later stages of multi-stage carburettors F02M 11/04; carburettor control gear in which the carburettor aspects do not predominate, see the relevant classes)

21/00 Apparatus for supplying engines with non-liquid fuels, e.g. gaseous fuels stored in liquid form

21/02 . for gaseous fuels (apparatus for vaporising liquid fuel by heat F02M 31/00; engines with apparatus generating gas from solid fuel, e.g. from wood, F02B 43/08)
21/04 . . Gas-air mixing apparatus (carburettors adapted to use liquid and gaseous fuels F02M 13/08; carburetting gases in general C10J)
21/06 . . Apparatus for de-liquefying, e.g. by heating (discharging liquefied gases in general F17C)
21/08 . for non-gaseous fuels (for engines operating on fuel containing oxidants F02B)
21/10 . . for fuels with low melting point, e.g. apparatus having heating means
21/12 . for fuels in pulverised state (engine plants with fuel-pulverising apparatus F02B)

Engine-pertinent apparatus for feeding, or treating before their admission to engine, combustion-air, fuel, or fuel-air mixture

23/00 Apparatus for adding secondary air to fuel-air mixture

23/02 . with personal control
23/03 . . the secondary air-valve controlled by main combustion-air throttle **[5]**
23/04 . with automatic control
23/06 . . dependent on engine speed
23/08 . . dependent on pressure in main combustion-air induction system
23/09 . . . using valves directly opened by low pressure **[6]**
23/10 . . dependent on temperature, e.g. engine temperature
23/12 . characterised by being combined with device for, or by secondary air effecting, re-atomising of condensed fuel
23/14 . characterised by adding hot air

25/00 Engine-pertinent apparatus for adding non-fuel substances or small quantities of secondary fuel to combustion-air, main fuel, or fuel-air mixture (F02M 43/00 takes precedence; adding secondary air to fuel-air mixture F02M 23/00)

25/022 . Adding fuel and water emulsion, water or steam **[6]**
25/025 . . Adding water **[6]**
25/028 . . . into the charge intakes **[6]**
25/03 . . . into the cylinders **[6]**
25/032 . . Producing and adding steam **[6]**
25/035 . . . into the charge intakes **[6]**
25/038 . . . into the cylinders **[6]**
25/06 . adding lubricant vapours or exhaust gases
25/07 . . adding exhaust gases **[5]**
25/08 . adding fuel vapours drawn from engine fuel reservoir
25/10 . adding acetylene, non-waterborne hydrogen, non-airborne oxygen, or ozone
25/12 . . the apparatus having means for generating such gases (using rays and simultaneously generating ozone F02M 27/06)
25/14 . adding anti-knock agents, not provided for in groups F02M 25/022 to F02M 25/10

27/00 Apparatus for treating combustion-air, fuel, or fuel-air mixture, by catalysts, electric means, magnetism, rays, sonic waves, or the like

27/02 . by catalysts
27/04 . by electric means or magnetism
27/06 . by rays
27/08 . by sonic or ultrasonic waves

29/00 Apparatus for re-atomising condensed fuel or homogenising fuel-air mixture (combined with secondary-air supply F02M 23/12)

29/02 . having rotary parts
29/04 . having screens, gratings, baffles, or the like (rotary F02M 29/02)
29/06 . . generating whirling motion of mixture
29/08 . . having spirally-wound wires
29/10 . . adjustable
29/12 . having homogenising valves held open by mixture current
29/14 . re-atomising or homogenising being effected by unevenness of internal surfaces of mixture intake

31/00 Apparatus for thermally treating combustion-air, fuel, or fuel-air mixture (F02M 21/06, F02M 21/10 take precedence; such apparatus being part of a carburettor or fuel-injection apparatus F02M 15/00, F02M 53/00; adding hot secondary air to fuel-air mixture F02M 23/14)

31/02 . for heating
31/04 . . combustion-air or fuel-air mixture (electrically F02M 31/12; by using heat from working cylinders or cylinder heads F02M 31/14; heating of combustion-air as an engine starting aid F02N 19/04) **[4]**
31/06 . . . by hot gases, e.g. by mixing cold and hot air
31/07 . . . . Temperature-responsive control, e.g. using thermostatically-controlled valves (F02M 31/083 takes precedence) **[6]**
31/08 . . . . the gases being exhaust gases

31/083 . . . . . Temperature-responsive control of the amount of exhaust gas or combustion air directed to the heat exchange surface **[6]**

31/087 . . . . . Heat-exchange arrangements between the air intake and exhaust gas passages, e.g. by means of contact between the passages **[5]**

31/093 . . . . . Air intake passage surrounding the exhaust gas passage; Exhaust gas passage surrounding the air intake passage **[5]**

31/10 . . . by hot liquids, e.g. lubricants

31/12 . . electrically

31/125 . . . Fuel **[5]**

31/13 . . . Combustion air **[5]**

31/135 . . . Fuel-air mixture **[5]**

31/14 . . by using heat from working cylinders or cylinder heads

31/16 . . Other apparatus for heating fuel

31/18 . . . to vaporise fuel

31/20 . for cooling (cooling of charging-air or of scavenging-air F02B)

33/00 Other apparatus for treating combustion-air, fuel or fuel-air mixture (combustion-air cleaners F02M 35/00; arrangements for purifying liquid fuel F02M 37/22)

33/02 . for collecting and returning condensed fuel

33/04 . . returning to the intake passage **[5]**

33/06 . . . with simultaneous heat supply **[5]**

33/08 . . returning to the fuel tank **[5]**

35/00 Combustion-air cleaners, air intakes, intake silencers, or induction systems specially adapted for, or arranged on, internal-combustion engines (air cleaners in general B01D)

35/02 . Air cleaners

35/022 . . acting by gravity, by centrifugal, or by other inertial forces, e.g. with moistened walls **[2]**

35/024 . . using filters, e.g. moistened (F02M 35/026 takes precedence; cleaning of the filtering material F02M 35/08) **[2]**

35/026 . . acting by guiding the air over or through an oil or other liquid bath, e.g. combined with filters **[2]**

35/04 . . specially arranged with respect to engine; Mounting thereon

35/06 . . . combined or associated with engine's cooling blower or fan, or with flywheel

35/08 . . with means for removing dust from cleaners; with means for indicating clogging; with by-pass means

35/09 . . . Clogging indicators **[6]**

35/10 . Air intakes; Induction systems (using kinetic or wave energy of charge in induction systems for improving quantity of charge F02B)

35/104 . . Intake manifolds **[6]**

35/108 . . . with primary and secondary intake passages **[6]**

35/112 . . . for engines with cylinders all in one line (F02M 35/108 takes precedence) **[6]**

35/116 . . . for engines with cylinders in V-arrangement or arranged oppositely relative to the main shaft (F02M 35/108 takes precedence) **[6]**

35/12 . Intake silencers

35/14 . Combined air cleaners and silencers

35/16 . characterised by use in vehicles (predominant vehicle aspects, see the relevant classes for the vehicles)

37/00 Apparatus or systems for feeding liquid fuel from storage containers to carburettors or fuel-injection apparatus (F02M 69/00 takes precedence; feeding liquid fuel to combustion apparatus, in general F23K 5/00; fuel supply to apparatus for generating combustion products of high pressure or high velocity F23R 3/28); **Arrangements for purifying liquid fuel specially adapted for, or arranged on, internal-combustion engines** (separating apparatus, filters per se B01D; centrifuges B04B) **[5]**

37/02 . Feeding by means of suction apparatus, e.g. by air flow through carburettors (by driven pumps F02M 37/04)

37/04 . Feeding by means of driven pumps (pump construction F04)

37/06 . . mechanically driven

37/08 . . electrically driven

37/10 . . . submerged in fuel, e.g. in reservoir

37/12 . . fluid-driven, e.g. by compressed combustion-air

37/14 . . the pumps being combined with other apparatus

37/16 . . characterised by provision of personally-, e.g. manually-, operated pumps

37/18 . . characterised by provision of main and auxiliary pumps

37/20 . characterised by means for preventing vapour lock

37/22 . Arrangements for purifying liquid fuel specially adapted for, or arranged on, internal-combustion engines, e.g. arrangement in the feeding system **[3]**

Fuel-injection apparatus

Note

Low-pressure fuel injection is classified in groups F02M 51/00, F02M 69/00 or F02M 71/00. **[2009.01]**

39/00 Arrangements of fuel-injection apparatus with respect to engines; **Pump drives adapted to such arrangements** (F02M 49/00 takes precedence; arrangements of injectors F02M 61/14)

39/02 . Arrangements of fuel-injection apparatus to facilitate the driving of pumps; Arrangements of fuel-injection pumps; Pump drives

41/00 Fuel-injection apparatus with two or more injectors fed from a common pressure-source sequentially by means of a distributor

41/02 . the distributor being spaced from pumping elements

41/04 . . the distributor reciprocating

41/06 . . the distributor rotating

41/08 . the distributor and pumping elements being combined

41/10 . . pump pistons acting as the distributor

41/12 . . . the pistons rotating to act as the distributor

41/14 . . rotary distributor supporting pump pistons

41/16 . characterised by the distributor being fed from a constant-pressure source, e.g. accumulator

43/00 Fuel-injection apparatus operating simultaneously on two or more fuels or on a liquid fuel and another liquid, e.g. the other liquid being an anti-knock additive

43/02 . Pumps peculiar thereto

43/04 . Injectors peculiar thereto

45/00 Fuel-injection apparatus characterised by having a cyclic delivery of specific time/pressure or time/quantity relationship (fuel injectors having such deliveries by means of valves furnished at seated ends with pintle- or plug-shaped extensions F02M 61/06)

45/02 . with each cyclic delivery being separated into two or more parts
45/04 . . with a small initial part
45/06 . . . Pumps peculiar thereto
45/08 . . . Injectors peculiar thereto
45/10 . . Other injectors with multiple-part delivery, e.g. with vibrating valves
45/12 . providing a continuous delivery with variable pressure

47/00 Fuel-injection apparatus operated cyclically with fuel-injection valves actuated by fluid pressure (F02M 49/00 takes precedence; apparatus with injection valves opened by fuel pressure and closed by non-fluid means, see the groups providing for other characteristics)

47/02 . of accumulator-injector type, i.e. having fuel pressure of accumulator tending to open, and fuel pressure in other chamber tending to close, injection valves, and having means for periodically releasing that closing pressure
47/04 . using fluid, other than fuel, for injection-valve actuation
47/06 . Other fuel injectors peculiar thereto

49/00 Fuel-injection apparatus in which injection pumps are driven, or injectors are actuated, by the pressure in engine working cylinders, or by impact of engine working piston

49/02 . using the cylinder pressure, e.g. compression end pressure
49/04 . using the piston impact

51/00 Fuel-injection apparatus characterised by being operated electrically

51/02 . specially for low-pressure fuel-injection (pumps per se F02M 51/04; injectors per se F02M 51/08)
51/04 . Pumps peculiar thereto
51/06 . Injectors peculiar thereto
51/08 . . specially for low-pressure fuel-injection

53/00 Fuel-injection apparatus characterised by having heating, cooling, or thermally-insulating means

53/02 . with fuel-heating means, e.g. for vaporising
53/04 . Injectors with heating, cooling, or thermally-insulating means
53/06 . . with fuel-heating means, e.g. for vaporising
53/08 . . with air cooling

55/00 Fuel-injection apparatus characterised by their fuel conduits or their venting means

55/02 . Conduits between injection pumps and injectors
55/04 . Means for damping vibrations in injection-pump inlets

57/00 Fuel injectors combined or associated with other devices

57/02 . Injectors structurally combined with fuel-injection pumps
57/04 . the devices being combustion-air intake or exhaust valves
57/06 . the devices being sparking-plugs

59/00 Pumps specially adapted for fuel-injection and not provided for in groups F02M 39/00 to F02M 57/00 (general features of pumps F04)

59/02 . of reciprocating-piston type
59/04 . . characterised by special arrangement of cylinders with respect to piston-driving shaft, e.g. arranged parallel to that shaft
59/06 . . . with cylinders arranged radially to driving shaft, e.g. in V- or star-arrangement
59/08 . . characterised by two or more pumping elements with conjoint outlet
59/10 . . characterised by the piston drive
59/12 . having other positive-displacement pumping elements, e.g. rotary
59/14 . . of elastic-wall type
59/16 . characterised by having multi-stage compression of fuel
59/18 . characterised by the pumping action being achieved through release of pre-compressed springs
59/20 . Varying fuel delivery in quantity or timing
59/22 . . Varying quantity by adjusting cylinder-head space
59/24 . . with constant-length-stroke pistons having variable effective portion of stroke
59/26 . . . caused by movements of pistons relative to their cylinders
59/28 . . . . Mechanisms therefor
59/30 . . with variable-length-stroke pistons
59/32 . . fuel delivery being controlled by means of fuel-displaced auxiliary pistons, which effect injection
59/34 . . by throttling of passages to pumping elements or of overflow passages
59/36 . . by variably-timed valves controlling fuel passages
59/38 . Pumps characterised by adaptations to special uses or conditions
59/40 . . for reversible engines
59/42 . . for starting of engines
59/44 . Details, component parts, or accessories not provided for in, or of interest apart from, the apparatus of groups F02M 59/02 to F02M 59/42
59/46 . . Valves (in general F16K)
59/48 . . Assembling; Disassembling; Replacing

61/00 Fuel injectors not provided for in groups F02M 39/00 to F02M 57/00 or F02M 67/00

61/02 . of valveless type
61/04 . having valves (valves in general F16K)
61/06 . . the valves being furnished at seated ends with pintle- or plug-shaped extensions
61/08 . . the valves opening in direction of fuel flow
61/10 . . Other injectors with elongated valve bodies, i.e. of needle-valve type
61/12 . . . characterised by the provision of guiding or centring means for valve bodies
61/14 . Arrangements of injectors with respect to engines; Mounting of injectors
61/16 . Details not provided for in, or of interest apart from, the apparatus of groups F02M 61/02 to F02M 61/14
61/18 . . Injection nozzles, e.g. having valve-seats
61/20 . . Closing valves mechanically, e.g. arrangements of springs or weights

63/00 **Other fuel-injection apparatus having pertinent characteristics not provided for in groups F02M 39/00 to F02M 57/00 or F02M 67/00**; **Details, component parts or accessories of fuel-injection apparatus, not provided for in, or of interest apart from, the apparatus of groups F02M 39/00 to F02M 61/00 or F02M 67/00**

63/02 . Fuel-injection apparatus having several injectors fed by a common pumping element, or having several pumping elements feeding a common injector; Fuel-injection apparatus having provisions for cutting-out pumps, pumping elements, or injectors; Fuel-injection apparatus having provisions for variably interconnecting pumping elements and injectors alternatively

63/04 . Fuel-injection apparatus having injection valves held closed by a cyclically-operated mechanism for a time and automatically opened by fuel pressure, e.g. of constant-pressure pump or accumulator, when that mechanism releases the valve

63/06 . Use of pressure wave generated by fuel inertia to open injection valves

65/00 **Testing fuel-injection apparatus, e.g. testing injection timing**

67/00 **Apparatus in which fuel-injection is effected by means of high-pressure gas, the gas carrying the fuel into working cylinders of the engine, e.g. air-injection type** (using compressed air for low-pressure fuel-injection apparatus F02M 69/08)

67/02 . the gas being compressed air, e.g. compressed in pumps (arrangements or adaptations of such pumps F02B)

67/04 . . the air being extracted from working cylinders of the engine

67/06 . the gas being other than air, e.g. steam, combustion gas

67/08 . . the gas being generated by combustion of part of fuel other than in engine working cylinders

67/10 . Injectors peculiar thereto, e.g. of valveless type

67/12 . . having valves

67/14 . characterised by provisions for injecting different fuels, e.g. main fuel and readily self-igniting starting-fuel

69/00 **Low-pressure fuel-injection apparatus** (electrically-operated F02M 51/00)

69/02 . Pumps peculiar thereto

69/04 . Injectors peculiar thereto

69/06 . characterised by the pressurisation of the fuel being caused by centrifugal force acting on the fuel

69/08 . characterised by the fuel being carried by compressed air into main stream of combustion-air

69/10 . peculiar to scavenged two-stroke engines, e.g. injecting into crankcase-pump chamber

69/12 . comprising a fuel-displaced free piston for intermittently metering and supplying fuel to injection nozzles **[5]**

69/14 . having cyclically-operated valves connecting injection nozzles to a source of fuel under pressure during the injection period **[5]**

69/16 . characterised by means for metering continuous fuel flow to injectors or means for varying fuel pressure upstream of injectors **[5]**

69/18 . . the means being metering valves throttling fuel passages to injectors or by-pass valves throttling overflow passages, the metering valves being actuated by a device responsive to the engine working parameters, e.g. engine load, speed, temperature or quantity of air (F02M 69/26 takes precedence) **[5]**

69/20 . . . the device being a servo-motor, e.g. using engine intake air pressure or vacuum (F02M 69/22 takes precedence) **[5]**

69/22 . . . the device comprising a member movably mounted in the air intake conduit and displaced according to the quantity of air admitted to the engine **[5]**

69/24 . . . the device comprising a member for transmitting the movement of the air throttle valve actuated by the operator to the valves controlling fuel passages **[5]**

69/26 . . the means varying fuel pressure in a fuel by-pass passage, the pressure acting on a throttle valve against the action of metered or throttled fuel pressure for variably throttling fuel flow to injection nozzles, e.g. to keep constant the pressure differential at the metering valve **[5]**

69/28 . characterised by means for cutting-out the fuel supply to the engine or to main injectors during certain operating periods, e.g. deceleration **[5]**

69/30 . characterised by means for facilitating the starting-up or idling of engines or by means for enriching fuel charge, e.g. below operational temperatures or upon high power demand of engines (at acceleration F02M 69/44) **[5]**

69/32 . . with an air by-pass around the air throttle valve or with an auxiliary air passage, e.g. with a variably controlled valve therein **[5]**

69/34 . . with an auxiliary fuel circuit supplying fuel to the engine, e.g. with the fuel pump outlet being directly connected to the injection nozzles **[5]**

69/36 . . having an enrichment mechanism modifying fuel flow to injectors, e.g. by acting on the fuel metering device or on the valves throttling fuel passages to injection nozzles or overflow passages **[5]**

69/38 . . . using fuel pressure, e.g. by varying fuel pressure in the control chambers of the fuel metering device (F02M 69/26 takes precedence) **[5]**

69/40 . . . using variably controlled air pressure, e.g. by modifying the intake air vacuum signal acting on the fuel metering device **[5]**

69/42 . . . using other means than variable fluid pressure, e.g. acting on the fuel metering device mechanically or electrically **[5]**

69/44 . characterised by means for supplying extra fuel to the engine on sudden air throttle opening, e.g at acceleration **[5]**

69/46 . Details, component parts or accessories not provided for in, or of interest apart from, the apparatus covered by groups F02M 69/02 to F02M 69/44 **[5]**

69/48 . . Arrangement of air sensors **[5]**

69/50 . . Arrangement of fuel distributors **[5]**

69/52 . . Arrangement of fuel metering devices **[5]**

69/54 . . Arrangement of fuel pressure regulators **[5]**

71/00 **Combinations of carburettors and low-pressure fuel-injection apparatus** (means for enriching charge on sudden air throttle opening of carburettors F02M 7/06)

71/02 . with fuel-air mixture being produced by the carburettor and being compressed by a pump for subsequent injection into main combustion-air (adaptations or arrangements of such pumps F02B)

71/04 . with carburettor being used at starting or idling only and injection apparatus being used during normal operation of engine

99/00 **Subject matter not provided for in other groups of this subclass [8]**

F02N **STARTING OF COMBUSTION ENGINES** (starting of free-piston combustion-engines F02B 71/02; starting of gas-turbine plants F02C 7/26); **STARTING AIDS FOR SUCH ENGINES, NOT OTHERWISE PROVIDED FOR**

(1) Attention is drawn to the Notes preceding class F01.
(2) The starting of engines which are not explicitly stated to be combustion engines is classified in this subclass in so far as their starting is equivalent to that of combustion engines.

Subclass index

Muscle-operated starting apparatus

1/00 **Starting apparatus having hand cranks** (with intermediate power storage F02N 5/00 to F02N 15/00)

1/02 . having safety means preventing damage caused by reverse rotation

3/00 **Other muscle-operated starting apparatus** (with intermediate power storage F02N 5/00 to F02N 15/00)

3/02 . having pull-cords

3/04 . having foot-actuated levers

Power-operated starting apparatus; **Muscle-operated starting apparatus with intermediate power storage**

5/00 **Starting apparatus having mechanical power storage**

5/02 . of spring type

5/04 . of inertia type

7/00 **Starting apparatus having fluid-driven auxiliary engines or apparatus**

7/02 . the apparatus being of single-stroke piston type, e.g. pistons acting on racks or pull-cords

7/04 . . the pistons acting on screw-threaded members to effect rotation

7/06 . the engines being of reciprocating-piston type (of internal-combustion type F02N 7/10)

7/08 . the engines being of rotary type

7/10 . characterised by using auxiliary engines or apparatus of combustion type (by using explosive cartridges F02N 13/00)

7/12 . . the engines being of rotary type, e.g. turbines (F02N 7/14 takes precedence)

7/14 . . the starting engines being readily removable from main engines, e.g. of portable type

9/00 **Starting of engines by supplying auxiliary pressure fluid to their working chambers**

9/02 . the pressure fluid being generated directly by combustion (by using explosive cartridges F02N 13/00)

9/04 . the pressure fluid being generated otherwise, e.g. by compressing air

11/00 **Starting of engines by means of electric motors** (arrangement or mounting of prime-movers consisting of electric motors and internal combustion engines for mutual or common propulsion B60K 6/20)

11/02 . the motors having longitudinally-shiftable rotors

11/04 . the motors being associated with current generators

11/06 . . and with ignition apparatus

11/08 . Circuits specially adapted for starting of engines

11/10 . Safety devices (F02N 11/08 takes precedence)

11/12 . Starting of engines by means of mobile, e.g. portable, starting sets

11/14 . Starting of engines by means of electric starters with external current supply (F02N 11/12 takes precedence)

13/00 **Starting of engines, or driving of starting apparatus by use of explosives, e.g. stored in cartridges**

13/02 . Cartridges specially adapted therefor (gas cartridges in general F42B 3/04)

15/00 **Other power-operated starting apparatus**; **Component parts, details, or accessories, not provided for in, or of interest apart from, groups F02N 5/00 to F02N 13/00**

15/02 . Gearing between starting-engines and started engines; Engagement or disengagement thereof

15/04 . . the gearing including disengaging toothed gears

15/06 . . . the toothed gears being moved by axial displacement

15/08 . . the gearing being of friction type

15/10 . Safety devices not otherwise provided for

19/00 **Starting aids for combustion engines, not otherwise provided for [2010.01]**

19/02 . Aiding engine start by thermal means, e.g. using lighted wicks (using electrically-heated glowing plugs F02P 19/02) **[2010.01]**

19/04 . . by heating of fluids used in engines (heating of lubricants F01M 5/02) **[2010.01]**

19/06 . . . by heating of combustion-air by flame generating means, e.g. flame glow-plugs **[2010.01]**

19/08 . . . . Arrangement thereof **[2010.01]**

19/10 . . . by heating of engine coolants **[2010.01]**

99/00 **Subject matter not provided for in the other groups of this subclass [2010.01]**

F02P **IGNITION, OTHER THAN COMPRESSION IGNITION, FOR INTERNAL-COMBUSTION ENGINES**; **TESTING OF IGNITION TIMING IN COMPRESSION-IGNITION ENGINES** (specially adapted for rotary-piston or oscillating-piston engines F02B 53/12; ignition of combustion apparatus in general, glowing plugs F23Q; measuring of physical variables in general G01; controlling in general G05; data processing in general G06; electrical components in general, see section H; sparking plugs H01T)

Subclass index

Electric spark ignition installations characterised by the type of ignition power generation or storage

1/00 **Installations having electric ignition energy generated by magneto- or dynamo-electric generators without subsequent storage**

1/02 . the generator rotor being characterised by forming part of the engine flywheel

1/04 . the generator being specially adapted for use with specific engine types, e.g. engines with V-arrangement of cylinders

1/06 . Generator drives, e.g. having snap couplings

1/08 . Layout of circuits

3/00 **Other electric spark ignition installations characterised by the type of ignition power generation storage**

3/01 . Electric spark ignition installations without subsequent energy storage, i.e. energy supplied by an electrical oscillator (with magneto- or dynamo-electric generators F02P 1/00; piezo-electric ignition F02P 3/12; with continuous electric spark F02P 15/10) **[4]**

3/02 . having inductive energy storage, e.g. arrangements of induction coils

3/04 . . Layout of circuits

3/045 . . . for control of the dwell or anti-dwell time **[4]**

3/05 . . . for control of the magnitude of the current in the ignition coil (during starting F02P 15/12) **[4]**

3/055 . . . with protective means to prevent damage to the circuit or the ignition coil **[4]**

3/06 . having capacitive energy storage (piezo-electric or electrostatic ignition F02P 3/12)

3/08 . . Layout of circuits (for low tension F02P 3/10)

3/09 . . . for control of the charging current in the capacitor (F02P 15/12 takes precedence) **[4]**

3/10 . . Low-tension installation, e.g. using surface-discharge sparking plugs

3/12 . Piezo-electric ignition; Electrostatic ignition

Advancing or retarding electric ignition spark; **Arrangements of distributors or of circuit-makers or -breakers for electric spark ignition**; **Electric spark ignition control or safety means, not otherwise provided for**

5/00 **Advancing or retarding electric ignition spark**; **Control therefor [6]**

5/02 . non-automatically; dependent on position of personal controls of engine, e.g. throttle position

5/04 . automatically, as a function of the working conditions of the engine or vehicle or of the atmospheric conditions (dependent on position of personal controls of engine F02P 5/02)

5/05 . . using mechanical means **[4]**

5/06 . . . dependent on engine speed **[4]**

5/07 . . . . Centrifugal timing mechanisms **[6]**

5/10 . . . dependent on fluid pressure in engine, e.g. combustion-air pressure **[4]**

5/12 . . . . dependent on a specific pressure other than that of combustion-air, e.g. of exhaust, cooling fluid, lubricant **[4]**

5/14 . . . dependent on specific conditions other than engine speed or engine fluid pressure, e.g. temperature **[4]**

5/145 . . using electrical means **[4]**

5/15 . . . Digital data processing **[4]**

5/152 . . . . dependent on pinking (detecting or indicating knocks in internal-combustion engines G01L 23/22) **[6]**

5/153 . . . . dependent on combustion pressure **[6]**

5/155 . . . Analogue data processing **[4]**

5/16 . characterised by the mechanical transmission between sensing elements or personal controls and final actuating elements

7/00 **Arrangement of distributors, circuit-makers, circuit-breakers or pick-up devices for electric spark ignition** (advancing or retarding ignition or control therefor F02P 5/00; such devices per se, see the relevant classes of section H, e.g. rotary switches H01H 19/00, contact-breakers, distributors H01R 39/00, generators H02K)

7/02 . of distributors

7/03 . . with electrical means (ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders F02P 15/08) **[4]**

7/04 . . having distributors with air-tight casing

7/06 . of circuit-makers or -breakers, or pick-up devices adapted to sense particular points of the timing cycle **[4]**

7/063 . . Mechanical pick-up devices, circuit-makers or -breakers, e.g. contact-breakers **[4]**

7/067 . . Electromagnetic pick-up devices **[4]**

7/07 . . . Hall-effect pick-up devices **[4]**

7/073 . . Optical pick-up devices **[4]**

7/077 . . Circuits therefor, e.g. pulse generators **[4]**

7/08 . . having air-tight casings

7/10 . Drives of distributors or of circuit-makers or -breakers

9/00 **Electric spark ignition control, not otherwise provided for**

11/00 **Safety means for electric spark ignition, not otherwise provided for**

11/02 . Preventing damage to engines or engine-driven gearing

11/04 . Preventing unauthorised use of engines (of vehicles B60R 25/04; ignition locks H01H 27/00)

11/06 . Indicating unsafe conditions

13/00 **Sparking plugs structurally combined with other parts of internal-combustion engines** (with fuel injectors F02M 57/06; predominant aspects of the parts, see the relevant subclasses)

15/00 **Electric spark ignition having characteristics not provided for in, or of interest apart from, groups F02P 1/00 to F02P 13/00**

15/02 . Arrangements having two or more sparking plugs

15/04 . one of the spark electrodes being mounted on the engine working piston

15/06 . the electric spark triggered by engine working cylinder compression

15/08 . having multiple-spark ignition, i.e. ignition occurring simultaneously at different places in one engine cylinder or in two or more separate engine cylinders

15/10 . having continuous electric sparks

15/12 . having means for strengthening spark during starting

17/00 **Testing of ignition installations, e.g. in combination with adjusting** (testing fuel injection apparatus F02M 65/00; testing ignition installations in general F23Q 23/00); **Testing of ignition timing in compression-ignition engines [4]**

17/02 . Checking or adjusting ignition timing **[6]**

17/04 . . dynamically **[6]**

17/06 . . . using a stroboscopic lamp **[6]**

17/08 . . . using a cathode-ray oscilloscope (F02P 17/06 takes precedence) **[6]**

17/10 . Measuring dwell or antidwell time **[6]**

17/12 . Testing characteristics of the spark, ignition voltage or current **[6]**

Other ignition

19/00 **Incandescent ignition, e.g. during starting of internal-combustion engines**; **Combination of incandescent and spark ignition [4]**

19/02 . electric, e.g. layout of circuits of apparatus having glowing plugs

19/04 . non-electric, e.g. heating incandescent spots by burners (use of burners for direct ignition F02P 21/00)

21/00 **Direct use of flames or burners for ignition**

21/02 . the flames being kept burning essentially external to engine working chambers

21/04 . Burning-cartridges or like inserts being arranged in engine working chambers (as starting aid F02N 19/02)

23/00 **Other ignition**

23/02 . Friction, pyrophoric, or catalytic ignition

23/04 . Other physical ignition means, e.g. using laser rays

F03 MACHINES OR ENGINES FOR LIQUIDS; WIND, SPRING, OR WEIGHT MOTORS; PRODUCING MECHANICAL POWER OR A REACTIVE PROPULSIVE THRUST, NOT OTHERWISE PROVIDED FOR

F03B **MACHINES OR ENGINES FOR LIQUIDS** (machines or engines for liquids and elastic fluids F01; positive-displacement engines for liquids F03C; positive-displacement machines for liquids F04)

(1) This subclass covers:
- engines, other than of positive-displacement type, driven by liquids;
- machines, other than of positive-displacement type, for liquids.

(2) Attention is drawn to the Notes preceding class F01, especially as regards the definition of "reaction type".

Subclass index

1/00 **Engines of impulse type, i.e. turbines with jets of high-velocity liquid impinging on bladed or like rotors, e.g. Pelton wheels; Parts or details peculiar thereto**

1/02 . Buckets; Bucket-carrying rotors

1/04 . Nozzles (in general B05B); Nozzle-carrying members

3/00 **Machines or engines of reaction type; Parts or details peculiar thereto**

3/02 . with radial flow at high-pressure side and axial flow at low-pressure side of rotors, e.g. Francis turbines

3/04 . with substantially axial flow throughout rotors, e.g. propeller turbines

3/06 . . with adjustable blades, e.g. Kaplan turbines

3/08 . with pressure/velocity transformation exclusively in rotors

3/10 . characterised by having means for functioning alternatively as pumps or turbines

3/12 . Blades; Blade-carrying rotors

3/14 . . Rotors having adjustable blades

3/16 . Stators

3/18 . . Stator blades; Guide conduits or vanes, e.g. adjustable

5/00 **Machines or engines characterised by non-bladed rotors, e.g. serrated, using friction**

7/00 **Water wheels**

9/00 **Endless-chain type machines or engines**

11/00 **Parts or details not provided for in, or of interest apart from, groups F03B 1/00 to F03B 9/00** (controlling F03B 15/00)

11/02 . Casings

11/04 . for diminishing cavitation or vibration, e.g. balancing

11/06 . Bearing arrangements

11/08 . for removing foreign matter, e.g. mud

13/00 **Adaptations of machines or engines for special use; Combinations of machines or engines with driving or driven apparatus** (if the apparatus aspects are predominant, see the relevant places for such apparatus, e.g. H02K 7/18); **Power stations or aggregates** (hydraulic-engineering aspects E02B; incorporating only machines or engines of positive-displacement type F03C)

13/02 . Adaptations for drilling wells

13/04 . Adaptations for use in dentistry

13/06 . Stations or aggregates of water-storage type (turbines characterised by having means for functioning alternatively as pumps F03B 3/10)

13/08 . Machine or engine aggregates in dams or the like; Conduits therefor

13/10 . Submerged units incorporating electric generators or motors

13/12 . characterised by using wave or tide energy

13/14 . . using wave energy **[4]**

13/16 . . . using the relative movement between a wave-operated member and another member **[4]**

13/18 . . . . wherein the other member is fixed, at least at one point, with respect to the sea bed or shore **[4]**

13/20 . . . . wherein both members are movable relative to the sea bed or shore **[4]**

13/22 . . . using the flow of water resulting from wave movements, e.g. to drive a hydraulic motor or turbine **[4]**

13/24 . . . to produce a flow of air, e.g. to drive an air turbine **[4]**

13/26 . . using tide energy **[4]**

15/00 **Controlling** (controlling in general G05)

15/02 . by varying liquid flow

15/04 . . of turbines (rotors having adjustable blades F03B 3/06, F03B 3/14; adjustable guide vanes F03B 3/18; specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors F03B 15/20)

15/06 . . . Regulating, i.e. acting automatically

15/08 . . . . by speed, e.g. by measuring electric frequency or liquid flow
15/10 . . . . . without retroactive action
15/12 . . . . . with retroactive action
15/14 . . . . by or of water level
15/16 . . . . by power output
15/18 . . . . for safety purposes, e.g. preventing overspeed
15/20 . . specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors (nozzles F03B 1/04)
15/22 . . . for safety purposes

17/00 Other machines or engines
17/02 . using hydrostatic thrust
17/04 . . Alleged perpetua mobilia
17/06 . using liquid flow, e.g. of swinging-flap type

F03C POSITIVE-DISPLACEMENT ENGINES DRIVEN BY LIQUIDS (positive-displacement engines for liquids and elastic fluids F01; positive-displacement machines for liquids F04; fluid-pressure actuators F15B; fluid gearing F16H)

Note

Attention is drawn to the Notes preceding class F01, especially as regards the definitions of "positive displacement", "rotary-piston machines", "oscillating-piston machines", "rotary-piston", "co-operating members", "movement of co-operating members", "teeth or tooth-equivalents", and "internal axis".

1/00 Reciprocating-piston liquid engines
1/007 . with single cylinder, double-acting piston **[5]**
1/013 . with single cylinder, single-acting piston **[5]**
1/02 . with multiple cylinders, characterised by the number or arrangement of cylinders (with movable cylinders F03C 1/22; of flexible-wall type F03C 7/00)
1/03 . . with movement in two directions being obtained by two single-acting piston liquid engines, each acting in one direction **[5]**
1/04 . . with cylinders in star- or fan-arrangement
1/047 . . . the pistons co-operating with an actuated element at the outer ends of the cylinders **[5]**
1/053 . . . the pistons co-operating with an actuated element at the inner ends of the cylinders **[5]**
1/06 . . with cylinder axes generally coaxial with, or parallel or inclined to, main shaft axis
1/08 . Distributing valve-gear peculiar thereto (for multiple-cylinder engines F03C 1/34; for engines with positive displacement in general F01L)
1/10 . . actuated by piston or piston-rod
1/12 . . . mechanically **[5]**
1/14 . . actuated by the driving liquid of the engine **[5]**
1/16 . . Speed controlling, equalising, or cushioning **[5]**
1/20 . . specially adapted for engines generating vibration only
1/22 . with movable cylinders
1/24 . . in which the liquid exclusively displaces one or more pistons reciprocating in rotary cylinders
1/247 . . . with cylinders in star- or fan-arrangement **[5]**
1/253 . . . with cylinder axes generally coaxial with, or parallel to, main shaft axis **[5]**
1/26 . adapted for special use or combined with apparatus driven thereby (aspects predominantly concerning the driven apparatus, see the relevant classes for such apparatus)
1/28 . Pistons specially adapted therefor **[5]**
1/30 . Cams specially adapted therefor **[5]**
1/32 . Cylinders specially adapted therefor **[5]**
1/34 . Distribution members specially adapted for multiple-cylinder engines **[5]**
1/36 . . Cylindrical distribution members **[5]**
1/38 . . Plate-like distribution members **[5]**
1/40 . Control specially adapted therefor **[5]**

2/00 Rotary-piston engines (in which the liquid exclusively displaces one or more piston reciprocating in rotary cylinders F03C 1/24) **[3]**

Note

Group F03C 2/30 takes precedence over groups F03C 2/02 to F03C 2/24. **[3]**

2/02 . of arcuate-engagement type, i.e. with circular translatory movement of co-operating members, each member having the same number of teeth or tooth-equivalents **[3]**
2/08 . of intermeshing-engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[3]**
2/22 . of internal-axis type with equidirectional movement of co-operating members at the points of engagement, or with one of the co-operating members being stationary, the inner member having more teeth or tooth-equivalents than the outer member **[3]**
2/24 . of counter-engagement type, i.e. the movement of co-operating members at the points of engagement being in opposite directions **[3]**
2/30 . having the characteristics covered by two or more of groups F03C 2/02, F03C 2/08, F03C 2/22, F03C 2/24 or having the characteristics covered by one of these groups together with some other type of movement between co-operating members **[3]**

4/00 Oscillating-piston engines [3]

7/00 Engines of flexible-wall type [2010.01]

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

F03D WIND MOTORS

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "wind motor" means a mechanism for converting the energy of natural wind into useful mechanical power, and the transmission of such power to its point of use;
– "rotor" means the wind-engaging parts of the wind motor and the rotary member carrying them;
– "rotation axis" means the axis of rotation of the rotor.

1/00 **Wind motors with rotation axis substantially in wind direction** (controlling F03D 7/00)
1/02 . having a plurality of rotors
1/04 . having stationary wind-guiding means, e.g. with shrouds or channels (F03D 1/02 takes precedence)
1/06 . Rotors

3/00 **Wind motors with rotation axis substantially at right angle to wind direction** (controlling F03D 7/00)
3/02 . having a plurality of rotors
3/04 . having stationary wind-guiding means, e.g. with shrouds or channels (F03D 3/02 takes precedence)
3/06 . Rotors

5/00 **Other wind motors** (controlling F03D 7/00)
5/02 . the wind-engaging parts being attached to endless chains or the like
5/04 . the wind-engaging parts being attached to carriages running on tracks or the like
5/06 . the wind-engaging parts swinging to-and-fro and not rotating

7/00 **Controlling wind motors**
7/02 . the wind motors having rotation axis substantially in wind direction
7/04 . . Regulation, i.e. controlling automatically
7/06 . the wind motors having rotation axis substantially at right angle to wind direction

9/00 **Adaptations of wind motors for special use**; **Combinations of wind motors with apparatus driven thereby** (aspects predominantly concerning driven apparatus, see the relevant classes for such apparatus)
9/02 . the apparatus storing power

11/00 **Details, component parts, or accessories not provided for in, or of interest apart from, the other groups of this subclass**
11/02 . Transmission of power, e.g. using hollow exhausting blades
11/04 . Mounting structures

F03G SPRING, WEIGHT, INERTIA, OR LIKE MOTORS; MECHANICAL-POWER-PRODUCING DEVICES OR MECHANISMS, NOT OTHERWISE PROVIDED FOR OR USING ENERGY SOURCES NOT OTHERWISE PROVIDED FOR (arrangements in connection with power supply in vehicles from force of nature B60K 16/00; electric propulsion with power supply in vehicles from force of nature B60L 8/00)

Note

In this subclass, the following term is used with the meaning indicated:
– "motors" means mechanisms for producing mechanical power from potential energy of solid bodies.

1/00 **Spring motors** (spring-driven toys A63H; springs in general F16F; precision time mechanisms, e.g. for clocks or watches, G04B)
1/02 . characterised by shape or material of spring, e.g. helical, spiral, coil
1/04 . . using rubber springs
1/06 . Other parts or details
1/08 . . for winding
1/10 . . for producing output movement other than rotary, e.g. vibratory

3/00 **Other motors, e.g. gravity or inertia motors**
3/02 . using wheels with circumferentially-arranged compartments co-operating with solid falling bodies (F03G 3/04 takes precedence)
3/04 . driven by sand or like fluent solid material
3/06 . using pendulums
3/08 . using flywheels

4/00 **Devices for producing mechanical power from geothermal energy [5]**
4/02 . with direct fluid contact **[5]**
4/04 . with deep-well turbo-pump **[5]**
4/06 . with fluid flashing **[5]**

5/00 **Devices for producing mechanical power from muscle energy** (driving cycles B62M)
5/02 . of endless-walk type, e.g. treadmills
5/04 . . Horsemills or the like
5/06 . other than of endless-walk type
5/08 . . for combined actuation by different limbs, e.g. hand and leg

6/00 **Devices for producing mechanical power from solar energy** (solar boilers F24) **[5]**
6/02 . using a single state working fluid **[5]**
6/04 . . gaseous **[5]**
6/06 . with solar energy concentrating means **[5]**

7/00 Mechanical-power-producing mechanisms, not otherwise provided for or using energy sources not otherwise provided for

7/04 . using pressure differences or thermal differences occurring in nature (F03G 7/06 takes precedence)

7/05 . . Ocean thermal energy conversion, i.e. OTEC **[5]**

7/06 . using expansion or contraction of bodies due to heating, cooling, moistening, drying, or the like (using thermal expansion of non-vaporising liquids F01K)

7/08 . recovering energy derived from swinging, rolling, pitching, or like movements, e.g. from the vibrations of a machine

7/10 . Alleged perpetua mobilia (using hydrostatic thrust F03B 17/04)

F03H PRODUCING A REACTIVE PROPULSIVE THRUST, NOT OTHERWISE PROVIDED FOR (from combustion products F02K)

1/00 Use of plasma to produce a reactive propulsive thrust (generating plasma H05H 1/00)

3/00 Use of photons to produce a reactive propulsive thrust

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

F04 POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS FOR LIQUIDS OR ELASTIC FLUIDS

Note

Combinations of positive-displacement and non-positive-displacement pumps are classified in subclass F04B as a general subclass for pumps, and in subclasses F04C, F04D in respect of matter specific to those subclasses.

F04B **POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS**; **PUMPS** (engine fuel-injection pumps F02M; machines for liquids, or pumps, of rotary-piston or oscillating-piston type F04C; non-positive-displacement pumps F04D; pumping of fluid by direct contact of another fluid or by using inertia of fluid to be pumped F04F; crankshafts, crossheads, connecting-rods F16C; flywheels F16F; gearings for interconverting rotary motion and reciprocating motion in general F16H; pistons, piston-rods, cylinders, in general F16J)

(1) In this subclass, the following term is used with the meaning indicated:
– "piston" also covers a plunger.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81Brelating to "micro-structural devices" and "micro-structural systems". **[7]**

(3) Attention is drawn to the Notes preceding class F01, especially as regards the definitions of "machines", "pumps", and "positive-displacement".

(4) Machines, pumps or pumping installations having flexible working members are classified in groups F04B 43/00 or F04B 45/00. **[2009.01]**

Subclass index

Pumps for liquids or for liquid and elastic fluids; **Positive-displacement machines for liquids**

1/00 **Multi-cylinder machines or pumps characterised by number or arrangement of cylinders** (F04B 3/00 takes precedence; fluid-driven pumps F04B 9/08; control of reciprocating machines or pumps in general F04B 49/00)

1/02 . having two cylinders (in V-arrangement F04B 1/04)

1/04 . having cylinders in star- or fan-arrangement **[6]**

1/047 . . with an actuating or actuated element at the outer ends of the cylinders **[6]**

1/053 . . with an actuating or actuated element at the inner ends of the cylinders **[6]**

1/06 . . Control

1/07 . . . by varying the relative eccentricity between two members, e.g. a cam and a drive shaft **[6]**

1/08 . . . regulated by delivery pressure

1/10 . . the cylinders being movable, e.g. rotary **[6]**

1/107 . . . with an actuating or actuated element at the outer ends of the cylinders **[6]**

1/113 . . . with an actuating or actuated element at the inner ends of the cylinders **[6]**

1/12 . having cylinder axes coaxial with, or parallel or inclined to, main shaft axis
1/14 . . having stationary cylinders
1/16 . . . having two or more sets of cylinders or pistons
1/18 . . . having self-acting distribution members, i.e. actuated by working fluid
1/20 . . having rotary cylinder block
1/22 . . . having two or more sets of cylinders or pistons
1/24 . . . . inclined to main shaft axis
1/26 . . Control
1/28 . . . for machines or pumps with stationary cylinders
1/29 . . . . by varying the relative positions of a swash plate and a cylinder block **[6]**
1/30 . . . for machines or pumps with rotary cylinder block
1/32 . . . . by varying the relative positions of a swash plate and a cylinder block **[6]**
1/34 . Control not provided for in a single group of groups F04B 1/02 to F04B 1/32 **[6]**

3/00 Machines or pumps with pistons coacting within one cylinder, e.g. multi-stage

5/00 Machines or pumps with differential-surface pistons
5/02 . with double-acting pistons **[6]**

7/00 Piston machines or pumps characterised by having positively-driven valving (with cylinders in star- or fan-arrangement F04B 1/04; with cylinder axes coaxial with, or parallel or inclined to, main shaft axis F04B 1/12)
7/02 . the valving being fluid-actuated
7/04 . in which the valving is performed by pistons and cylinders coacting to open and close intake or outlet ports **[3]**
7/06 . . the pistons and cylinders being relatively reciprocated and rotated **[3]**

9/00 Piston machines or pumps characterised by the driving or driven means to or from their working members
9/02 . the means being mechanical
9/04 . . the means being cams, eccentrics, or pin-and-slot mechanisms (with cylinder axes coaxial with, or parallel or inclined to, main shaft axis F04B 1/12)
9/06 . . the means including spring- or weight-loaded lost-motion devices
9/08 . the means being fluid
9/10 . . the fluid being liquid
9/103 . . . having only one pumping chamber **[6]**
9/105 . . . . reciprocating movement of the pumping member being obtained by a double-acting liquid motor **[6]**
9/107 . . . . rectilinear movement of the pumping member in the working direction being obtained by a single-acting liquid motor, e.g. actuated in the other direction by gravity or a spring **[6]**
9/109 . . . having plural pumping chambers **[6]**
9/111 . . . . with two mechanically connected pumping members **[6]**
9/113 . . . . . reciprocating movement of the pumping members being obtained by a double-acting liquid motor **[6]**
9/115 . . . . . reciprocating movement of the pumping members being obtained by two single-acting liquid motors, each acting in one direction **[6]**
9/117 . . . . the pumping members not being mechanically connected to each other **[6]**
9/12 . . the fluid being elastic, e.g. steam or air
9/123 . . . having only one pumping chamber **[6]**
9/125 . . . . reciprocating movement of the pumping member being obtained by a double-acting elastic-fluid motor **[6]**
9/127 . . . . rectilinear movement of the pumping member in the working direction being obtained by a single-acting elastic-fluid motor, e.g. actuated in the other direction by gravity or a spring **[6]**
9/129 . . . having plural pumping chambers **[6]**
9/131 . . . . with two mechanically connected pumping members **[6]**
9/133 . . . . . reciprocating movement of the pumping members being obtained by a double-acting elastic-fluid motor **[6]**
9/135 . . . . . reciprocating movement of the pumping members being obtained by two single-acting elastic-fluid motors, each acting in one direction **[6]**
9/137 . . . . the pumping members not being mechanically connected to each other **[6]**
9/14 . Pumps characterised by muscle-power operation

11/00 Equalisation of pulses, e.g. by use of air vessels; **Counteracting cavitation**

13/00 Pumps specially modified to deliver fixed or variable measured quantities (for transferring liquid from bulk storage containers or reservoirs into vehicles or into portable containers B67D 7/58)
13/02 . of two or more fluids at the same time

15/00 Pumps adapted to handle specific fluids, e.g. by selection of specific materials for pumps or pump parts
15/02 . the fluids being viscous or non-homogeneous
15/04 . the fluids being hot or corrosive (F04B 15/06 takes precedence)
15/06 . for liquids near their boiling point, e.g. under subnormal pressure
15/08 . . the liquids having low boiling points

17/00 Pumps characterised by combination with, or adaptation to, specific driving engines or motors
17/02 . driven by wind motors
17/03 . driven by electric motors **[6]**
17/04 . . using solenoids **[6]**
17/05 . driven by internal-combustion engines **[6]**
17/06 . Mobile combinations

19/00 Machines or pumps having pertinent characteristics not provided for in, or of interest apart from, groups F04B 1/00 to F04B 17/00
19/02 . having movable cylinders
19/04 . Pumps for special use (for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers B67D 7/58)
19/06 . . Pumps for delivery of both liquid and elastic fluids at the same time (wet gas pumps F04B 37/20) **[6]**
19/08 . Scoop devices
19/10 . . of wheel type
19/12 . . of helical or screw type

19/14 . . of endless-chain type, e.g. with the chains carrying pistons co-operating with open-ended cylinders
19/16 . Adhesion-type liquid-lifting devices
19/18 . . Adhesion members therefor
19/20 . Other positive-displacement pumps
19/22 . . of reciprocating-piston type
19/24 . . Pumping by heat expansion of pumped fluid

23/00 Pumping installations or systems (F04B 17/00 takes precedence)
23/02 . having reservoirs
23/04 . Combinations of two or more pumps
23/06 . . the pumps being all of reciprocating positive-displacement type
23/08 . . the pumps being of different types
23/10 . . . at least one pump being of the reciprocating positive-displacement type
23/12 . . . at least one pump being of the rotary-piston positive-displacement type (F04B 23/10 takes precedence)
23/14 . . . at least one pump being of the non-positive-displacement type (F04B 23/10, F04B 23/12 take precedence)

Pumps specially adapted for elastic fluids

25/00 Multi-stage pumps specially adapted for elastic fluids
25/02 . of stepped-piston type
25/04 . having cylinders coaxial with, or parallel or inclined to, main shaft axis

27/00 Multi-cylinder pumps specially adapted for elastic fluids and characterised by number or arrangement of cylinders (F04B 25/00 takes precedence; control of reciprocating machines or pumps in general F04B 49/00)
27/02 . having cylinders arranged oppositely relative to main shaft
27/04 . having cylinders in star- or fan-arrangement **[6]**
27/047 . . with an actuating element at the outer ends of the cylinders **[6]**
27/053 . . with an actuating element at the inner ends of the cylinders **[6]**
27/06 . . the cylinders being movable, e.g. rotary
27/067 . . Control **[6]**
27/073 . . . by varying the relative eccentricity between two members, e.g. a cam and a drive shaft **[6]**
27/08 . having cylinders coaxial with, or parallel or inclined to, main shaft axis
27/10 . . having stationary cylinders **[6]**
27/12 . . . having plural sets of cylinders or pistons **[6]**
27/14 . . Control **[6]**
27/16 . . . of pumps with stationary cylinders **[6]**
27/18 . . . . by varying the relative positions of a swash plate and a cylinder block **[6]**
27/20 . . . of pumps with rotary cylinder block **[6]**
27/22 . . . . by varying the relative positions of a swash plate and a cylinder block **[6]**
27/24 . Control not provided for in a single group of groups F04B 27/02 to F04B 27/22 **[6]**

31/00 Free-piston pumps specially adapted for elastic fluids; **Systems incorporating such pumps** (muscle-driven pumps in which the stroke is not defined by gearing F04B 33/00; free-piston combustion engines, free-piston gas generators F02B 71/00; systems predominated by prime mover aspects, see the relevant class for the prime mover)

33/00 Pumps specially adapted for elastic fluids actuated by muscle power, e.g. for inflating
33/02 . with intermediate gearing

35/00 Piston pumps specially adapted for elastic fluids and characterised by the driving means to their working members, or by combination with, or adaptation to, specific driving engines or motors, not otherwise provided for (predominant aspects of the engines or motors, see the relevant classes)
35/01 . the means being mechanical **[6]**
35/02 . the means being fluid
35/04 . the means being electric
35/06 . Mobile combinations

37/00 Pumps specially adapted for elastic fluids and having pertinent characteristics not provided for in, or of interest apart from, groups F04B 25/00 to F04B 35/00
37/02 . for evacuating by absorption or adsorption (absorption or adsorption in general B01J)
37/04 . . Selection of specific absorption or adsorption materials
37/06 . for evacuating by thermal means
37/08 . . by condensing or freezing, e.g. cryogenic pumps (cold traps B01D 8/00)
37/10 . for special use (F04B 37/02, F04B 37/06 take precedence)
37/12 . . to obtain high pressure
37/14 . . to obtain high vacuum
37/16 . . . Means for nullifying unswept space
37/18 . . for specific elastic fluids
37/20 . . . for wet gases, e.g. wet air

39/00 Component parts, details, or accessories, of pumps or pumping systems specially adapted for elastic fluids, not otherwise provided for in, or of interest apart from, groups F04B 25/00 to F04B 37/00 (for controlling F04B 49/00)
39/02 . Lubrication (of machines or engines in general F01M)
39/04 . Measures to avoid lubricant contaminating the pumped fluid
39/06 . Cooling (of machines or engines in general F01P); Heating; Prevention of freezing
39/08 . Actuation of distribution members
39/10 . Adaptation or arrangement of distribution members
39/12 . Casings (casings for machines or engines in general F16M); Cylinders; Cylinder heads; Fluid connections
39/14 . Provisions for readily assembling or disassembling
39/16 . Filtration; Moisture separation

41/00 Pumping installations or systems specially adapted for elastic fluids (F04B 31/00, F04B 35/00 take precedence)
41/02 . having reservoirs
41/04 . Conversion of internal-combustion engine cylinder units to pumps
41/06 . Combinations of two or more pumps

Machines or pumps having flexible working members

43/00 Machines, pumps, or pumping installations having flexible working members (pumps or pumping installations specially adapted for elastic fluids F04B 45/00)
43/02 . having plate-like flexible members, e.g. diaphragms (F04B 43/14 takes precedence) **[3]**
43/04 . . Pumps having electric drive

43/06 . . Pumps having fluid drive
43/067 . . . the fluid being actuated directly by a piston **[6]**
43/073 . . . the actuating fluid being controlled by at least one valve **[6]**
43/08 . having tubular flexible members (F04B 43/12 takes precedence)
43/09 . . Pumps having electric drive **[6]**
43/10 . . Pumps having fluid drive
43/107 . . . the fluid being actuated directly by a piston **[6]**
43/113 . . . the actuating fluid being controlled by at least one valve **[6]**
43/12 . having peristaltic action
43/14 . . having plate-like flexible members **[3]**

45/00 Pumps or pumping installations having flexible working members and specially adapted for elastic fluids

45/02 . having bellows
45/027 . . having electric drive **[6]**
45/033 . . having fluid drive **[6]**
45/04 . having plate-like flexible members, e.g. diaphragms (F04B 45/10 takes precedence) **[3]**
45/047 . . Pumps having electric drive **[6]**
45/053 . . Pumps having fluid drive **[6]**
45/06 . having tubular flexible members (F04B 45/02, F04B 45/08 take precedence) **[3]**
45/067 . . Pumps having electric drive **[6]**
45/073 . . Pumps having fluid drive **[6]**
45/08 . having peristaltic action **[3]**
45/10 . . having plate-like flexible members **[3]**

47/00 Pumps or pumping installations specially adapted for raising fluids from great depths, e.g. well pumps (by using positive or negative pressurised fluid medium acting directly on the liquid to be pumped F04F 1/00)

47/02 . the driving mechanisms being situated at ground level (F04B 47/12 takes precedence)
47/04 . . the driving means incorporating fluid means
47/06 . having motor-pump units situated at great depth
47/08 . . the motors being actuated by fluid
47/10 . . . the units or parts thereof being liftable to ground level by fluid pressure
47/12 . having free plunger lifting the fluid to the surface
47/14 . Counterbalancing

49/00 Control of, or safety measures for, machines, pumps, or pumping installations, not otherwise provided for in, or of interest apart from, groups F04B 1/00 to F04B 47/00

49/02 . Stopping, starting, unloading, or idling control (controlled electrically F04B 49/06) **[6]**
49/025 . . by means of floats **[6]**
49/03 . . by means of valves **[6]**
49/035 . . . Bypassing **[6]**
49/04 . Regulating by means of floats (F04B 49/025 takes precedence) **[6]**
49/06 . Control using electricity (regulating by means of floats actuating electric switches F04B 49/04)
49/08 . Regulating by delivery pressure
49/10 . Other safety measures
49/12 . by varying the length of stroke of the working members **[6]**
49/14 . . Adjusting abutments located in the path of reciprocation **[6]**
49/16 . by adjusting the capacity of dead spaces of working chambers **[6]**
49/18 . by changing the effective cross-section of the working surface of the piston **[6]**
49/20 . by changing the driving speed (controlled electrically F04B 49/06) **[6]**
49/22 . by means of valves (F04B 49/03 takes precedence) **[6]**
49/24 . . Bypassing **[6]**

51/00 Testing machines, pumps, or pumping installations

53/00 Component parts, details or accessories not provided for in, or of interest apart from, groups F04B 1/00 to F04B 23/00 or F04B 39/00 to F04B 47/00 [6]

53/02 . Packing the free space between cylinders and pistons **[6]**
53/04 . Draining **[6]**
53/06 . Venting **[6]**
53/08 . Cooling (of machines or engines in general F01P); Heating; Preventing freezing **[6]**
53/10 . Valves; Arrangement of valves **[6]**
53/12 . . arranged in or on pistons **[6]**
53/14 . Pistons, piston-rods or piston-rod connections **[6]**
53/16 . Casings; Cylinders; Cylinder liners or heads; Fluid connections **[6]**
53/18 . Lubricating (of machines or engines in general F01M) **[6]**
53/20 . Filtering **[6]**
53/22 . Arrangements for enabling ready assembly or disassembly **[6]**

F04C **ROTARY-PISTON, OR OSCILLATING-PISTON, POSITIVE-DISPLACEMENT MACHINES FOR LIQUIDS** (engines driven by liquids F03C); **ROTARY-PISTON, OR OSCILLATING-PISTON, POSITIVE-DISPLACEMENT PUMPS** (engine fuel-injection pumps F02M)

Note

Attention is drawn to the Notes preceding class F01, especially as regards the definitions of “machines”, “pumps”, “positive displacement”, “rotary-piston machines”, “oscillating-piston machines”, “rotary piston”, “co-operating members”, “movement of co-operating members”, “teeth or tooth-equivalents”, and “internal axis”.

Subclass index

***Machines for liquids*; *Pumps for liquids or for liquids and elastic fluids* [2011.01]**

2/00 **Rotary-piston machines or pumps** (with non-parallel axes of co-operating members F04C 3/00; with the working-chamber walls at least partly resiliently deformable F04C 5/00; with fluid ring or the like F04C 7/00; rotary-piston pumps specially adapted for elastic fluids F04C 18/00, F04C 19/00; rotary-piston machines or pumps in which the working-fluid is exclusively displaced by, or exclusively displaces, one or more reciprocating pistons F04B) **[3]**

Note

Group F04C 2/30 takes precedence over groups F04C 2/02 to F04C 2/24. **[3]**

2/02 . of arcuate-engagement type, i.e. with circular translatory movement of co-operating members, each member having the same number of teeth or tooth-equivalents **[3]**

2/04 . . of internal-axis type **[3]**

2/06 . . of other than internal-axis type (F04C 2/063 takes precedence) **[3]**

2/063 . . with coaxially-mounted members having continuously-changing circumferential spacing between them **[3]**

2/067 . . . having cam-and-follower type drive **[3]**

2/07 . . . having crankshaft-and-connecting-rod type drive **[3]**

2/073 . . . having pawl-and-ratchet type drive **[3]**

2/077 . . . having toothed-gearing type drive **[3]**

2/08 . of intermeshing-engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[3]**

2/10 . . of internal-axis type with the outer member having more teeth or tooth-equivalents, e.g. rollers, than the inner member **[3]**

2/107 . . . with helical teeth **[3]**

2/113 . . . the inner member carrying rollers intermeshing with the outer member **[3]**

2/12 . . of other than internal-axis type **[3]**

2/14 . . . with toothed rotary pistons **[3]**

2/16 . . . . with helical teeth, e.g. chevron-shaped, screw type **[3]**

2/18 . . . . with similar tooth forms (F04C 2/16 takes precedence) **[3]**

2/20 . . . . with dissimilar tooth forms (F04C 2/16 takes precedence) **[3]**

2/22 . of internal-axis type with equidirectional movement of co-operating members at the points of engagement, or with one of the co-operating members being stationary, the inner member having more teeth or tooth-equivalents than the outer member **[3]**

2/24 . of counter-engagement type, i.e. the movement of co-operating members at the points of engagement being in opposite directions **[3]**

2/26 . . of internal-axis type **[3]**

2/28 . . of other than internal-axis type **[3]**

2/30 . having the characteristics covered by two or more of groups F04C 2/02, F04C 2/08, F04C 2/22, F04C 2/24 or having the characteristics covered by one of these groups together with some other type of movement between co-operating members **[3]**

2/32 . . having both the movement defined in group F04C 2/02 and relative reciprocation between the co-operating members **[3]**

2/324 . . . with vanes hinged to the inner member and reciprocating with respect to the outer member **[3]**

2/328 . . . . and hinged to the outer member **[3]**

2/332 . . . with vanes hinged to the outer member and reciprocating with respect to the inner member **[3]**

2/336 . . . . and hinged to the inner member **[3]**

2/34 . . having the movement defined in group F04C 2/08 or F04C 2/22 and relative reciprocation between the co-operating members **[3]**

2/344 . . . with vanes reciprocating with respect to the inner member **[3]**

2/348 . . . . the vanes positively engaging, with circumferential play, an outer rotatable member **[3]**

2/352 . . . . the vanes being pivoted on the axis of the outer member **[3]**

2/356 . . . with vanes reciprocating with respect to the outer member **[3]**

2/36 . . having both the movements defined in groups F04C 2/22 and F04C 2/24 **[3]**

2/38 . . having the movement defined in group F04C 2/02 and having a hinged member (F04C 2/32 takes precedence) **[3]**

2/39 . . . with vanes hinged to the inner as well as to the outer member **[3]**

2/40 . . having the movement defined in group F04C 2/08 or F04C 2/22 and having a hinged member **[3]**

2/44 . . . with vanes hinged to the inner member **[3]**

2/46 . . . with vanes hinged to the outer member **[3]**

3/00 **Rotary-piston machines or pumps, with non-parallel axes of movement of co-operating members, e.g. of screw type** (with the working-chamber walls at least partly resiliently deformable F04C 5/00; rotary-piston pumps with non-parallel axes of movement of co-operating members specially adapted for elastic fluids F04C 18/48)

3/02 . the axes being arranged at an angle of 90 degrees **[5]**

3/04 . . of intermeshing engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[5]**

3/06 . the axes being arranged otherwise than at an angle of 90 degrees **[5]**

3/08 . . of intermeshing engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[5]**

5/00 **Rotary-piston machines or pumps with the working-chamber walls at least partly resiliently deformable** (such pumps specially adapted for elastic fluids F04C 18/00)

7/00 **Rotary-piston machines or pumps with fluid ring or the like** (such pumps specially adapted for elastic fluids F04C 19/00)

9/00 **Oscillating-piston machines or pumps** (such pumps specially adapted for elastic fluids F04C 21/00)

11/00 **Combinations of two or more machines or pumps, each being of rotary-piston or oscillating-piston type** (combinations of such pumps specially adapted for elastic fluids F04C 23/00); **Pumping installations** (F04C 13/00 takes precedence; specially adapted for elastic fluids F04C 23/00; fluid gearing F16H 39/00 to F16H 47/00)

13/00 **Adaptations of machines or pumps for special use, e.g. for extremely high pressures** (of pumps specially adapted for elastic fluids F04C 25/00)

14/00 **Control of, monitoring of, or safety arrangements for, machines, pumps or pumping installations** (of pumps or pumping installations specially adapted for elastic fluids F04C 28/00) **[8]**

14/02 . specially adapted for several machines or pumps connected in series or in parallel **[8]**

14/04 . specially adapted for reversible machines or pumps **[8]**

14/06 . specially adapted for stopping, starting, idling or no-load operation **[8]**

14/08 . characterised by varying the rotational speed **[8]**

14/10 . characterised by changing the positions of the inlet or outlet openings with respect to the working chamber **[8]**

14/12 . . using sliding valves **[8]**

14/14 . . using rotating valves **[8]**

14/16 . . using lift valves **[8]**

14/18 . characterised by varying the volume of the working chamber (by changing the positions of inlet or outlet openings F04C 14/10) **[8]**

14/20 . . by changing the form of the inner or outer contour of the working chamber **[8]**

14/22 . . by changing the eccentricity between cooperating members **[8]**

14/24 . characterised by using valves regulating pressure or flow rate, e.g. discharge valves (F04C 14/10 takes precedence) **[8]**

14/26 . . using bypass channels **[8]**

14/28 . Safety arrangements; Monitoring **[8]**

15/00 **Component parts, details or accessories of machines, pumps or pumping installations, not provided for in groups F04C 2/00 to F04C 14/00** (of pumps specially adapted for elastic fluids F04C 18/00 to F04C 29/00) **[1,8]**

15/06 . Arrangements for admission or discharge of the working fluid, e.g. constructional features of the inlet or outlet **[8]**

Pumps specially adapted for elastic fluids

18/00 **Rotary-piston pumps specially adapted for elastic fluids** (with fluid ring or the like F04C 19/00; rotary-piston pumps in which the working-fluid is exclusively displaced by one or more reciprocating pistons F04B) **[3]**

Note

Group F04C 18/30 takes precedence over groups F04C 18/02 to F04C 18/24. **[3,5]**

18/02 . of arcuate-engagement type, i.e. with circular translatory movement of co-operating members, each member having the same number of teeth or tooth-equivalents **[3]**

18/04 . . of internal-axis type **[3]**

18/06 . . of other than internal-axis type (F04C 18/063 takes precedence) **[3]**
18/063 . . with coaxially-mounted members having continuously-changing circumferential spacing between them **[3]**
18/067 . . . having cam-and-follower type drive **[3]**
18/07 . . . having crankshaft-and-connecting-rod type drive **[3]**
18/073 . . . having pawl-and-ratchet type drive **[3]**
18/077 . . . having toothed-gearing type drive **[3]**
18/08 . of intermeshing-engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[3]**
18/10 . . of internal-axis type with the outer member having more teeth or tooth-equivalents, e.g. rollers, than the inner member **[3]**
18/107 . . . with helical teeth **[3]**
18/113 . . . the inner member carrying rollers intermeshing with the outer member **[3]**
18/12 . . of other than internal-axis type **[3]**
18/14 . . . with toothed rotary pistons **[3]**
18/16 . . . . with helical teeth, e.g. chevron-shaped, screw type **[3]**
18/18 . . . . with similar tooth forms (F04C 18/16 takes precedence) **[3]**
18/20 . . . . with dissimilar tooth forms (F04C 18/16 takes precedence) **[3]**
18/22 . of internal-axis type with equidirectional movement of co-operating members at the points of engagement, or with one of the co-operating members being stationary, the inner member having more teeth or tooth-equivalents than the outer member **[3]**
18/24 . of counter-engagement type, i.e. the movement of co-operating members at the points of engagement being in opposite directions **[3]**
18/26 . . of internal-axis type **[3]**
18/28 . . of other than internal-axis type **[3]**
18/30 . having the characteristics covered by two or more of groups F04C 18/02, F04C 18/08, F04C 18/22, F04C 18/24, F04C 18/48, or having the characteristics covered by one of these groups together with some other type of movement between co-operating members **[3]**
18/32 . . having both the movement defined in group F04C 18/02 and relative reciprocation between the co-operating members **[3]**
18/324 . . . with vanes hinged to the inner member and reciprocating with respect to the outer member **[3]**
18/328 . . . . and hinged to the outer member **[3]**
18/332 . . . with vanes hinged to the outer member and reciprocating with respect to the inner member **[3]**
18/336 . . . . and hinged to the inner member **[3]**
18/34 . . having the movement defined in group F04C 18/08 or F04C 18/22 and relative reciprocation between the co-operating members **[3]**
18/344 . . . with vanes reciprocating with respect to the inner member **[3]**
18/348 . . . . the vanes positively engaging, with circumferential play, an outer rotatable member **[3]**
18/352 . . . . the vanes being pivoted on the axis of the outer member **[3]**
18/356 . . . with vanes reciprocating with respect to the outer member **[3]**
18/36 . . having both the movements defined in groups F04C 18/22 and F04C 18/24 **[3]**
18/38 . . having the movement defined in group F04C 18/02 and having a hinged member (F04C 18/32 takes precedence) **[3]**
18/39 . . . with vanes hinged to the inner as well as to the outer member **[3]**
18/40 . . having the movement defined in group F04C 18/08 or F04C 18/22 and having a hinged member **[3]**
18/44 . . . with vanes hinged to the inner member **[3]**
18/46 . . . with vanes hinged to the outer member **[3]**
18/48 . Rotary-piston pumps with non-parallel axes of movement of co-operating members **[5]**

Note

Group F04C 18/30 takes precedence over group F04C 18/48. **[8]**

18/50 . . the axes being arranged at an angle of 90 degrees **[5]**
18/52 . . . of intermeshing engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[5]**
18/54 . . the axes being arranged otherwise than at an angle of 90 degrees **[5]**
18/56 . . . of intermeshing engagement type, i.e. with engagement of co-operating members similar to that of toothed gearing **[5]**

19/00 Rotary-piston pumps with fluid ring or the like, specially adapted for elastic fluids

21/00 Oscillating-piston pumps specially adapted for elastic fluids

23/00 Combinations of two or more pumps, each being of rotary-piston or oscillating-piston type, specially adapted for elastic fluids; **Pumping installations specially adapted for elastic fluids**; **Multi-stage pumps specially adapted for elastic fluids**
(F04C 25/00 takes precedence)
23/02 . Pumps characterised by combination with, or adaptation to, specific driving engines or motors (predominant aspects of the engines or motors, see the relevant classes)

25/00 Adaptations for special use of pumps for elastic fluids
25/02 . for producing high vacuum (sealing arrangements F04C 27/00; silencing F04C 29/06)

27/00 Sealing arrangements in rotary-piston pumps specially adapted for elastic fluids
27/02 . Liquid sealing for high-vacuum pumps

28/00 Control of, monitoring of, or safety arrangements for, pumps or pumping installations specially adapted for elastic fluids [8]
28/02 . specially adapted for several pumps connected in series or in parallel **[8]**
28/04 . specially adapted for reversible pumps **[8]**
28/06 . specially adapted for stopping, starting, idling or no-load operation **[8]**
28/08 . characterised by varying the rotational speed **[8]**

28/10 . characterised by changing the positions of the inlet or outlet openings with respect to the working chamber **[8]**
28/12 . . using sliding valves **[8]**
28/14 . . using rotating valves **[8]**
28/16 . . using lift valves **[8]**
28/18 . characterised by varying the volume of the working chamber (by changing the positions of inlet or outlet openings F04C 28/10) **[8]**
28/20 . . by changing the form of the inner or outer contour of the working chamber **[8]**
28/22 . . by changing the eccentricity between cooperating members **[8]**
28/24 . characterised by using valves regulating pressure or flow rate, e.g. discharge valves (F04C 28/10 takes precedence) **[8]**
28/26 . . using bypass channels **[8]**
28/28 . Safety arrangements; Monitoring **[8]**

29/00 Component parts, details, or accessories, of pumps or pumping installations specially adapted for elastic fluids, not provided for in groups F04C 18/00 to F04C 28/00
29/02 . Lubrication; Lubricant separation
29/04 . Heating; Cooling; Heat insulation
29/06 . Silencing
29/12 . Arrangements for admission or discharge of the working fluid, e.g. constructional features of the inlet or outlet **[8]**

F04D NON-POSITIVE-DISPLACEMENT PUMPS (engine fuel-injection pumps F02M)

(1) This subclass covers non-positive-displacement pumps for liquids, for elastic fluids, or for liquids and elastic fluids whether rotary or not having pure rotation.
(2) This subclass does not cover combinations of non-positive-displacement pumps with other pumps, which are covered by subclass F04B, except that the use of such other pumps for priming or boosting non-positive-displacement is covered by this subclass.
(3) Attention is drawn to the Notes preceding class F01, especially as regards the definition of "pump".

Subclass index

1/00 Radial-flow pumps, e.g. centrifugal pumps; **Helico-centrifugal pumps** (adapted for pumping specific fluids F04D 7/00; priming or boosting F04D 9/00; pumping liquids and elastic fluids at the same time F04D 31/00)
1/02 . having non-centrifugal stages, e.g. centripetal
1/04 . Helico-centrifugal pumps
1/06 . Multi-stage pumps (F04D 1/02 takes precedence)
1/08 . . the stages being situated concentrically
1/10 . . with means for changing the flow-path through the stages, e.g. series/parallel
1/12 . Pumps with scoops or like paring members protruding in the fluid circulating in a bowl
1/14 . Pumps raising fluids by centrifugal force within a conical rotary bowl with vertical axis

3/00 Axial-flow pumps (priming or boosting F04D 9/00; pumping liquids and elastic fluids at the same time F04D 31/00)
3/02 . of screw type

5/00 Pumps with circumferential or transverse flow (pumping liquids and elastic fluids at the same time F04D 31/00)

7/00 Pumps adapted for handling specific fluids, e.g. by selection of specific materials for pumps or pump parts (pumping liquids and elastic fluids at the same time F04D 31/00)
7/02 . of centrifugal type
7/04 . . the fluids being viscous or non-homogeneous
7/06 . . the fluids being hot or corrosive, e.g. liquid metal
7/08 . . the fluids being radioactive

9/00 Priming; **Preventing vapour lock**
9/02 . Self-priming pumps
9/04 . using priming pumps; using booster pumps to prevent vapour lock
9/06 . . of jet type

11/00 Other rotary non-positive-displacement pumps (pumping installations or systems F04D 13/00; pumping liquids and elastic fluids at the same time F04D 31/00)

13/00 **Pumping installations or systems** (controlling F04D 15/00; pumping liquids and elastic fluids at the same time F04D 31/00)

13/02 . Units comprising pumps and their driving means (predominant aspects of the driving means, see the relevant classes for such means)

13/04 . . the pump being fluid-driven

13/06 . . the pump being electrically driven

13/08 . . . for submerged use

13/10 . . . . adapted for use in mining bore holes

13/12 . Combinations of two or more pumps (combinations with priming pumps or booster pumps to counter-act vapour lock F04D 9/04)

13/14 . . the pumps being all of centrifugal type

13/16 . with storage reservoirs

15/00 **Control, e.g. regulation, of pumps, pumping installations, or systems**

15/02 . Stopping of pumps, or operating valves, on occurrence of unwanted conditions

Rotary pumps specially adapted for elastic fluids

17/00 **Radial-flow pumps specially adapted for elastic fluids, e.g. centrifugal pumps**; **Helico-centrifugal pumps specially adapted for elastic fluids** (F04D 21/00 takes precedence)

17/02 . having non-centrifugal stages, e.g. centripetal

17/04 . . of transverse-flow type

17/06 . Helico-centrifugal pumps

17/08 . Centrifugal pumps

17/10 . . for compressing or evacuating

17/12 . . . Multi-stage pumps

17/14 . . . . with means for changing the flow-path through the stages, e.g. series/parallel (surge control F04D 27/02)

17/16 . . for displacing without appreciable compression

17/18 . . characterised by use of centrifugal force of liquids entrained in pumps

19/00 **Axial-flow pumps specially adapted for elastic fluids** (F04D 21/00 takes precedence)

19/02 . Multi-stage pumps

19/04 . . specially adapted to the production of a high vacuum, e.g. molecular pumps

21/00 **Pumps specially adapted for elastic fluids involving supersonic speed of pumped fluids**

23/00 **Other rotary non-positive-displacement pumps specially adapted for elastic fluids** (pumping installations or systems F04D 25/00)

25/00 **Pumping installations or systems specially adapted for elastic fluids** (controlling F04D 27/00)

25/02 . Units comprising pumps and their driving means (predominant aspects of the driving means, see the relevant classes for such means)

25/04 . . the pump being fluid-driven

25/06 . . the pump being electrically driven (F04D 25/08 takes precedence)

25/08 . . the working fluid being air, e.g. for ventilation

25/10 . . . the unit having provisions for automatically changing the direction of output air

25/12 . . . the unit being adapted for mounting in apertures

25/14 . . . . and having shutters, e.g. automatically closed when not in use

25/16 . Combinations of two or more pumps

27/00 **Control, e.g. regulation, of pumps, pumping nstallations or pumping systems specially adapted for elastic fluids**

27/02 . Surge control

29/00 **Details, component parts, or accessories** (machine elements in general F16)

29/02 . Selection of particular materials (for handling specific liquids F04D 7/00)

29/04 . Shafts or bearings, or assemblies thereof (specially adapted for elastic fluid pumps F04D 29/05) **[1,8]**

29/041 . . Axial thrust balancing **[8]**

29/042 . . Axially shiftable rotors (F04D 29/041 takes precedence) **[8]**

29/043 . . Shafts **[8]**

29/044 . . . Arrangements for joining or assembling shafts **[8]**

29/046 . . Bearings **[8]**

29/047 . . . hydrostatic; hydrodynamic **[8]**

29/048 . . . magnetic; electromagnetic **[8]**

29/049 . . . Roller bearings **[8]**

29/05 . Shafts or bearings, or assemblies therof, specially adapted for elastic fluid pumps **[8]**

29/051 . . Axial thrust balancing **[8]**

29/052 . . Axially shiftable rotors (F04D 29/051 takes precedence) **[8]**

29/053 . . Shafts **[8]**

29/054 . . . Arrangements for joining or assembling shafts **[8]**

29/056 . . Bearings **[8]**

29/057 . . . hydrostatic; hydrodynamic **[8]**

29/058 . . . magnetic; electromagnetic **[8]**

29/059 . . . Roller bearings **[8]**

29/06 . Lubrication **[1,8]**

29/063 . . specially adapted for elastic fluid pumps **[8]**

29/08 . Sealings

29/10 . . Shaft sealings

29/12 . . . using sealing-rings

29/14 . . . operative only when pump is inoperative

29/16 . . between pressure and suction sides

29/18 . Rotors (specially adapted for elastic fluids F04D 29/26)

29/20 . . Mounting rotors on shafts

29/22 . . specially for centrifugal pumps

29/24 . . . Vanes

29/26 . Rotors specially adapted for elastic fluids

29/28 . . for centrifugal or helico-centrifugal pumps

29/30 . . . Vanes

29/32 . . for axial-flow pumps

29/34 . . . Blade mountings

29/36 . . . . adjustable

29/38 . . . Blades

29/40 . Casings; Connections for working fluid

29/42 . . for radial or helico-centrifugal pumps

29/44 . . . Fluid-guiding means, e.g. diffusers

29/46 . . . . adjustable

29/48 . . . . . for unidirectional fluid flow in reversible pumps

29/50 . . . . . for reversing fluid flow

29/52 . . for axial pumps

29/54 . . . Fluid-guiding means, e.g. diffusers

29/56 . . . . adjustable

29/58 . Cooling (of machines or engines in general F01P); Heating; Diminishing heat transfer

29/60 . Mounting; Assembling; Disassembling
29/62 . . of radial or helico-centrifugal pumps
29/64 . . of axial pumps
29/66 . Combating cavitation, whirls, noise, vibration, or the like (gas-flow silencers for machines or engines in general F01N); Balancing (surge control F04D 27/02)
29/68 . . by influencing boundary layers
29/70 . Suction grids; Strainers; Dust separation; Cleaning

Other non-positive-displacement pumps

31/00 Pumping liquids and elastic fluids at the same time

33/00 Non-positive-displacement pumps with other than pure rotation, e.g. of oscillating type (F04D 35/00 takes precedence; hand-held fans A45B) **[2]**

35/00 Pumps producing waves in liquids, i.e. wave-producers (for bath tubs A47K 3/10) **[2]**

F04F PUMPING OF FLUID BY DIRECT CONTACT OF ANOTHER FLUID OR BY USING INERTIA OF FLUID TO BE PUMPED (containers or packages with special means for dispensing liquid or semi-liquid contents by internal gaseous pressure B65D 83/14); SIPHONS [2]

(1) Attention is drawn to the Notes preceding class F01.
(2) Combinations of pumps covered by this subclass with other pumps are only classified in this subclass if such other pumps are intended for preliminary pumping for diffusion pumps.

Subclass index

1/00 Pumps using positively or negatively pressurised fluid medium acting directly on the liquid to be pumped (using only negative pressure F04F 3/00; jet pumps F04F 5/00; siphons F04F 10/00)
1/02 . using both positively and negatively pressurised fluid medium, e.g. alternating
1/04 . . generated by vaporising and condensing
1/06 . the fluid medium acting on the surface of the liquid to be pumped (F04F 1/02 takes precedence)
1/08 . . specially adapted for raising liquids from great depths, e.g. in wells
1/10 . . of multiple type, e.g. with two or more units in parallel (F04F 1/08 takes precedence)
1/12 . . . in series
1/14 . . adapted to pump specific liquids, e.g. corrosive or hot liquids
1/16 . . characterised by the fluid medium being suddenly pressurised, e.g. by explosion
1/18 . the fluid medium being mixed with, or generated from, the liquid to be pumped
1/20 . . specially adapted for raising liquids from great depths, e.g. in wells

3/00 Pumps using negative pressure acting directly on the liquid to be pumped (siphons F04F 10/00)

5/00 Jet pumps, i.e. devices in which fluid flow is induced by pressure drop caused by velocity of another fluid flow (diffusion pumps F04F 9/00; combination of jet pumps with pumps of other than jet type F04B; use of jet pumps for priming or boosting non-positive-displacement pumps F04D)
5/02 . the inducing fluid being liquid
5/04 . . displacing elastic fluids
5/06 . . . of rotary type
5/08 . . . the elastic fluid being entrained in a free-falling column of liquid
5/10 . . displacing liquids, e.g. containing solids, or liquids and elastic fluids
5/12 . . . of multi-stage type
5/14 . the inducing fluid being elastic fluid
5/16 . . displacing elastic fluids
5/18 . . . for compressing
5/20 . . . for evacuating
5/22 . . . . of multi-stage type
5/24 . . displacing liquids, e.g. containing solids, or liquids and elastic fluids
5/26 . . . of multi-stage type (F04F 5/28 takes precedence)
5/28 . . . Restarting of inducing action
5/30 . . . . with axially-slidable combining nozzle
5/32 . . . . with hinged flap in combining nozzle
5/34 . . characterised by means for changing inducing-fluid source
5/36 . . characterised by using specific inducing fluid
5/38 . . . the inducing fluid being mercury vapour
5/40 . . . the inducing fluid being oil vapour
5/42 . characterised by the input flow of inducing fluid medium being radial or tangential to output flow (cyclones B04C)
5/44 . Component parts, details, or accessories not provided for in, or of interest apart from, groups F04F 5/02 to F04F 5/42
5/46 . . Arrangements of nozzles
5/48 . . Control
5/50 . . . of compressing pumps
5/52 . . . of evacuating pumps
5/54 . Installations characterised by use of jet pumps, e.g. combinations of two or more jet pumps of different type

7/00 Pumps displacing fluids by using inertia thereof, e.g. by generating vibrations therein

7/02 . Hydraulic rams

9/00 Diffusion pumps

9/02 . of multi-stage type

9/04 . in combination with fore pumps, e.g. use of isolating valves

9/06 . Arrangement of vapour traps

9/08 . Control

10/00 Siphons

10/02 . Gravity-actuated siphons

13/00 Pressure exchangers [2009.01]

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

ENGINEERING IN GENERAL

F15 FLUID-PRESSURE ACTUATORS; HYDRAULICS OR PNEUMATICS IN GENERAL

F15B SYSTEMS ACTING BY MEANS OF FLUIDS IN GENERAL; FLUID-PRESSURE ACTUATORS, E.G. SERVOMOTORS; DETAILS OF FLUID-PRESSURE SYSTEMS, NOT OTHERWISE PROVIDED FOR (motors, turbines, compressors, blowers, pumps F01 to F04; fluid dynamics F15D; fluid clutches or brakes F16D; fluid springs F16F; fluid gearing F16H; pistons, cylinders, packing F16J; valves, taps, cocks, actuating-floats F16K; safety valves with auxiliary fluid operation of the main valve F16K 17/10; fluid-operating means for valves F16K 31/12; pipes, pipe joints F16L; lubricating F16N)

Note

In this subclass, the following terms are used with the meanings indicated:
- "telemotor" means a system or device in which a substantially constant amount of fluid is trapped between an input member and an output member to act as a fluid link;
- "servomotor" means a fluid-pressure actuator, e.g. a piston and cylinder, directly controlled by a valve or other device which is responsive to operation of an initial controlling member; "Servomotor" does not cover a telemotor. The initial controlling member may be adjacent to the servomotor or at a distance, and may be, for example, a hand lever.

Subclass index

1/00 Installations or systems with accumulators; Supply reservoir or sump assemblies

1/02 . Installations or systems with accumulators (devices damping pulsations or vibrations in fluids for use in, or in connection with, pipes or pipe systems F16L 55/04)

1/027 . . having accumulator charging devices (control of fluid pressure in general G05D 16/00) **[6]**

1/033 . . . with electrical control means **[6]**

1/04 . . Accumulators (connection of valves to inflatable elastic bodies B60C 29/00)

1/08 . . . using a gas cushion; Gas charging devices; Indicators or floats therefor **[6]**

1/10 . . . . with flexible separating means **[6]**

1/12 . . . . . attached at their periphery (F15B 1/16 takes precedence) **[6]**

1/14 . . . . . by means of a rigid annular supporting member **[6]**

1/16 . . . . . in the form of a tube **[6]**

1/18 . . . . . Anti-extrusion means **[6]**

1/20 . . . . . fixed to the separating means **[6]**

1/22 . . . . Liquid port constructions **[6]**

1/24 . . . . with rigid separating means, e.g. pistons **[6]**

1/26 . Supply reservoir or sump assemblies **[6]**

3/00 Intensifiers or fluid-pressure converters, e.g. pressure exchangers; Conveying pressure from one fluid system to another, without contact between the fluids

5/00 Transducers converting variations of physical quantities, e.g. expressed by variations in positions of members, into fluid-pressure variations or vice versa; Varying fluid pressure as a function of variations of a plurality of fluid pressures or variations of other quantities (F15B 9/00 takes precedence; for measuring or controlling G01, G05)

Fluid-pressure actuator systems

(1) Groups F15B 7/00 to F15B 21/00 cover systems in which members are moved into one or more definite positions by means of fluid pressure.

(2) Pump, motor, and control features so far as not peculiar to this purpose are classified in the relevant classes.

7/00 Fluid-pressure actuator systems in which the movement produced is definitely related to the output of a volumetric pump; Telemotors

7/02 . Systems with continuously-operating input and output apparatus

7/04 . in which the ratio between pump stroke and motor stroke varies with the resistance against the motor (in brake-actuating systems for motor vehicles B60T)

7/06 . Details (F15B 15/00 takes precedence)

7/08 . . Input units; Master units

7/10 . . Compensation of the liquid content in a system (F15B 7/08 takes precedence; pressure-maintaining arrangements for brake master cylinders B60T 11/228) **[5]**

9/00 Servomotors with follow-up action, i.e. in which the position of the actuated member conforms with that of the controlling member

9/02 . with servomotors of the reciprocatable or oscillatable type
9/03 . . with electrical control means
9/04 . . controlled by varying the output of a pump with variable capacity
9/06 . . controlled by means using a fluid jet
9/07 . . . with electrical control means
9/08 . . controlled by valves affecting the fluid feed or the fluid outlet of the servomotor (F15B 9/06 takes precedence)
9/09 . . . with electrical control means
9/10 . . . in which the controlling element and the servomotor each controls a separate member, these members influencing different fluid passages or the same passage
9/12 . . . in which both the controlling element and the servomotor control the same member influencing a fluid passage and are connected to that member by means of a differential gearing
9/14 . with rotary servomotors
9/16 . Systems essentially having two or more interacting servomotors
9/17 . . with electrical control means

11/00 Servomotor systems without provision for follow-up action (F15B 3/00 takes precedence)

11/02 . Systems essentially incorporating special features for controlling the speed or the actuating force or speed of an output member
11/024 . . by means of differential connection of the servomotor lines, e.g. regenerative circuits **[6]**
11/028 . . for controlling the actuating force (F15B 11/024 takes precedence) **[6]**
11/032 . . . by means of fluid-pressure converters (fluid-pressure converters per se F15B 3/00) **[6]**
11/036 . . . by means of servomotors having a plurality of working chambers (servomotors per se F15B 15/00) **[6]**
11/04 . . for controlling the speed (F15B 11/024 takes precedence) **[6]**
11/042 . . . by regulating means in feed line (F15B 11/046, F15B 11/05 take precedence) **[6]**
11/044 . . . by regulating means in return line (F15B 11/046, F15B 11/05 take precedence) **[6]**
11/046 . . . depending on the position of the working member **[6]**
11/048 . . . . with deceleration control **[6]**
11/05 . . . specially adapted to maintain constant speed, e.g. pressure-compensated, load-responsive
11/06 . involving features specific to the use of a compressible medium, e.g. air, steam
11/064 . . with devices for saving the compressible medium **[6]**
11/068 . . with valves for gradually putting pneumatic systems under pressure **[6]**
11/072 . . Combined pneumatic-hydraulic systems **[6]**
11/076 . . . with pneumatic drive or displacement and speed control or stopping by hydraulic braking **[6]**
11/08 . with only one servomotor
11/10 . . in which the servomotor position is a function of the pressure
11/12 . . providing distinct intermediate positions; with step-by-step action
11/13 . . . using chambers of predetermined volume **[6]**
11/15 . . with special provision for automatic return
11/16 . with two or more servomotors
11/17 . . using two or more pumps **[6]**
11/18 . . used in combination for obtaining stepwise operation of a single controlled member
11/20 . . controlling several interacting or sequentially-operating members (fluid distribution or supply devices for the control of two or more servomotors F15B 13/06)
11/22 . . Synchronisation of the movement of two or more servomotors

13/00 Details of servomotor systems (F15B 15/00 takes precedence)

13/01 . Locking-valves or other detent devices (associated with the actuator F15B 15/26)
13/02 . Fluid distribution or supply devices characterised by their adaptation to the control of servomotors (multiple-way valves F16K 11/00)
13/04 . . for use with a single servomotor
13/042 . . . operated by fluid pressure
13/043 . . . . with electrically-controlled pilot valves
13/044 . . . operated by electrically-controlled means, e.g. solenoids, torque-motors
13/06 . . for use with two or more servomotors
13/07 . . . in distinct sequence
13/08 . . . Assemblies of units, each for the control of a single servomotor only
13/10 . Special arrangements for operating the actuated device without using fluid pressure, e.g. for emergency use
13/12 . Special measures for increasing the sensitivity of the system
13/14 . Special measures for giving the operator by sense of touch the immediate response of the actuated device
13/16 . Special measures for feedback

15/00 Fluid-actuated devices for displacing a member from one position to another (motors for continuous movement F01 to F03); **Gearing associated therewith**

15/02 . Mechanical layout characterised by the means for converting the movement of the fluid-actuated element into movement of the finally-operated member
15/04 . . with oscillating cylinder
15/06 . . for mechanically converting rectilinear movement into non-rectilinear movement
15/08 . characterised by the construction of the motor unit (pistons, cylinders, packing F16J)
15/10 . . the motor being of diaphragm type (connection of valves to inflatable elastic bodies B60C 29/00; diaphragms, bellows F16J 3/00)
15/12 . . of the oscillating-vane or curved-cylinder type
15/14 . . of the straight-cylinder type
15/16 . . . of the telescopic type
15/17 . . . of differential-piston type
15/18 . Combined units comprising both motor and pump
15/19 . Pyrotechnical actuators **[3]**
15/20 . Other details
15/22 . . for accelerating or decelerating the stroke
15/24 . . for restricting the stroke
15/26 . . Locking mechanisms
15/28 . . Means for indicating the position, e.g. end of stroke **[4]**

17/00 **Combinations of telemotor and servomotor systems**

17/02 . in which a telemotor operates the control member of a servomotor

18/00 **Parallel arrangements of independent servomotor systems**

19/00 **Testing fluid-pressure actuator systems or apparatus, so far as not provided for elsewhere**

20/00 **Safety arrangements for fluid actuator systems**; **Applications of safety devices in fluid actuator systems**; **Emergency measures for fluid actuator systems**

21/00 **Common features of fluid actuator systems**; **Fluid-pressure actuator systems or details thereof, not covered by any other group of this subclass**

21/02 . Servomotor systems with programme control derived from a store or timing device; Control devices therefor

21/04 . Special measures taken in connection with the properties of the fluid, e.g. for venting, compensating for changes of viscosity, cooling, filtering, preventing churning

21/06 . Use of special fluids, e.g. liquid metal; Special adaptations of fluid-pressure systems, or control of elements therefor, to the use of such fluids

21/08 . Servomotor systems incorporating electrically-operated control means (F15B 21/02 takes precedence)

21/10 . Delay devices or arrangements (associated with fluid motors or actuators F15B 15/22)

21/12 . Fluid oscillators or pulse generators (fluid oscillators predominantly used for computing or control purposes F15C 1/22, F15C 3/16)

21/14 . Energy-recuperation means (for vehicles B60T 1/10) **[6]**

F15C **FLUID-CIRCUIT ELEMENTS PREDOMINANTLY USED FOR COMPUTING OR CONTROL PURPOSES** (transducers F15B 5/00; fluid dynamics in general F15D; computers comprising fluid elements G06D, G06G)

Note

Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

1/00 **Circuit elements having no moving parts**

1/02 . Details

1/04 . . Means for controlling fluid streams to fluid devices, e.g. by electric signals

1/06 . . Constructional details; Selection of specified materials

Note

Group F15C 1/22 takes precedence over groups F15C 1/08 to F15C 1/20. **[2]**

1/08 . Boundary-layer devices, e.g. wall-attachment amplifiers **[2]**

1/10 . . for digital operation, e.g. to form a logical flip-flop, OR-gate, NOR-gate

1/12 . . . Multiple arrangements thereof for performing operations of the same kind, e.g. majority gates, identity gates

1/14 . Stream-interaction devices; Momentum-exchange devices, e.g. operating by exchange between two orthogonal fluid jets

1/16 . Vortex devices, i.e. devices in which use is made of the pressure drop associated with vortex motion in a fluid

1/18 . Turbulence devices, i.e. devices in which a controlling stream will cause a laminar flow to become turbulent

1/20 . Direct-impact devices, i.e. devices in which two collinear opposing power streams are impacted

1/22 . Oscillators **[2]**

3/00 **Circuit elements having moving parts** (valves, construction of valves F16K)

Note

Group F15C 3/16 takes precedence over groups F15C 3/02 to F15C 3/10. **[2]**

3/02 . using spool valves

3/04 . using diaphragms (connection of valves to inflatable elastic bodies B60C 29/00)

3/06 . using balls

3/08 . using reeds

3/10 . using nozzles or jet pipes

3/12 . . the nozzle or jet pipe being movable

3/14 . . the jet from the nozzle being intercepted by a flap

3/16 . Oscillators **[2]**

4/00 **Circuit elements characterised by their special functions**

5/00 **Manufacture of fluid-circuit elements**; **Manufacture of assemblages of such elements**

7/00 **Hybrid elements, i.e. circuit elements having features according to groups F15C 1/00 and F15C 3/00 [2]**

F15D FLUID DYNAMICS, I.E. METHODS OR MEANS FOR INFLUENCING THE FLOW OF GASES OR LIQUIDS (fluid-circuit elements F15C)

Note

This subclass covers boundary-layer control and other arrangements and methods, not provided for in other classes, for influencing the flow of fluids relative to constraining surfaces and after leaving these surfaces, e.g. producing or removing turbulence, deflecting jets, guiding flow through bends in conduits, affecting distribution of fluid in a conduit, reducing fluid friction.

1/00 Influencing the flow of fluids

1/02 . in pipes or conduits

1/04 . . Arrangements of guide vanes in pipe elbows or duct bends; Construction of pipe conduit elements or elbows with respect to flow, specially for reducing losses of flow

1/06 . . by influencing the boundary layer

1/08 . of jets leaving an orifice (nozzles or outlets with means for mechanically breaking-up or deflecting the jet B05B, e.g. B05B 1/26)

1/10 . around bodies of solid material

1/12 . . by influencing the boundary layer

1/14 . Diverting flow into alternative channels (in hydraulic engineering E02B)

F16 ENGINEERING ELEMENTS OR UNITS; GENERAL MEASURES FOR PRODUCING AND MAINTAINING EFFECTIVE FUNCTIONING OF MACHINES OR INSTALLATIONS; THERMAL INSULATION IN GENERAL

F16B DEVICES FOR FASTENING OR SECURING CONSTRUCTIONAL ELEMENTS OR MACHINE PARTS TOGETHER, E.G. NAILS, BOLTS, CIRCLIPS, CLAMPS, CLIPS OR WEDGES; JOINTS OR JOINTING (couplings for transmitting rotation F16D)

Note

Attention is drawn to:
(a) the Note following group E04B 1/38; **[5]**
(b) the following places:

A44B		Buckles, slide fasteners
A47G	3/00	Ornamental heads for nails, screws, or the like
B42F	3/00	Means, not using staples, for attaching sheets temporarily together
E01B	9/10	Screws or bolts for railway sleepers
E01B	11/00	Rail joints
E04		Connections for building
E04D	13/08	Clamping means for down pipes for roof drainage
E04F	13/21	Fastening means specially adapted for covering or lining elements for buildings
E04G	5/04	Fastening scaffolds against buildings
E04G	7/00	Scaffolding couplings
E05C		Bolts or fasteners for wings, specially for doors or windows
F16C	29/10	Locking bearings for parts moving only linearly
F16G	17/00	Hooks as integral parts of chains
F16L		Pipe joints
F16L	3/00	Supports for pipes, cables or protective tubing, e.g. hangers, holders, clamps, cleats, clips, brackets
F16L	33/02	Clips for connecting hoses to rigid members
H01F	7/00	Magnetic holding devices
H02N	13/00	Electrostatic holding devices.

Subclass index

1/00 Devices for securing together, or preventing relative movement between, constructional elements or machine parts

Note

Groups F16B 2/00 to F16B 47/00 take precedence over group F16B 1/00. **[2]**

1/02 . Means for securing elements of mechanisms after operation (means for bringing members to rest F16D)

1/04 . . disengaged by movement of the actuating member of the element (locking of actuators G05G, e.g. G05G 5/00)

Fastenings for constructional elements or machine parts in general

2/00 **Friction-grip releasable fastenings** (for cables or ropes, e.g. cleats, F16G 11/00; supports for pipes, cables or protective tubing F16L 3/00)

2/02 . Clamps, i.e. with gripping action effected by positive means other than the inherent resistance to deformation of the material of the fastening

2/04 . . internal, i.e. with spreading action (F16B 2/14 to F16B 2/18 take precedence)

2/06 . . external, i.e. with contracting action (F16B 2/14 to F16B 2/18 take precedence)

2/08 . . . using bands (clips for connecting hoses to rigid members F16L 33/02)

2/10 . . . using pivoting jaws

2/12 . . . using sliding jaws

2/14 . . using wedges

2/16 . . using rollers or balls

2/18 . . using cams, levers, eccentrics, or toggles

2/20 . Clips, i.e. with gripping action effected solely by the inherent resistance to deformation of the material of the fastening

2/22 . . of resilient material, e.g. rubbery material

2/24 . . . of metal

2/26 . . of pliable non-resilient material, e.g. plant tie

3/00 **Key-type connections**; **Keys** (F16B 2/00 takes precedence; for rods or tubes mutually F16B 7/00)

3/04 . using keys formed of wire or other flexible material, to be inserted through an opening giving access to grooves in the adjacent surfaces of the parts to be connected

3/06 . using taper sleeves

4/00 **Shrinkage connection, e.g. assembled with the parts at different temperature**; **Force fits** (restricted to metal parts or objects B23P 11/02); **Non-releasable friction-grip fastenings** (F16B 2/00 takes precedence)

5/00 **Joining sheets or plates to one another or to strips or bars parallel to them** (by sticking together F16B 11/00; dowel connections F16B 13/00; pins, including deformable elements F16B 19/00; covering of walls E04F 13/00; fastening signs, plates, panels, or boards to a supporting structure, fastening readily-detachable elements, e.g. letters, to signs, plates, panels, or boards, G09F 7/00)

5/01 . by means of fastening elements specially adapted for honeycomb panels

5/02 . by means of fastening members using screw-thread (construction of screw-threaded connections F16B 25/00 to F16B 39/00)

5/04 . by means of riveting (rivets F16B 19/04)

5/06 . by means of clamps or clips (friction-grip releasable fastenings in general F16B 2/00)

5/07 . by means of multiple interengaging protrusions on the surfaces, e.g. hooks, coils

5/08 . by means of welds or the like (welding B23K)

5/10 . by means of bayonet connections (fastening devices locking by rotation F16B 21/02)

5/12 . Fastening strips or bars to sheets or plates, e.g. rubber strips, decorative strips for motor vehicles, by means of clips (friction-grip releasable fastenings in general F16B 2/00; fastening rods or tubular parts to flat surfaces at an angle F16B 9/00; clips for connecting hoses to rigid members F16L 33/02)

7/00 **Connections of rods or tubes, e.g. of non-circular section, mutually, including resilient connections** (umbrella frames A45B 25/02; welding or soldering of connections B23K; vehicle connections in general B60D; railway couplings B61G; bicycle frames B62K; couplings for transmitting rotation F16D; couplings for tubes conveying fluid F16L)

7/02 . with conical parts

7/04 . Clamping or clipping connections (friction-grip releasable fastenings in general F16B 2/00)

7/06 . Turnbuckles (for cables, ropes, or wire F16G 11/12)

7/08 . Pipe saddles (friction-grip releasable fastenings in general F16B 2/00)

7/10 . Telescoping systems (for scaffolding E04G 25/04; telescope props for mining E21D 15/14 to E21D 15/46; stands or trestles as supports for apparatus or articles placed thereon F16M 11/00)

7/12 . . locking only in extreme extended position

7/14 . . locking in intermediate positions

7/16 . . . locking only against movement in one direction

7/18 . using screw-thread elements

7/20 . using bayonet connections

7/22 . using hooks or like elements

9/00 **Connections of rods or tubular parts to flat surfaces at an angle** (friction-grip releasable fastenings in general F16B 2/00; making press-fit connections B23P 11/00, B23P 19/00; fluid-tight connecting of pipes to reservoirs, sheets, or the like F16L, e.g. joining pipes to walls F16L 41/00; supports for pipes, cables or protective tubing F16L 3/00)

9/02 . Detachable connections

11/00 **Connecting constructional elements or machine parts by sticking or pressing them together, e.g. cold pressure welding** (non-electric welding in general B23K; methods of using adhesives independently of the form of the surfaces joined C09J 5/00)

12/00 **Jointing of furniture or the like, e.g. hidden from exterior** (F16B 2/00 to F16B 11/00 take precedence; fastening means per se F16B 13/00 to F16B 47/00; wood-working B27)

12/02 . Joints between panels and corner posts

12/04 . Non-loosenable joints for non-metal furniture parts, e.g. glued

12/06 . Non-loosenable joints for metal furniture parts

12/08 . . without use of separate connecting elements

12/10 . using pegs, bolts, tenons, clamps, clips, or the like (glued F16B 12/04; fastening means per se F16B 15/00 to F16B 47/00)

12/12 . . for non-metal furniture parts, e.g. made of wood, of plastics

12/14 . . . using threaded bolts or screws

12/16 . . . . using self-tapping screws

12/18 . . . . using drawing bars

12/20 . . . using clamps, clips, wedges, sliding bolts, or the like

12/22 . . . using keyhole-shaped slots and pins

12/24 . . . using separate pins, dowels, or the like

12/26 . . . using snap-action elements

12/28 . . for metal furniture parts

12/30 . . . using threaded bolts

12/32 . . . using clamps, clips, wedges, sliding bolts, or the like

12/34 . . . using keyhole-shaped slots and pins

12/36 . . . using separate pins, dowels, or the like

12/38 . . . using snap-action elements
12/40 . Joints for furniture tubing
12/42 . . connecting furniture tubing to non-tubular parts
12/44 . Leg joints; Corner joints
12/46 . . Non-metal corner connections
12/48 . . Non-metal leg connections (F16B 12/46 takes precedence)
12/50 . . Metal corner connections
12/52 . . Metal leg connections (F16B 12/50 takes precedence)
12/54 . Fittings for bedsteads or the like
12/56 . . Brackets for bedsteads; Coupling joints consisting of bolts or the like; Latches therefor
12/58 . . Tapered connectors for bed rails
12/60 . . Fittings for detachable side panels

13/00 Dowels or other devices fastened in walls or the like by inserting them in holes made therein for that purpose (nails F16B 15/00; self-locking pins or bolts in general, stud-and-socket releasable fastenings F16B 21/00; dowels or bolts for railroad sleepers E01B 9/00; means for anchoring structural elements or bulkheads specially adapted to foundation engineering E02D 5/74; bolts or dowels used while laying bricks or casting concrete E04B 1/38; setting anchoring bolts in shafts, tunnels or galleries E21D 20/00; anchoring bolts for shafts, tunnels or galleries E21D 21/00) **[5]**

13/02 . in one piece with protrusions or ridges on the shaft
13/04 . with parts gripping in the hole or behind the reverse side of the wall after inserting from the front (friction-grip releasable fastenings in general F16B 2/00)
13/06 . . combined with expanding sleeve
13/08 . . with separate gripping parts moved into their final position in relation to the body of the device without further manual operation
13/10 . . with separate gripping parts moved into their final position in relation to the body of the device by a separate operation (F16B 13/06 takes precedence)
13/12 . Separate metal dowel sleeves fastened by inserting the screw, nail, or the like
13/13 . . self-cutting **[2]**
13/14 . Non-metallic plugs or sleeves; Use of liquid, loose solid or kneadable material therefor **[5]**

Fastening means without screw-thread

15/00 Nails; **Staples** (surgical staples A61B 17/064; manufacture of nails or staples B21G; railway spikes E01B 9/06)

15/02 . with specially shaped heads, e.g. with enlarged surfaces (ornaments for furniture A47B 95/04; removable ornamental heads for nails A47G 3/00)
15/04 . with spreading shaft
15/06 . with barbs, e.g. for metal parts; Drive screws
15/08 . formed in integral series but easily separable

17/00 Fastening means without screw-thread for connecting constructional elements or machine parts by a part of or on one member entering a hole in the other (construction of bolts, pins, or rivets F16B 19/00; riveting F16B 19/04; means for preventing withdrawal of a pin, spigot, or the like from its operative position, stud-and-socket releasable fastenings F16B 21/00)

19/00 Bolts without screw-thread; **Pins, including deformable elements** (in screwed connections F16B 29/00); **Rivets** (means for preventing withdrawal F16B 21/00)

19/02 . Bolts or sleeves for positioning of machine parts, e.g. notched taper pins, fitting pins, sleeves, eccentric positioning rings
19/04 . Rivets; Spigots or the like fastened by riveting (lead seals G09F 3/00)
19/05 . . Bolts fastening by swaged-on collars (F16B 19/08 takes precedence)
19/06 . . Solid rivets made in one piece
19/08 . . Hollow rivets; Multi-part rivets
19/10 . . . fastened by expanding mechanically
19/12 . . . fastened by fluid pressure, including by explosion (bolts shot by means of detonation-operated nailing tools into concrete constructions, metal walls, or the like F16B 19/14)
19/14 . Bolts or the like for shooting into concrete constructions, metal walls, or the like by means of detonation-operated nailing tools (tools therefor B25C, B27F)

21/00 Means without screw-thread for preventing relative axial movement of a pin, spigot, shaft, or the like and a member surrounding it (riveted or deformable spigots F16B 19/04; for gudgeon pins F16J 1/18); **Stud-and-socket releasable fastenings without screw-thread**

21/02 . Releasable fastening devices locking by rotation (with snap action F16B 21/06; studs or coupling-pins with resilient protrusions F16B 21/08)
21/04 . . with bayonet catch
21/06 . Releasable fastening devices with snap action
21/07 . . in which the socket has a resilient part
21/08 . . in which the stud, pin, or spigot has a resilient part (wall-dowels F16B 13/00)
21/09 . Releasable fastening devices with a stud engaging a keyhole slot
21/10 . by separate parts (key-type connection F16B 3/00; locking screws or nuts against rotation by such means F16B 39/04)
21/12 . . with locking-pins or split-pins thrust into holes
21/14 . . . Details of locking-pins or split-pins
21/16 . . with grooves or notches in the pin or shaft
21/18 . . . with circlips or like resilient retaining devices; Details (spring-washers for locking nuts F16B 39/24; adjusting-rings F16B 43/00)
21/20 . . for bolts or shafts without holes, grooves, or notches for locking members

Fastening means using screw-thread

23/00 Specially-shaped heads of bolts or screws for rotations by a tool

25/00 Screws that form threads in the body into which they are screwed, e.g. wood screws, self-tapping screws [4]

25/02 . by a cutting and material removing action, e.g. fluted self-tapping screws **[4]**
25/04 . by a slicing and material displacing action, e.g. wood screws with sharp thread crests **[4]**
25/06 . by swaging, i.e. material deforming action **[4]**
25/08 . by a combination of any two or all of the actions provided for in groups F16B 25/02 to F16B 25/06 **[4]**
25/10 . Screws performing an additional function to thread-forming, e.g. drill screws **[4]**

27/00 **Bolts, screws, or nuts formed in integral series but easily separable, particularly for use in automatic machines**

29/00 **Screwed connection with deformation of nut or auxiliary member while fastening** (wall-dowels F16B 13/00; members deformed for locking screws, bolts or nuts F16B 39/22)

31/00 **Screwed connections specially modified in view of tensile load**; **Break-bolts** (shape of thread F16B 33/04)

31/02 . for indicating or limiting tensile load

31/04 . for maintaining constant tensile load

31/06 . having regard to possibility of fatigue rupture

33/00 **Features common to bolt and nut** (wall-dowels F16B 13/00)

33/02 . Shape of thread; Special thread-forms (used as screw-locking device F16B 39/30)

33/04 . . in view of tensile load

33/06 . Surface treatment of parts furnished with screw-thread, e.g. for preventing seizure

35/00 **Screw-bolts**; **Stay bolts**; **Screw-threaded studs**; **Screws**; **Set screws** (wall-dowels F16B 13/00; thread-cutting screws F16B 25/00)

35/02 . divided longitudinally

35/04 . with specially-shaped head or shaft in order to fix the bolt on or in an object (locking the bolt against turning in the object by the use of accessory parts F16B 39/00)

35/06 . . Specially-shaped heads (special shape in order to rotate the bolt F16B 23/00)

37/00 **Nuts or like thread-engaging members** (wall-dowels F16B 13/00)

37/02 . made of thin sheet material (fastening to surfaces F16B 37/04)

37/04 . Devices for fastening nuts to surfaces, e.g. sheets, plates

37/06 . . by means of welding or riveting

37/08 . Quickly-detachable nuts, e.g. consisting of two or more parts; Nuts movable along the bolt after tilting the nut

37/10 . . divided parallel or about parallel to the bolt axis

37/12 . with thread-engaging surfaces formed by inserted coil-springs, discs, or the like; Independent pieces of wound wire used as nuts; Threaded inserts for holes

37/14 . Cap nuts; Nut caps or bolt caps

37/16 . Wing nuts (F16B 37/14 takes precedence)

39/00 **Locking of screws, bolts, or nuts** (wall-dowels F16B 13/00; locking of bottle closures B65D; locking of rail-fastening bolts for permanent ways E01B 9/12; locking of fastening means for railway fishplates E01B 11/38; locking devices for valves or cocks F16K)

Note

In this group, heads of screws or bolts are put on a par with nuts as far as pertains to locking; an object into which a screw is threaded is put on a par with a nut.

39/01 . specially adapted to prevent loosening at extreme temperatures

39/02 . in which the locking takes place after screwing down (F16B 39/01 takes precedence; split-pins, circlips, or the like for preventing relative axial movement only F16B 21/10; fastening nuts by welding or riveting F16B 37/06)

39/04 . . with a member penetrating the screw-threaded surface of at least one part, e.g. a pin, wedge, cotter-pin, screw

39/06 . . . with a pin or staple parallel to the bolt axis

39/08 . . with a cap interacting with the nut, connected to the bolt by a pin or cotter-pin

39/10 . . by a plate or ring immovable with regard to the bolt or object (F16B 39/08 takes precedence)

39/12 . . by means of locknuts

39/14 . . . made of thin sheet material or formed as spring washers (locknuts per se made of thin sheet material F16B 37/02)

39/16 . . . in which the screw-thread of the locknut differs from that of the nut

39/18 . . . . in which the locknut grips with screw-thread in the nuts as well as on the bolt

39/20 . . by means of steel wire or the like (F16B 39/10 takes precedence)

39/22 . in which the locking takes place during screwing down or tightening (F16B 39/01 takes precedence)

39/24 . . by means of washers, spring washers, or resilient plates that lock against the object (locking to the screw-thread F16B 39/14, F16B 39/36)

39/26 . . . with spring washers fastened to the nut or bolt-head

39/28 . . by special members on, or shape of, the nut or bolt (F16B 39/26 takes precedence; locknuts F16B 39/12)

39/282 . . . Locking by means of special shape of work-engaging surfaces, e.g. notched or toothed nuts

39/284 . . . Locking by means of elastic deformation (F16B 39/38 takes precedence)

39/286 . . . . caused by saw cuts

39/30 . . . Locking exclusively by special shape of the screw-thread

39/32 . . . Locking by means of a pawl or pawl-like tongue

39/34 . . . Locking by deformable inserts or like parts

39/36 . . . with conical locking parts, which may be split, including use of separate rings co-operating therewith

39/38 . . . with a second part of the screw-thread which may be resiliently mounted (F16B 39/30 takes precedence)

41/00 **Measures against loss of bolts, nuts, or pins**; **Measures against unauthorised operation of bolts, nuts, or pins** (seals G09F 3/00)

43/00 **Washers or equivalent devices**; **Other devices for supporting bolt-heads or nuts** (circlips F16B 21/18; with special means for locking bolts or nuts F16B 39/10, F16B 39/24)

43/02 . with special provisions for engaging surfaces which are not perpendicular to a bolt axis or do not surround the bolt

45/00 **Hooks**; **Eyes** (if the attaching parts or means are concerned, groups F16B 13/00, F16B 15/00, F16B 19/00, F16B 25/00, F16B 35/00, F16B 47/00 take precedence; for hanging pictures or the like A47G 1/16; towing hooks for ships B63B 21/58; for hoisting or hauling purposes B66C; hooks or eyes with integral parts designed to facilitate quick attachment to cables or ropes at any point F16G 11/14)

45/02 . Hooks with pivoting closing member

45/04 . Hooks with sliding closing member
45/06 . Hooks with two symmetrically-pivoting hook parts

47/00 Suction cups for attaching purposes; Equivalent means using adhesives

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F16C SHAFTS; FLEXIBLE SHAFTS; MECHANICAL MEANS FOR TRANSMITTING MOVEMENT IN A FLEXIBLE SHEATHING; ELEMENTS OF CRANKSHAFT MECHANISMS; PIVOTS; PIVOTAL CONNECTIONS; ROTARY ENGINEERING ELEMENTS OTHER THAN GEARING, COUPLING, CLUTCH OR BRAKE ELEMENTS; BEARINGS [5]

Note

In this subclass, the following expression is used with the meaning indicated:
– "rotary engineering elements other than gearing, coupling, clutch or brake elements" covers any engineering element other than gearing, coupling, clutch or brake elements which rotates in so far as its features are affected only by the fact that it rotates.

Subclass index

1/00 Flexible shafts (flexible shafts in dental machines for boring or cutting A61C 1/18); **Mechanical means for transmitting movement in a flexible sheathing**
1/02 . for conveying rotary movements
1/04 . . Articulated shafts
1/06 . . with guiding-sheathing, tube, or box (F16C 1/04 takes precedence; guiding-sheathings F16C 1/26)
1/08 . . End connections
1/10 . Means for transmitting linear movement in a flexible sheathing, e.g. "Bowden mechanisms" (guiding-sheathings F16C 1/26)
1/12 . . Arrangements for transmitting movement to or from the flexible member
1/14 . . . Construction of the end-piece of the flexible member; Attachment thereof to the flexible member
1/16 . . . in which the end-piece is guided rectilinearly
1/18 . . . in which the end portion of the flexible member is laid along a curved surface of a pivoted member
1/20 . . Construction of flexible members moved to and fro in the sheathing
1/22 . . Adjusting; Compensating length
1/24 . Lubrication; Lubricating equipment
1/26 . Construction of guiding-sheathings or guiding-tubes
1/28 . . with built-in bearings

3/00 Shafts (flexible shafts F16C 1/00; marine propeller shafts, paddle wheel shafts B63H 23/34); **Axles**; **Cranks**; **Eccentrics**
3/02 . Shafts; Axles
3/03 . . telescopic
3/035 . . . with built-in bearings
3/04 . Crankshafts, eccentric-shafts; Cranks, eccentrics
3/06 . . Crankshafts
3/08 . . . made in one piece (features relating to lubrication F16C 3/14, to cooling F16C 3/16)
3/10 . . . assembled of several parts, e.g. by welding
3/12 . . . . releasably connected
3/14 . . . Features relating to lubrication
3/16 . . . Features relating to cooling
3/18 . . Eccentric-shafts
3/20 . . Shape of crankshafts or eccentric-shafts having regard to balancing
3/22 . . Cranks; Eccentrics (constructional features of crank-pins F16C 11/02)
3/24 . . . with return cranks, i.e. a second crank carried by the crank-pin
3/26 . . . Elastic crank-webs; Resiliently-mounted crank-pins
3/28 . . . Adjustable cranks or eccentrics
3/30 . . . with arrangements for overcoming dead-centres

5/00 Crossheads; **Constructions of connecting-rod heads or piston-rod connections rigid with crossheads** (piston-rods, i.e. rods rigidly connected to the piston, F16J 7/00)

7/00 Connecting-rods or like links pivoted at both ends (coupling-rods for locomotive driving-wheels B61C 17/10); **Construction of connecting-rod heads** (heads rigid with crossheads F16C 5/00)
7/02 . Constructions of connecting-rods of constant length
7/04 . with elastic intermediate part or fluid cushion
7/06 . Adjustable connecting-rods
7/08 . made from sheet metal

9/00 **Bearings for crankshafts or connecting-rods**; **Attachment of connecting-rods** (lubrication of connecting-rods in connection with crankshafts F16C 3/14; connections to crossheads F16C 5/00, to pistons F16J 1/14)

9/02 . Crankshaft bearings

9/03 . . Arrangements for adjusting play

9/04 . Connecting-rod bearings; Attachment thereof

9/06 . . Arrangements for adjusting play in bearings, operating either automatically or not

11/00 **Pivots**; **Pivotal connections** (arrangements of steering linkage connections B62D 7/16)

11/02 . Trunnions; Crank-pins (fastening crank-pins to webs, crank-pins integral with cranks F16C 3/06, F16C 3/22)

11/04 . Pivotal connections (hinges for doors, windows or wings E05D)

11/06 . . Ball-joints; Other joints having more than one degree of angular freedom, i.e. universal joints (universal joints in which flexibility is produced by means of pivots or sliding or rolling connecting parts F16D 3/16)

11/08 . . . with resilient bearings

11/10 . . Arrangements for locking

11/12 . . incorporating flexible connections, e.g. leaf springs

13/00 **Rolls, drums, discs, or the like** (guide rollers in feeding webs B65H 27/00; calender rolls, bearings therefor D21G 1/02; rotary drums or rollers for heat-exchange or heat-transfer apparatus F28F 5/02; special adaptations, see the relevant classes); **Bearings or mountings therefor**

13/02 . Bearings

13/04 . . Bearings with only partial enclosure of the member to be borne; Bearings with local support at two or more points

13/06 . . self-adjusting

15/00 **Construction of rotary bodies to resist centrifugal force** (flywheels, correction weights F16F 15/30, F16F 15/32)

Bearings for rotary parts (F16C 9/00, F16C 13/02 take precedence; allowing for linear movement also F16C 31/00)

17/00 **Sliding-contact bearings for exclusively rotary movement** (F16C 32/06 takes precedence; adjustable bearings F16C 23/00, F16C 25/00) **[2]**

17/02 . for radial load only

17/03 . . with tiltably-supported segments, e.g. Michell bearings

17/04 . for axial load only

17/06 . . with tiltably-supported segments, e.g. Michell bearings

17/08 . . for supporting the end face of a shaft or other member, e.g. footstep bearings

17/10 . for both radial and axial load

17/12 . characterised by features not related to the direction of the load

17/14 . . specially adapted for operating in water

17/18 . . with floating brasses or bushes, rotatable at a reduced speed

17/20 . . with emergency supports or bearings

17/22 . . with arrangements compensating for thermal expansion

17/24 . . with devices affected by abnormal or undesired conditions, e.g. for preventing overheating, for safety

17/26 . Systems consisting of a plurality of sliding-contact bearings

19/00 **Bearings with rolling contact, for exclusively rotary movement** (adjustable bearings F16C 23/00, F16C 25/00)

19/02 . with bearing balls essentially of the same size in one or more circular rows

19/04 . . for radial load mainly

19/06 . . . with a single row of balls

19/08 . . . with two or more rows of balls

19/10 . . for axial load mainly

19/12 . . . for supporting the end face of a shaft or other member, e.g. footstep bearings

19/14 . . for both radial and axial load

19/16 . . . with a single row of balls

19/18 . . . with two or more rows of balls

19/20 . . with loose spacing bodies, e.g. balls, between the bearing balls

19/22 . with bearing rollers essentially of the same size in one or more circular rows, e.g. needle bearings

19/24 . . for radial load mainly

19/26 . . . with a single row of rollers

19/28 . . . with two or more rows of rollers

19/30 . . for axial load mainly

19/32 . . . for supporting the end face of a shaft or other member, e.g. footstep bearings

19/34 . . for both radial and axial load

19/36 . . . with a single row of rollers

19/38 . . . with two or more rows of rollers

19/40 . . with loose spacing bodies between the rollers

19/44 . . Needle bearings

19/46 . . . with one row of needles

19/48 . . . with two or more rows of needles

19/49 . Bearings with both balls and rollers

19/50 . Other types of ball or roller bearings

19/52 . with devices affected by abnormal or undesired conditions

19/54 . Systems consisting of a plurality of bearings with rolling friction (spindle bearings F16C 35/08)

19/55 . . with intermediate floating rings rotating at reduced speed

19/56 . . in which the rolling bodies of one bearing differ in diameter from those of another

21/00 **Combinations of sliding-contact bearings with ball or roller bearings, for exclusively rotary movement** (F16C 17/24, F16C 19/52take precedence) **[2]**

23/00 **Bearings for exclusively rotary movement adjustable for aligning or positioning** (F16C 27/00 takes precedence)

23/02 . Sliding-contact bearings

23/04 . . self-adjusting

23/06 . Ball or roller bearings

23/08 . . self-adjusting

23/10 . Bearings, parts of which are eccentrically adjustable with respect to each other

25/00 **Bearings for exclusively rotary movement adjustable for wear or play** (F16C 27/00 takes precedence)

25/02 . Sliding-contact bearings

25/04 . . self-adjusting

25/06 . Ball or roller bearings
25/08 . . self-adjusting

27/00 Elastic or yielding bearings or bearing supports, for exclusively rotary movement (shock-damping bearings for watches or clocks G04B 31/02)
27/02 . Sliding-contact bearings
27/04 . Ball or roller bearings, e.g. with resilient rolling bodies
27/06 . by means of parts of rubber or like materials (F16C 27/08 takes precedence; with sliding surfaces of rubber or synthetic rubber F16C 33/22)
27/08 . primarily for axial load, e.g. for vertically-arranged shafts

29/00 Bearings for parts moving only linearly (F16C 32/06 takes precedence; incorporated in flexible shafts F16C 1/28) **[2]**
29/02 . Sliding-contact bearings
29/04 . Ball or roller bearings
29/06 . . in which the rolling bodies circulate partly without carrying load
29/08 . Arrangements for covering or protecting the ways
29/10 . Arrangements for locking the bearings
29/12 . Arrangements for adjusting play

31/00 Bearings for parts which both rotate and move linearly
31/02 . Sliding-contact bearings
31/04 . Ball or roller bearings
31/06 . . in which the rolling bodies circulate partly without carrying load

32/00 Bearings not otherwise provided for
32/02 . Knife-edge bearings
32/04 . using magnetic or electric supporting means **[2]**
32/06 . with moving member supported by a fluid cushion formed, at least to a large extent, otherwise than by movement of the shaft, e.g. hydrostatic air-cushion bearings **[2]**

Details or accessories of bearings

33/00 Parts of bearings; **Special methods for making bearings or parts thereof** (metal-working or like operations, see the relevant classes)
33/02 . Parts of sliding-contact bearings
33/04 . . Brasses; Bushes; Linings
33/06 . . . Sliding surface mainly made of metal (F16C 33/24 to F16C 33/28 take precedence)
33/08 . . . . Attachment of brasses, bushes, or linings to the bearing housing
33/10 . . . . Construction relative to lubrication
33/12 . . . . Structural composition; Use of special materials or surface treatments, e.g. for rust-proofing
33/14 . . . . Special methods of manufacture; Running-in
33/16 . . . Sliding surface consisting mainly of graphite
33/18 . . . Sliding surface consisting mainly of wood or fibrous material
33/20 . . . Sliding surface consisting mainly of plastics (F16C 33/22 to F16C 33/28 take precedence)
33/22 . . . Sliding surface consisting mainly of rubber or synthetic rubber (F16C 33/24 to F16C 33/28 take precedence)
33/24 . . . with different areas of the sliding surface consisting of different materials
33/26 . . . made from wire coils; made from a number of discs, rings, rods, or other members
33/28 . . . with embedded reinforcements shaped as frames or meshed materials
33/30 . Parts of ball or roller bearings
33/32 . . Balls
33/34 . . Rollers; Needles
33/36 . . . with bearing-surfaces other than cylindrical, e.g. tapered; with grooves in the bearing surfaces
33/37 . . Loose spacing bodies
33/372 . . . rigid
33/374 . . . resilient
33/38 . . Ball cages
33/40 . . . for multiple rows of balls
33/41 . . . comb-shaped
33/42 . . . made from wire or sheet-metal strips (F16C 33/40, F16C 33/41 take precedence)
33/44 . . . Selection of substances (F16C 33/40, F16C 33/41 take precedence)
33/46 . . Cages for rollers or needles
33/48 . . . for multiple rows of rollers or needles
33/49 . . . comb-shaped
33/50 . . . formed of interconnected members, e.g. chains
33/51 . . . formed of unconnected members
33/52 . . . with no part entering between, or touching, the bearing surfaces of the rollers (F16C 33/50 takes precedence)
33/54 . . . made from wire, strips, or sheet metal (F16C 33/48, F16C 33/49 take precedence)
33/56 . . . Selection of substances (F16C 33/48, F16C 33/49 take precedence)
33/58 . . Raceways; Race rings
33/60 . . . divided
33/61 . . . . formed by wires
33/62 . . . Selection of substances
33/64 . . . Special methods of manufacture
33/66 . . Special parts or details in view of lubrication
33/72 . Sealings
33/74 . . of sliding-contact bearings
33/76 . . of ball or roller bearings
33/78 . . . with a diaphragm, disc, or ring, with or without resilient members
33/80 . . . Labyrinth sealings
33/82 . . . Arrangements for electrostatic or magnetic action against dust or other particles

35/00 Rigid support of bearing units; **Housings, e.g. caps, covers** (F16C 23/00 takes precedence)
35/02 . in the case of sliding-contact bearings
35/04 . in the case of ball or roller bearings
35/06 . . Mounting of ball or roller bearings; Fixing them onto shaft or in housing
35/063 . . . Fixing them on the shaft (with interposition of an element F16C 35/07) **[3]**
35/067 . . . Fixing them in a housing (with interposition of an element F16C 35/07) **[3]**
35/07 . . . Fixing them on the shaft or housing with interposition of an element **[3]**
35/073 . . . . between shaft and inner race ring **[3]**
35/077 . . . . between housing and outer race ring **[3]**
35/078 . . . using pressure fluid as mounting aid **[3]**
35/08 . for spindles
35/10 . . with sliding-contact bearings
35/12 . . with ball or roller bearings

37/00 Cooling of bearings

39/00 Relieving load on bearings
39/02 . using mechanical means
39/04 . using hydraulic or pneumatic means
39/06 . using magnetic means

41/00 Other accessories for bearings
41/02 . Arrangements for equalising the load on a plurality of bearings or their elements
41/04 . Preventing damage to bearings during storage or transport thereof or when otherwise out of use

43/00 Assembling bearings
43/02 . Assembling sliding-contact bearings
43/04 . Assembling rolling contact bearings
43/06 . . Placing rolling bodies in cages or bearings
43/08 . . . by deforming the cages or the races

F16D COUPLINGS FOR TRANSMITTING ROTATION (gearing for conveying rotation F16H, e.g. fluid gearing F16H 39/00 to F16H 47/00); **CLUTCHES** (dynamo-electric clutches H02K 49/00; clutches using electrostatic attraction H02N 13/00); **BRAKES** (electrodynamic brake systems for vehicles in general B60L 7/00; dynamo-electric brakes H02K 49/00) **[2]**

Subclass index

Couplings

1/00 Couplings for rigidly connecting two coaxial shafts or other movable machine elements (for attachment of cranks to their shafts F16C 3/10)
1/02 . for connecting two abutting shafts or the like
1/027 . . non-disconnectable, e.g. involving gluing, welding or the like **[6]**
1/033 . . by clamping together two faces perpendicular to the axis of rotation, e.g. with bolted flanges **[6]**
1/04 . . with clamping hub; with hub and longitudinal key
1/05 . . . with radial clamping due to axial loading of at least one pair of conical surfaces **[5]**
1/06 . for attachment of a member on a shaft or on a shaft-end (attachment of marine propellers on shafts B63H 23/34)
1/064 . . non-disconnectable **[6]**
1/068 . . . involving gluing, welding or the like **[6]**
1/072 . . . involving plastic deformation (plastic welding F16D 1/068) **[6]**
1/076 . . by clamping together two faces perpendicular to the axis of rotation, e.g. with bolted flanges **[6]**
1/08 . . with clamping hub; with hub and longitudinal key
1/09 . . . with radial clamping due to axial loading of at least one pair of conical surfaces **[5]**
1/091 . . . . and comprising a chamber including a tapered piston moved axially by fluid pressure to effect clamping **[8]**
1/092 . . . . the pair of conical mating surfaces being provided on the coupled hub and shaft **[8]**
1/093 . . . . using one or more elastic or segmented conical rings forming at least one of the conical surfaces, the rings being expanded or contracted to effect clamping (F16D 1/091 takes precedence) **[8]**
1/094 . . . . . using one or more pairs of elastic or segmented rings with mutually mating conical surfaces, one of the mating rings being contracted and the other being expanded **[8]**
1/095 . . . . . with clamping effected by ring contraction only **[8]**
1/096 . . . . . the ring or rings being located between the shaft and the hub **[8]**
1/097 . . . . . with clamping effected by ring expansion only, e.g. with an expanded ring located between hub and shaft **[8]**

1/10 . Quick-acting couplings in which the parts are connected by simply bringing them together axially
1/104 . . having retaining means rotating with the coupling and acting only by friction **[6]**
1/108 . . having retaining means rotating with the coupling and acting by interengaging parts, i.e. positive coupling **[6]**
1/112 . . . the interengaging parts comprising torque-transmitting surfaces, e.g. bayonet joints **[6]**
1/116 . . . the interengaging parts including a continuous or interrupted circumferential groove in the surface of one of the coupling parts (circlips for retaining hubs on shafts F16B 21/18) **[6]**
1/12 . allowing adjustment of the parts about the axis (during motion F16D 3/10)

3/00 Yielding couplings, i.e. with means permitting movement between the connected parts during the drive (couplings disconnectable simply by axial movement F16D 1/10; slip couplings F16D 7/00; fluid couplings F16D 31/00 to F16D 39/00)

3/02 . adapted to specific functions (universal joints, see the appropriate groups)
3/04 . . specially adapted to allow radial displacement, e.g. Oldham couplings
3/06 . . specially adapted to allow axial displacement
3/08 . . Couplings for intersecting shafts, provided with intermediate bars bent in an angle corresponding with the angle of intersection
3/10 . . Couplings with means for varying the angular relationship of two coaxial shafts during motion
3/12 . . specially adapted for accumulation of energy to absorb shocks or vibration (by making use of fluid elements F16D 3/80)
3/14 . . combined with a friction coupling for damping vibration or absorbing shock
3/16 . Universal joints in which flexibility is produced by means of pivots or sliding or rolling connecting parts
3/18 . . the coupling parts having slidably-interengaging teeth

Note

In this group, the following expression is used with the meaning indicated:
– "coupling parts" means the driving member and the driven member of the coupling, which are mounted on, and rotate as a unit with, the shafts or their equivalents between which the coupling is placed. An intermediate member interconnecting these parts is regarded as such an equivalent. **[4]**

3/19 . . . of resilient material or structure
3/20 . . one coupling part entering a sleeve of the other coupling part and connected thereto by sliding or rolling members (F16D 3/18, F16D 3/24 take precedence) **[4,5]**
3/202 . . . one coupling part having radially projecting pins, e.g. tripod joints **[5]**
3/205 . . . . the pins extending radially outwardly from the coupling part **[5]**
3/207 . . . . the pins extending radially inwardly from the coupling part **[5]**
3/22 . . . the rolling members being balls, rollers, or the like, guided in grooves or sockets in both coupling parts **[3,5]**
3/221 . . . . the rolling members being located in sockets in one of the coupling parts **[5]**
3/223 . . . . *the rolling members being guided in grooves in both coupling parts* **[5,2011.01]**
3/2233 . . . . . *where the track is made up of two curves with a point of inflexion in between, i.e. S-track joints* **[2011.01]**
3/2237 . . . . . *where the grooves are composed of radii and adjoining straight lines, i.e. undercut free [UF] type joints* **[2011.01]**
3/224 . . . . . *the groove centre-lines of each coupling part lying on a sphere* **[5,2011.01]**
3/2245 . . . . . *where the groove centres are offset from the joint centre* **[2011.01]**
3/226 . . . . . the groove centre-lines of each coupling part lying on a cylinder co-axial with the respective coupling part **[5]**
3/227 . . . . . the joints being telescopic **[5]**
3/229 . . . . . Prismatic coupling parts having each groove centre-line lying on planes parallel to the axis of the respective coupling part (F16D 3/224, F16D 3/226 take precedence) **[5]**
3/24 . . comprising balls, rollers, or the like, between overlapping driving faces, e.g. cogs, on both coupling parts **[3,5]**
3/26 . . Hooke's joints or other joints with an equivalent intermediate member to which each coupling part is pivotally or slideably connected (F16D 3/18, F16D 3/20 take precedence)
3/27 . . . with two or more intermediate members pivotally or slidably connected together, e.g. tongue-and-slipper type joints **[5]**
3/28 . . . in which the interconnecting pivots include elastic members
3/30 . . . in which the coupling is specially adapted to constant velocity-ratio
3/32 . . . . by the provision of two intermediate members each having two relatively-perpendicular trunnions or bearings
3/33 . . . . . with ball or roller bearings
3/34 . . . . parts being connected by ridges, pins, balls, or the like guided in grooves or between cogs
3/36 . . . in which each pivot between the coupling parts and the intermediate member comprises a single ball
3/38 . . . with a single intermediate member with trunnions or bearings arranged on two axes perpendicular to one another (F16D 3/36 takes precedence)
3/40 . . . . with intermediate member provided with two pairs of outwardly-directed trunnions on intersecting axes
3/41 . . . . . with ball or roller bearings
3/42 . . . . with ring-shaped intermediate member provided with bearings or inwardly-directed trunnions
3/43 . . . . . with ball or roller bearings
3/44 . . . the intermediate member being connected to the coupling parts by ridges, pins, balls, or the like guided in grooves or between cogs
3/46 . . . . each coupling part embracing grooves or ridges on the intermediate member
3/48 . . one coupling part having pins arranged parallel to the axis and entering holes in the other coupling part
3/50 . with the coupling parts connected by one or more intermediate members (F16D 3/16 takes precedence)

3/52 . . comprising a continuous strip, spring, or the like engaging the coupling parts at a number of places
3/54 . . Couplings comprising a chain or strip surrounding two wheels arranged side by side and provided with teeth or the equivalent
3/56 . . comprising elastic metal lamellae, elastic rods, or the like, e.g. arranged radially or parallel to the axis, the members being shear-loaded collectively by the total load
3/58 . . . the intermediate members being made of rubber or like material
3/60 . . comprising pushing or pulling links attached to both parts (F16D 3/64 takes precedence)
3/62 . . . the links or their attachments being elastic
3/64 . . comprising elastic elements arranged between substantially-radial walls of both coupling parts
3/66 . . . the elements being metallic, e.g. in the form of coils
3/68 . . . the elements being made of rubber or similar material
3/70 . . comprising elastic elements arranged in holes in one coupling part and surrounding pins on the other coupling part
3/72 . . with axially-spaced attachments to the coupling parts (F16D 3/56 takes precedence)
3/74 . . . the intermediate member or members being made of rubber or other flexible material
3/76 . . shaped as an elastic ring centered on the axis, surrounding a portion of one coupling part and surrounded by a sleeve of the other coupling part
3/77 . . . the ring being metallic
3/78 . . shaped as an elastic disc or flat ring, arranged perpendicular to the axis of the coupling parts, different sets of spots of the disc or ring being attached to each coupling part, e.g. Hardy couplings
3/79 . . . the disc or ring being metallic
3/80 . in which a fluid is used (fluid couplings allowing continuous slip F16D 31/00 to F16D 35/00)
3/82 . . with a coupling element in the form of a pneumatic tube
3/84 . Shrouds, e.g. casings, covers; Sealing means specially adapted therefor

5/00 **Impulse couplings, i.e. couplings that alternately accelerate and decelerate the driven member** (fluid couplings F16D 31/00 to F16D 39/00)

7/00 **Slip couplings, e.g. slipping on overload, for absorbing shock** (combined with yielding shaft couplings F16D 3/14; fluid slip couplings F16D 31/00 to F16D 35/00)
7/02 . of the friction type (couplings in which overload initiates a decrease of coupling pressure or a disconnection, see the relevant groups for clutches)
7/04 . of the ratchet type
7/06 . . with intermediate balls or rollers
7/08 . . . moving axially between engagement and disengagement **[5]**
7/10 . . . moving radially between engagement and disengagement **[5]**

9/00 **Couplings with safety member for disconnecting**
9/02 . by thermal means, e.g. melting member **[6]**
9/04 . by tensile breaking **[6]**
9/06 . by breaking due to shear stress **[6]**
9/08 . . over a single area encircling the axis of rotation, e.g. shear necks on shafts (F16D 9/10 takes precedence) **[6]**
9/10 . . having a part movable after disconnection so as to provide reconnection, e.g. advanceable shear pins **[6]**

Clutches with mechanically-actuated clutching members; **Synchronisation arrangements for clutches**

11/00 **Clutches in which the members have interengaging parts** (arrangements for synchronisation F16D 23/02; automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)
11/02 . disengaged by a contact of a part mounted on the clutch with a stationarily-mounted member
11/04 . . with clutching members movable only axially
11/06 . . with clutching members movable otherwise than only axially, e.g. rotatable keys
11/08 . actuated by moving a non-rotating part axially (actuating-mechanisms in the relevant groups)
11/10 . . with clutching members movable only axially
11/12 . . with clutching members movable otherwise than only axially
11/14 . with clutching members movable only axially (F16D 11/02, F16D 11/08 take precedence) **[5]**
11/16 . with clutching members movable otherwise than only axially (F16D 11/02, F16D 11/08 take precedence) **[5]**

13/00 **Friction clutches** (arrangements for synchronisation F16D 23/02; automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)
13/02 . disengaged by the contact of a part mounted on the clutch with a stationarily-mounted member
13/04 . with means for actuating or keeping engaged by a force derived at least partially from one of the shafts to be connected (automatic clutches F16D 43/00)
13/06 . . with clutching members movable otherwise than only axially (F16D 13/08, F16D 13/12 take precedence)
13/08 . with a helical band or equivalent member, which may be built-up from linked parts, with more than one turn embracing a drum or the like, with or without an additional clutch actuating the end of the band (F16D 13/02 takes precedence)
13/10 . with clutching members co-operating with the periphery of a drum, a wheel-rim, or the like (F16D 13/02 to F16D 13/08 take precedence)
13/12 . with an expansible band or coil co-operating with the inner surface of a drum or the like (F16D 13/02 takes precedence)
13/14 . with outwardly-movable clutching members co-operating with the inner surface of a drum or the like (F16D 13/02, F16D 13/06, F16D 13/12 take precedence)
13/16 . . shaped as radially-movable segments
13/18 . . shaped as linked or separately-pivoted segments
13/20 . with clutching members co-operating with both the periphery and the inner surface of a drum or wheel-rim
13/22 . with axially-movable clutching members
13/24 . . with conical friction surfaces
13/26 . . . in which the or each axially-movable member is pressed exclusively against an axially-located member

13/28 . . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
13/30 . . . . . in which the clutching pressure is produced by springs only
13/32 . . . in which two or more axially-movable members are pressed from one side towards an axially-located member
13/34 . . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
13/36 . . . . . in which the clutching pressure is produced by springs only
13/38 . . with flat clutching surfaces, e.g. discs
13/40 . . . in which the or each axially-movable member is pressed exclusively against an axially-located member
13/42 . . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
13/44 . . . . . in which the clutching pressure is produced by springs only
13/46 . . . in which two axially-movable members, of which one is attached to the driving side and the other to the driven side, are pressed from one side towards an axially-located member
13/48 . . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
13/50 . . . . . in which the clutching pressure is produced by springs only
13/52 . . . Clutches with multiple lamellae
13/54 . . . . with means for increasing the effective force between the actuating sleeve or equivalent member and the pressure member
13/56 . . . . . in which the clutching pressure is produced by springs only
13/58 . Details
13/60 . . Clutching elements (friction lining or attachment thereof F16D 69/00)
13/62 . . . Clutch-bands; Clutch-shoes; Clutch-drums (brake-bands, brake-shoes, brake-drums F16D 65/00)
13/64 . . . Clutch-plates; Clutch-lamellae (brake-plates, brake-lamellae F16D 65/12)
13/66 . . . . of conical shape
13/68 . . . . Attachments of plates or lamellae to their supports
13/69 . . . . Arrangements for spreading lamellae in released state
13/70 . . Pressure members, e.g. pressure plates, for clutch-plates or lamellae; Guiding arrangements for pressure members
13/71 . . . in which the clutching pressure is produced by springs only
13/72 . . Features relating to cooling
13/74 . . Features relating to lubrication
13/75 . . Features relating to adjustment, e.g. slack adjusters
13/76 . specially adapted to incorporate with other transmission parts, i.e. at least one of the clutch parts also having another function, e.g. being the disc of a pulley

15/00 Clutches with wedging balls or rollers or with other wedgeable separate clutching members (freewheels, freewheel clutches F16D 41/00; automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)

17/00 Clutches in which the drive is transmitted solely by virtue of the eccentricity of the contacting surfaces of clutch members which fit one around the other (automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)

19/00 Clutches with mechanically-actuated clutching members not otherwise provided for (automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)

21/00 Systems comprising a plurality of mechanically-actuated clutches (for synchronisation F16D 23/04; automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)
21/02 . for interconnecting three or more shafts or other transmission members in different ways
21/04 . . with a shaft carrying a number of rotatable transmission members, e.g. gears, each of which can be connected to the shaft by a clutching member or members between the shaft and the hub of the transmission member
21/06 . . at least two driving shafts or two driven shafts being concentric
21/08 . Serially-arranged clutches interconnecting two shafts only when all the clutches are engaged (F16D 13/08, F16D 13/12 take precedence)

23/00 Details of mechanically-actuated clutches not specific for one distinct type; **Synchronisation arrangements for clutches**
23/02 . Arrangements for synchronisation (shape or mounting of interengaging parts of clutch members to facilitate engagement F16D 11/08)
23/04 . . with an additional friction cluch
23/06 . . . and a blocking mechanism preventing the engagement of the main clutch prior to synchronisation
23/08 . . with a blocking mechanism that only releases the clutching member on synchronisation (in combination with an additional friction clutch F16D 23/06)
23/10 . . automatically producing the engagement of the clutch when the clutch members are moving at the same speed; Indicating synchronisation
23/12 . Mechanical clutch-actuating mechanisms arranged outside the clutch as such (specific for combined clutches F16D 21/00; mechanisms specific for synchronisation F16D 23/02)
23/14 . . Clutch-actuating sleeves; Actuating members directly connected to clutch-actuating sleeves

Clutches actuated non-mechanically [3]

25/00 Fluid-actuated clutches (arrangements for synchronisation F16D 23/02; fluid clutches F16D 31/00 to F16D 39/00; automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00)
25/02 . with means for actuating or keeping engaged by a force derived at least partially from one of the shafts to be connected
25/04 . in which the fluid actuates an elastic clutching member, e.g. a diaphragm or a pneumatic tube (F16D 25/02 takes precedence; coupling using a pneumatic tube F16D 3/82)
25/06 . in which the fluid actuates a piston incorporated in the clutch (F16D 25/02 takes precedence)
25/061 . . the clutch having interengaging clutch members
25/062 . . the clutch having friction surfaces

25/063 . . . with clutch members exclusively moving axially
25/0632 . . . . with conical friction surfaces, e.g. cone clutches **[5]**
25/0635 . . . . with flat friction surfaces, e.g. discs **[5]**
25/0638 . . . . . with more than two discs, e.g. multiple lamellae **[5]**
25/064 . . . . the friction surface being grooved
25/065 . . . with clutching members having a movement which has at least a radial component
25/08 . with fluid-actuated member not rotating with a clutching member (F16D 25/02 takes precedence)
25/10 . Clutch systems with a plurality of fluid-actuated clutches
25/12 . Details not specific to one of the before-mentioned types

27/00 Magnetically-actuated clutches; **Control or electric circuits therefor** (arrangements for synchronisation F16D 23/02; clutches with magnetisable particles F16D 37/02; automatic clutches F16D 43/00 to F16D 45/00; circuits for external control F16D 48/00) **[2]**
27/01 . with permanent magnets
27/02 . with electromagnets incorporated in the clutch, i.e. with collecting rings
27/04 . . with axially-movable friction surfaces
27/06 . . . with friction surfaces arranged within the flux
27/07 . . . . Constructional features of clutch-plates or clutch-lamellae
27/08 . . . with friction surfaces arranged externally to the flux
27/09 . . and with interengaging jaws or gear-teeth
27/10 . with an electromagnet not rotating with a clutching member, i.e. without collecting rings
27/102 . . with radially movable clutching members (F16D 27/105 takes precedence) **[5]**
27/105 . . with a helical band or equivalent member co-operating with a cylindrical coupling surface **[5]**
27/108 . . with axially movable clutching members **[5]**
27/11 . . . with conical friction surfaces, e.g. cone clutches **[5]**
27/112 . . . with flat friction surfaces, e.g. discs **[5]**
27/115 . . . . with more than two discs, e.g. multiple lamellae **[5]**
27/118 . . with interengaging jaws or gear teeth **[5]**
27/12 . Clutch systems with a plurality of electromagnetically-actuated clutches
27/14 . Details

28/00 Electrically-actuated clutches (arrangements for synchronisation F16D 23/02; clutches actuated directly by means of an electromagnet F16D 27/00; automatic clutches F16D 43/00 to F16D 45/00; external control F16D 48/00) **[6]**

29/00 Clutches or systems of clutches involving both fluid and magnetic or both fluid and electric actuation [6]

Couplings or clutches with a fluid or semifluid as power-transmitting means

31/00 Fluid couplings or clutches with pumping sets of the volumetric type, i.e. in the case of liquid passing a predetermined volume per revolution
31/02 . using pumps with pistons or plungers working in cylinders
31/04 . using gear-pumps
31/06 . using pumps of types differing from those before-mentioned
31/08 . Control of slip

33/00 Rotary fluid couplings or clutches of the hydrokinetic type
33/02 . controlled by changing the flow of the liquid in the working circuit, while maintaining a completely filled working circuit
33/04 . . by altering the position of blades
33/06 . controlled by changing the amount of liquid in the working circuit
33/08 . . by devices incorporated in the fluid coupling, with or without remote control
33/10 . . . consisting of controllable supply and discharge openings
33/12 . . . . controlled automatically by self-actuated valves
33/14 . . . consisting of shiftable or adjustable scoops
33/16 . . by means arranged externally of the coupling or clutch
33/18 . Details
33/20 . . Shape of wheels, blades, or channels with respect to function

35/00 Fluid clutches in which the clutching is predominantly obtained by fluid adhesion (F16D 37/00 takes precedence)
35/02 . with rotary working chambers and rotary reservoirs, e.g. in one coupling part **[5]**

37/00 Clutches in which the drive is transmitted through a medium consisting of small particles, e.g. centrifugally speed-responsive
37/02 . the particles being magnetisable

39/00 Combinations of couplings according to two or more of the groups F16D 31/00 to F16D 37/00

Freewheels or freewheel clutches; **Automatic clutches**

Note

Groups F16D 31/00 to F16D 39/00 take precedence over groups F16D 41/00 to F16D 45/00. **[2009.01]**

41/00 Freewheels or freewheel clutches (cycle brakes controlled by back-pedalling B62L 5/00)
41/02 . disengaged by contact of a part of or on the freewheel or freewheel clutch with a stationarily-mounted member
41/04 . combined with a clutch for locking the driving and driven members (F16D 41/02, F16D 41/24 take precedence)
41/06 . with intermediate wedging coupling members between an inner and an outer surface (F16D 41/02, F16D 41/24 take precedence)
41/061 . . the intermediate members wedging by movement having an axial component **[6]**
41/063 . . the intermediate members wedging by moving along the inner and the outer surface without pivoting or rolling, e.g. sliding wedges (F16D 41/061 takes precedence) **[6]**
41/064 . . the intermediate members wedging by rolling and having a circular cross-section, e.g. balls (F16D 41/061 takes precedence) **[6]**
41/066 . . . all members having the same size and only one of the two surfaces being cylindrical **[6]**

41/067 . . . . and the members being distributed by a separate cage encircling the axis of rotation **[6]**
41/069 . . the intermediate members wedging by pivoting or rocking, e.g. sprags (F16D 41/061 takes precedence) **[6]**
41/07 . . . between two cylindrical surfaces **[6]**
41/08 . . with provision for altering the freewheeling action
41/10 . . . with self-actuated reversing
41/12 . with hinged pawl co-operating with teeth, cogs, or the like (F16D 41/02, F16D 41/24 take precedence)
41/14 . . the effective stroke of the pawl being adjustable
41/16 . . the action being reversible
41/18 . with non-hinged detent (F16D 41/02, F16D 41/24 take precedence)
41/20 . with expandable or contractable clamping ring or band (F16D 41/02, F16D 41/24 take precedence)
41/22 . with clutching ring or disc axially shifted as a result of lost motion between actuating members (F16D 41/02, F16D 41/24 take precedence)
41/24 . specially adapted for cycles
41/26 . . with provision for altering the action
41/28 . . with intermediate wedging coupling members
41/30 . . with hinged pawl co-operating with teeth, cogs, or the like
41/32 . . with non-hinged detent
41/34 . . with expandable or contractable clamping ring or band
41/36 . . with clutching ring or disc axially shifted as a result of lost motion between actuating members

43/00 Internally controlled automatic clutches (freewheels, freewheel clutches F16D 41/00; external control of clutches F16D 48/00) **[6]**

43/02 . actuated entirely mechanically
43/04 . . controlled by angular speed (F16D 43/24 takes precedence; clutches in which the drive is transmitted through a medium consisting of small particles F16D 37/00)
43/06 . . . with centrifugal masses actuating axially a movable pressure ring or the like
43/08 . . . . the pressure ring actuating friction plates, cones, or similar axially-movable friction surfaces
43/09 . . . . . in which the carrier of the centrifugal masses can be stopped
43/10 . . . . . the centrifugal masses acting directly on the pressure ring, no other actuating mechanism for the pressure ring being provided
43/12 . . . . . the centrifugal masses acting on, or forming a part of, an actuating mechanism by which the pressure ring can also be actuated independently of the masses
43/14 . . . with centrifugal masses actuating the clutching members directly in a direction which has at least a radial component; with centrifugal masses themselves being the clutching members
43/16 . . . . with clutching members having interengaging parts
43/18 . . . . with friction clutching members
43/20 . . controlled by torque, e.g. overload-release clutches, slip-clutches with means by which torque varies the clutching pressure
43/202 . . . of the ratchet type (slip couplings of the ratchet type F16D 7/04) **[5]**
43/204 . . . . with intermediate balls or rollers **[5]**
43/206 . . . . . moving axially between engagement and disengagement **[5]**
43/208 . . . . . moving radially between engagement and disengagement **[5]**
43/21 . . . with friction members
43/22 . . controlled by both speed and torque
43/24 . . controlled by acceleration or deceleration of angular speed
43/25 . . controlled by thermo-responsive elements
43/26 . . acting at definite angular position or disengaging after a definite number of rotations (actuating by means of stationary abutment F16D 11/02, F16D 13/02, F16D 15/00)
43/28 . actuated by fluid pressure
43/284 . . controlled by angular speed
43/286 . . controlled by torque
43/30 . Systems of a plurality of automatic clutches

45/00 Freewheels or freewheel clutches combined with automatic clutches

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47/00 Systems of clutches, or clutches and couplings, comprising devices of types grouped under at least two of the following sets of groups: F16D 1/00 to F16D 9/00; **F16D 11/00 to F16D 23/00**; **F16D 25/00 to F16D 29/00**; **F16D 31/00 to F16D 39/00**; **F16D 41/00 to F16D 45/00** (freewheels combined with a clutch to lock the driving and driven members of the freewheel F16D 41/04, F16D 41/26)

47/02 . of which at least one is a coupling (elastic attachment of clutch parts, see the relevant groups for clutches)
47/04 . of which at least one is a freewheel (F16D 47/02, F16D 47/06 take precedence)
47/06 . of which at least one is a clutch with a fluid or a semifluid as power-transmitting means

48/00 External control of clutches [6]

Note

This group does not cover actuation, which is covered by groups F16D 11/00 to F16D 29/00. **[6]**

48/02 . Control by fluid pressure **[6]**
48/04 . . providing power assistance **[6]**
48/06 . Control by electric or electronic means, e.g. of fluid pressure **[6]**
48/08 . . Regulating clutch take-up on starting **[6]**
48/10 . . Preventing unintentional or unsafe engagement **[6]**
48/12 . . Control of torque transfer between driven axles **[6]**

Brakes

49/00 Brakes with a braking member co-operating with the periphery of a drum, wheel-rim, or the like

49/02 . shaped as a helical band or coil with more than one turn, with or without intensification of the braking force by the tension of the band or contracting member
49/04 . . mechanically actuated
49/06 . . fluid actuated
49/08 . shaped as an encircling band extending over approximately 360°

49/10 . . mechanically actuated (self-tightening F16D 49/20)
49/12 . . fluid actuated
49/14 . shaped as a fluid-filled flexible member actuated by variation of the fluid pressure
49/16 . Brakes with two brake-blocks (self-tightening F16D 49/20)
49/18 . Brakes with three or more brake-blocks (self-tightening F16D 49/20)
49/20 . Self-tightening brakes (with helical band or coil with more than one turn F16D 49/02)
49/22 . . with an auxiliary friction member initiating or increasing the action of the brake

51/00 Brakes with outwardly-movable braking members co-operating with the inner surface of a drum or the like

51/02 . shaped as one or more circumferential bands
51/04 . . mechanically actuated
51/06 . . fluid actuated
51/08 . shaped as an expansible fluid-filled flexible member
51/10 . shaped as exclusively radially-movable brake-shoes
51/12 . . mechanically actuated
51/14 . . fluid actuated
51/16 . shaped as brake-shoes pivoted on a fixed or nearly-fixed axis (self-tightening F16D 51/46)
51/18 . . with two brake-shoes
51/20 . . . extending in opposite directions from their pivots
51/22 . . . . mechanically actuated
51/24 . . . . fluid actuated
51/26 . . . both extending in the same direction from their pivots
51/28 . . . . mechanically actuated
51/30 . . . . fluid actuated
51/32 . . with three or more brake-shoes
51/34 . . . extending in opposite directions from their pivots
51/36 . . . . mechanically actuated
51/38 . . . . fluid actuated
51/40 . . . all extending in the same direction from their pivots
51/42 . . . . mechanically actuated
51/44 . . . . fluid actuated
51/46 . Self-tightening brakes with pivoted brake-shoes
51/48 . . with two linked or directly-interacting brake-shoes
51/50 . . . mechanically actuated
51/52 . . . fluid actuated
51/54 . . with three or more brake-shoes, at least two of them being linked or directly interacting
51/56 . . . mechanically actuated
51/58 . . . fluid actuated
51/60 . . with wedging action of a brake-shoe, e.g. the shoe entering as a wedge between the brake-drum and a stationary part
51/62 . . . mechanically actuated
51/64 . . . fluid actuated
51/66 . . an actuated brake-shoe being carried along and thereby engaging a member for actuating another brake-shoe
51/68 . . . mechanically actuated
51/70 . . . fluid actuated

53/00 Brakes with braking members co-operating with both the periphery and the inner surface of a drum, wheel-rim, or the like

55/00 Brakes with substantially-radial braking surfaces pressed together in axial direction, e.g. disc brakes

55/02 . with axially-movable discs or pads pressed against axially-located rotating members
55/04 . . by moving discs or pads away from one another against radial walls of drums or cylinders
55/06 . . . without self-tightening action
55/08 . . . . Mechanically-actuated brakes
55/10 . . . . Brakes actuated by a fluid-pressure device arranged in or on the brake
55/12 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
55/14 . . . with self-tightening action, e.g. by means of coacting helical surfaces or balls and inclined surfaces
55/15 . . . . initiated by means of brake-bands or brake-shoes
55/16 . . . . Mechanically-actuated brakes
55/18 . . . . Brakes actuated by a fluid-pressure device arranged in or on the brake
55/20 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
55/22 . . by clamping an axially-located rotating disc between movable braking members, e.g. movable brake discs or brake pads **[5]**
55/224 . . . with a common actuating member for the braking members **[5]**
55/225 . . . . the braking members being brake pads **[5]**
55/2255 . . . . . in which the common actuating member is pivoted **[5]**
55/226 . . . . . in which the common actuating member is moved axially **[5]**
55/2265 . . . . . the axial movement being guided by one or more pins **[5]**
55/227 . . . . . by two pins **[5]**
55/228 . . . with a separate actuating member for each side
55/24 . with a plurality of axially-movable discs, lamellae, or pads, pressed from one side towards an axially-located member
55/26 . . without self-tightening action
55/28 . . . Brakes with only one rotating disc
55/30 . . . . mechanically actuated
55/31 . . . . . by means of an intermediate leverage
55/32 . . . . actuated by a fluid-pressure device arranged in or on the brake
55/33 . . . . . by means of an intermediate leverage
55/34 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
55/36 . . . Brakes with a plurality of rotating discs all lying side by side
55/38 . . . . mechanically actuated
55/39 . . . . . by means of an intermediate leverage
55/40 . . . . actuated by a fluid-pressure device arranged in or on the brake
55/41 . . . . . by means of an intermediate leverage
55/42 . . . . . comprising an expansible fluid-filled flexible member coaxial with the brake
55/44 . . . with the rotating part consisting of both central plates and ring-shaped plates arranged concentrically around the central plates
55/46 . . with self-tightening action

55/48 . . . with discs or pads having a small free angular travel relative to their support, which produces the self-tightening action

55/50 . . . with auxiliary friction members, which may be of different type, producing the self-tightening action

57/00 Liquid-resistance brakes; **Air-resistance brakes**

57/02 . with blades or like members braked by the fluid

57/04 . with blades causing a directed flow, e.g. Föttinger type

57/06 . comprising a pump circulating fluid, braking being effected by throttling of the circulation

59/00 Self-acting brakes, e.g. coming into operation at a predetermined speed

59/02 . spring-loaded and adapted to be released by mechanical, fluid, or electromagnetic means

61/00 Brakes with means for making the energy absorbed available for use (F16D 57/00 takes precedence)

63/00 Brakes not otherwise provided for; **Brakes combining more than one of the types of groups F16D 49/00 to F16D 61/00** (brakes with auxiliary members for self-tightening F16D 49/22, F16D 51/66, F16D 55/50)

65/00 Parts or details of brakes

65/02 . Braking members; Mounting thereof (friction linings or attachment thereof F16D 69/00)

65/04 . . Bands, shoes or pads; Pivots or supporting members therefor **[5]**

65/06 . . . for externally-engaging brakes

65/08 . . . for internally-engaging brakes

65/09 . . . . Pivots or supporting members therefor **[2]**

65/092 . . . for axially-engaging brakes, e.g. disc brakes **[5]**

65/095 . . . . Pivots or supporting members therefor **[5]**

65/097 . . . . . Resilient means interposed between pads and supporting members **[5]**

65/10 . . Drums for externally- or internally-engaging brakes

65/12 . . Discs; Drums for disc brakes

65/14 . Actuating mechanisms for brakes; Means for initiating operation at a predetermined position (brake control systems, parts thereof B60T)

65/16 . . arranged in or on the brake

65/18 . . . adapted for drawing members together

65/20 . . . . comprising a fluid-pressure device

65/21 . . . . acting by electric or magnetic means **[2]**

65/22 . . . adapted for pressing members apart

65/24 . . . . comprising a fluid-pressure device

65/26 . . . . . in the form of a fluid-filled flexible member

65/27 . . . . acting by electric or magnetic means **[2]**

65/28 . . arranged apart from the brake

65/30 . . . acting mechanically

65/32 . . . acting by fluid means

65/34 . . . acting by electric or magnetic means (holding devices using electrostatic attraction H02N 13/00) **[2]**

65/35 . . . . including a permanent magnet **[3]**

65/36 . . . acting by both fluid and electric means

65/38 . Slack adjusters

65/40 . . mechanical

65/42 . . . non-automatic

65/44 . . . . by means of direct linear adjustment (F16D 65/46, F16D 65/48 take precedence)

65/46 . . . . with screw-thread and nut

65/48 . . . . with eccentric or helical body

65/50 . . . . for angular adjustment of two concentric parts of the brake control system

65/52 . . . self-acting in one direction for adjusting excessive play

65/54 . . . . by means of direct linear adjustment (F16D 65/56, F16D 65/58 take precedence)

65/56 . . . . with screw-thread and nut

65/58 . . . . with eccentric or helical body

65/60 . . . . for angular adjustment of two concentric parts of the brake control system

65/62 . . . self-acting in both directions for adjusting excessive and insufficient play

65/64 . . . . by means of direct linear adjustment (F16D 65/66, F16D 65/68 take precedence)

65/66 . . . . with screw-thread and nut

65/68 . . . . with eccentric or helical body

65/70 . . . . for angular adjustment of two concentric parts of the brake control system

65/72 . . hydraulic

65/74 . . . self-acting in one direction

65/76 . . . self-acting in both directions

65/78 . Features relating to cooling

65/80 . . for externally-engaging brakes

65/807 . . . with open cooling system, e.g. cooled by air **[2]**

65/813 . . . with closed cooling system **[2]**

65/82 . . for internally-engaging brakes

65/827 . . . with open cooling system, e.g. cooled by air **[2]**

65/833 . . . with closed cooling system **[2]**

65/84 . . for disc brakes

65/847 . . . with open cooling system, e.g. cooled by air **[2]**

65/853 . . . with closed cooling system **[2]**

66/00 Arrangements for monitoring working conditions of brakes, e.g. wear or temperature

66/02 . Apparatus for indicating wear

67/00 Combinations of couplings and brakes; **Combinations of clutches and brakes** (F16D 71/00 takes precedence; conjoint control of brake systems and driveline clutches in vehicles B60W 10/02, B60W 10/18) **[2]**

67/02 . Clutch-brake combinations

67/04 . . fluid actuated

67/06 . . electromagnetically actuated

69/00 Friction linings; **Attachment thereof**; **Selection of coacting friction substances or surfaces** (braking members F16D 65/02)

69/02 . Composition of linings (chemical aspects, see the relevant classes)

69/04 . Attachment of linings

71/00 Mechanisms for bringing members to rest in a predetermined position (combined with, or controlling, clutches F16D 43/26; means for initiating operation of brakes at a predetermined position F16D 65/14)

71/02 . comprising auxiliary means for producing the final movement

71/04 . providing for selection between a plurality of positions (F16D 71/02 takes precedence)

F16F SPRINGS; SHOCK-ABSORBERS; MEANS FOR DAMPING VIBRATION

(1) This subclass covers:
- springs, shock-absorbers or vibration-dampers;
- their arrangement in, or adaptation for, particular apparatus, if not provided for in the subclasses covering said apparatus. **[5]**

(2) This subclass does not cover the arrangement or adaptation of springs, shock-absorbers or vibration-dampers in, or for, particular apparatus, if provided for in the subclasses concerning the said apparatus, e.g.

A47C	23/00	to	Spring mattresses
A47C	27/00		
A63C	5/075		Vibration dampers in skis
B60G			Vehicle suspensions
B60R	19/24		Mounting of bumpers on vehicles
B61F			Rail vehicle suspensions
B61G	11/00		Buffers for railway or tramway vehicles
B62D	21/15		Vehicle chassis frames having impact absorbing means
B62J	1/02		Resiliently mounted saddles on cycles
B62K	21/08		Steering dampers
B63H	1/15		Marine propellers having vibration-damping means
B63H	21/30		Anti-vibration mounting of marine propulsion plant in ships
B64C	25/58		Arrangement of shock-absorbers or springs in aeroplane alighting gear
B65D	81/02		Containers, packing elements or packages with shock-absorbing means
D06F	37/20		Resilient mountings in washing machines
D06F	49/06		Resilient mountings in domestic spin-dryers
F03G	1/00		Spring motors
F21V	15/04		Resilient mounting of lighting devices
F41A	25/00		Gun cradles to permit recoil
F41B	5/20		Vibration dampers for archery bows
G01D	11/00		Indicating or recording in connection with measuring
G01G	21/10		Weighing apparatus, e.g. arrangement of shock-absorbers in weighing apparatus
G04B			Clocks, watches
G12B	3/08		Damping of movements in instruments
G21C	7/20		Disposition of shock-absorbing devices for displacable control elements in nuclear reactors.

Subclass index

1/00 **Springs** (working with fluid F16F 5/00, F16F 9/00)

1/02 . made of steel or other material having low internal friction (F16F 1/36 takes precedence); Wound, torsion, leaf, cup, ring or the like springs, the material of the spring not being relevant **[6]**

1/04 . . Wound springs

1/06 . . . with turns lying in cylindrical surfaces

1/08 . . . with turns lying in mainly conical surfaces

1/10 . . . Spiral springs with turns lying substantially in plane surfaces

1/12 . . . Attachments or mountings

1/13 . . . . comprising inserts or spacers between the windings for changing the mechanical or physical characteristics of the spring **[6]**

1/14 . . Torsion springs consisting of bars or tubes

1/16 . . . Attachments or mountings

1/18 . . Leaf springs

1/20 . . . with layers, e.g. anti-friction layers, or with rollers between the leaves

1/22 . . . with means for modifying the spring characteristic

1/24 . . . Lubrication; Covers, e.g. for retaining lubricant

1/26 . . . Attachments or mountings (B60G 11/10 takes precedence) **[5]**

1/28 . . . . comprising cylindrical metal pins pivoted in close-fitting sleeves

1/30 . . . . comprising intermediate pieces made of rubber or similar elastic material

1/32 . . Cup springs; Dished disc springs (diaphragms F16J 3/00)

1/34 . . Ring springs, i.e. annular bodies deformed radially due to axial load

1/36 . made of plastics, e.g. rubber; made of material having high internal friction

1/362 . . made of steel wool or compressed hair **[6]**

1/364 . . made of cork, wood or the like material **[6]**

1/366 . . made of fibre reinforced plastics **[6]**

1/368 . . . Leaf springs **[6]**

1/37 . . of foam-like material, e.g. sponge rubber

1/371 . . characterised by inserts or auxiliary extension elements, e.g. for rigidification (F16F 1/366, F16F 1/387 take precedence) **[6]**
1/373 . . characterised by having a particular shape **[6]**
1/374 . . . having a spherical or the like shape **[6]**
1/376 . . . having projections, studs, serrations or the like on at least one surface (F16F 1/387 takes precedence) **[6]**
1/377 . . . having holes or openings (F16F 1/387 takes precedence) **[6]**
1/379 . . characterised by arrangements for regulating the spring temperature, e.g. by cooling **[6]**
1/38 . . with a sleeve of elastic material between a rigid outer sleeve and a rigid inner sleeve or pin
1/387 . . . comprising means for modifying the rigidity in particular directions **[6]**
1/393 . . . with spherical or conical sleeves **[6]**
1/40 . . consisting of a stack of similar elements separated by non-elastic intermediate layers
1/41 . . . the spring consisting of generally conically arranged elements **[6]**
1/42 . . characterised by the mode of stressing
1/44 . . . loaded mainly in compression
1/46 . . . loaded mainly in tension
1/48 . . . loaded mainly in torsion
1/50 . . . loaded mainly in shear
1/52 . . . loaded in combined stresses
1/54 . . . . loaded in compression and shear

3/00 Spring units consisting of several springs, e.g. for obtaining a desired spring characteristic (including fluid springs F16F 5/00, F16F 13/00)

3/02 . with springs made of steel or of other material having low internal friction
3/04 . . composed only of wound springs
3/06 . . . of which some are placed around others in such a way that they damp each other by mutual friction
3/07 . . combined with chambers filled with gas or liquid
3/08 . with springs made of a material having high internal friction, e.g. rubber
3/087 . . Units comprising several springs made of plastics or the like material (F16F 1/40 takes precedence) **[6]**
3/093 . . . the springs being of different materials, e.g. having different types of rubber **[6]**
3/10 . . combined with springs made of steel or other material having low internal friction
3/12 . . . the steel spring being in contact with the rubber spring, e.g. being embedded in it **[6]**

5/00 Liquid springs in which the liquid works as a spring by compression, e.g. combined with throttling action; **Combinations of devices including liquid springs**

6/00 Magnetic springs; **Fluid magnetic springs**

7/00 Vibration-dampers; **Shock-absorbers** (using fluid F16F 5/00, F16F 9/00; specific for rotary systems F16F 15/10)

7/01 . using friction between loose particles, e.g. sand **[6]**
7/02 . with relatively-rotatable friction surfaces that are pressed together (F16F 7/01 takes precedence; one of the members being a spring F16F 13/02) **[6]**
7/04 . . in the direction of the axis of rotation
7/06 . . in a direction perpendicular or inclined to the axis of rotation
7/08 . with friction surfaces rectilinearly movable along each other (F16F 7/01 takes precedence) **[6]**
7/09 . . in dampers of the cylinder-and-piston type **[6]**
7/10 . using inertia effect
7/104 . . the inertia member being resiliently mounted **[6]**
7/108 . . . on plastics springs **[6]**
7/112 . . . on fluid springs **[6]**
7/116 . . . on metal springs **[6]**
7/12 . using plastic deformation of members
7/14 . of cable-support type, i.e. frictionally-engaged loop-forming cables

9/00 Springs, vibration-dampers, shock-absorbers, or similarly-constructed movement-dampers using a fluid or the equivalent as damping medium (F16F 5/00 takes precedence; connection of valves to inflatable elastic bodies B60C 29/00; door-operating appliances with fluid braking systems E05F)

9/02 . using gas only
9/04 . . in a chamber with a flexible wall
9/05 . . . the flexible wall being of the rolling diaphragm type **[5]**
9/06 . using both gas and liquid
9/08 . . in a chamber with a flexible wall
9/084 . . . comprising a gas spring contained within a flexible wall, the wall not being in contact with the damping fluid, i.e. mounted externally on the damper cylinder **[6]**
9/088 . . . comprising a gas spring with a flexible wall provided within the cylinder on the piston rod of a monotubular damper or within the inner tube of a bitubular damper **[6]**
9/092 . . . comprising a gas spring with a flexible wall provided between the tubes of a bitubular damper **[6]**
9/096 . . . comprising a hydropneumatic accumulator of the membrane type provided on the upper or the lower end of a damper or separately from or laterally on the damper **[6]**
9/10 . using liquid only; using a fluid of which the nature is immaterial
9/12 . . Devices with one or more rotary vanes turning in the fluid, any throttling effect being immaterial
9/14 . . Devices with one or more members, e.g. pistons, vanes, moving to and fro in chambers and using throttling effect
9/16 . . . involving only straight-line movement of the effective parts
9/18 . . . . with a closed cylinder and a piston separating two or more working spaces therein
9/19 . . . . . with a single cylinder
9/20 . . . . . with the piston-rod extending through both ends of the cylinder
9/22 . . . . with one or more cylinders, each having a single working space closed by a piston or plunger
9/24 . . . . . with a single cylinder and a single piston or plunger
9/26 . . . . . with two cylinders in line and with the two pistons or plungers connected together
9/28 . . . . . with two parallel cylinders and with the two pistons or plungers connected together
9/30 . with solid or semi-solid material, e.g. pasty masses, as damping medium

9/32 . Details
9/34 . . Special valve constructions (valves in general F16K); Shape or construction of throttling passages
9/342 . . . Throttling passages operating with metering pins
9/344 . . . Vortex flow passages **[6]**
9/346 . . . Throttling passages in the form of slots arranged in cylinder walls
9/348 . . . Throttling passages in the form of annular discs operating in opposite directions
9/36 . . Special sealings, including sealings or guides for piston-rods
9/38 . . Covers for protection or appearance
9/40 . . Arrangements for preventing froth
9/42 . . Cooling arrangements
9/43 . . Filling arrangements, e.g. for supply of gas
9/44 . . Means on or in the damper for manual or non-automatic adjustment; such means combined with temperature correction (F16F 9/53, F16F 9/56 take precedence; temperature correction only F16F 9/52) **[5,6]**
9/46 . . . allowing control from a distance
9/48 . . Arrangements for providing different damping effects at different parts of the stroke (F16F 9/53, F16F 9/56 take precedence) **[5,6]**
9/49 . . . Stops limiting fluid passage, e.g. hydraulic stops
9/50 . . Special means providing automatic damping adjustment (F16F 9/53, F16F 9/56 take precedence) **[5,6]**
9/504 . . . Inertia-sensitive means **[6]**
9/508 . . . Means responsive to the velocity of movement of the piston **[6]**
9/512 . . . Means responsive to load action on the damper or fluid pressure in the damper **[6]**
9/516 . . . resulting in the damping effects during contraction being different from the damping effects during extension **[6]**
9/52 . . . in case of change of temperature (combined with external adjustment F16F 9/44)
9/53 . . Means for adjusting damping characteristics by varying fluid viscosity, e.g. electromagnetically **[5]**
9/54 . . Arrangements for attachment
9/56 . . Means for adjusting the length of, or for locking, the spring or damper, e.g. at the end of the stroke **[6]**
9/58 . . Stroke limiting stops, e.g. arranged on the piston rod outside the cylinder (F16F 9/49 takes precedence) **[6]**

11/00 Vibration-dampers or shock-absorbers working with both friction and a damping fluid

13/00 Units comprising springs of the non-fluid type as well as vibration-dampers, shock-absorbers, or fluid springs (F16F 5/00 takes precedence)
13/02 . damping by frictional contact between the spring and braking means (frictionally coacting wound springs F16F 3/06)
13/04 . comprising both a plastics spring and a damper, e.g. a friction damper **[6]**
13/06 . . the damper being a fluid damper, e.g. the plastics spring not forming a part of the wall of the fluid chamber of the damper (F16F 13/26 takes precedence) **[6]**
13/08 . . . the plastics spring forming at least a part of the wall of the fluid chamber of the damper (F16F 13/20 to F16F 13/24 take precedence) **[6]**
13/10 . . . . the wall being at least in part formed by a flexible membrane or the like (F16F 13/12 to F16F 13/18 take precedence) **[6]**
13/12 . . . . Single chamber dampers (F16F 13/14 takes precedence) **[6]**
13/14 . . . . Units of the bushing type **[6]**
13/16 . . . . . specially adapted for receiving axial loads **[6]**
13/18 . . . . characterised by the location or the shape of the equilibration chamber, e.g. the equilibration chamber surrounding the plastics spring or being annular (F16F 13/14 takes precedence) **[6]**
13/20 . . . characterised by comprising also a pneumatic spring (F16F 13/22 takes precedence) **[6]**
13/22 . . . characterised by comprising also a dynamic damper (dampers using inertia effect per se F16F 7/10) **[6]**
13/24 . . . the central part of the unit being supported by one element and both extremities of the unit being supported by a single other element, i.e. double acting mounting **[6]**
13/26 . . characterised by adjusting or regulating devices responsive to exterior conditions **[6]**
13/28 . . . specially adapted for units of the bushing type (F16F 13/30 takes precedence) **[6]**
13/30 . . . comprising means for varying fluid viscosity, e.g. of magnetic or electrorheological fluids **[6]**

15/00 Suppression of vibrations in systems (vehicle seat suspension devices B60N 2/50); **Means or arrangements for avoiding or reducing out-of-balance forces, e.g. due to motion** (testing static or dynamic balance of machines or structures G01M 1/00)
15/02 . Suppression of vibrations of non-rotating, e.g. reciprocating, systems; Suppression of vibrations of rotating systems by use of members not moving with the rotating system (layered products B32B; suppression of vibration in ships B63)
15/023 . . using fluid means **[6]**
15/027 . . . comprising control arrangements **[6]**
15/03 . . using electromagnetic means (F16F 9/53 takes precedence) **[5]**
15/04 . . using elastic means (single elements or their attachment F16F 1/00 to F16F 13/00) **[2]**
15/06 . . . with metal springs (with rubber springs also F16F 15/08)
15/067 . . . . using only wound springs **[6]**
15/073 . . . . using only leaf springs **[6]**
15/08 . . . with rubber springs
15/10 . Suppression of vibrations in rotating systems by making use of members moving with the system (by balancing F16F 15/22; with flywheels acting variably or intermittently F16H)
15/12 . . using elastic members or friction-damping members, e.g. between a rotating shaft and a gyratory mass mounted thereon (F16F 15/16 takes precedence) **[6]**
15/121 . . . using springs as elastic members, e.g. metallic springs (F16F 15/131 takes precedence) **[6]**
15/123 . . . . Wound springs **[6]**
15/124 . . . . Plastics springs, e.g. made of rubber (F16F 15/123 takes precedence) **[6]**

15/126 . . . . . consisting of at least one annular element surrounding the axis of rotation **[6]**
15/127 . . . . using plastics springs combined with other types of springs **[6]**
15/129 . . . characterised by friction-damping means (F16F 15/131 takes precedence) **[6]**
15/131 . . . the rotating system comprising two or more gyratory masses **[6]**
15/133 . . . . using springs as elastic members, e.g. metallic springs **[6]**
15/134 . . . . . Wound springs **[6]**
15/136 . . . . . Plastics springs, e.g. made of rubber (F16F 15/134 takes precedence) **[6]**
15/137 . . . . . the elastic members consisting of two or more springs of different types **[6]**
15/139 . . . . characterised by friction-damping means **[6]**
15/14 . . using freely-swinging masses rotating with the system
15/16 . . using a fluid (devices connecting input and output members F16D)
15/167 . . . having an inertia member, e.g. ring **[6]**
15/173 . . . . provided within a closed housing **[6]**
15/18 . . using electric means (dynamo-electric devices H02K)
15/20 . Suppression of vibrations of rotating systems by favourable grouping or relative arrangement of the moving members of the system or systems
15/22 . Compensation of inertia forces
15/24 . . of crankshaft systems by particular disposition of cranks, pistons, or the like
15/26 . . of crankshaft systems using solid masses, other than the ordinary pistons, moving with the system
15/28 . Counterweights; Attaching or mounting same (for roll-type closures E06B 9/62)
15/30 . Flywheels (F16F 15/16 takes precedence; suppression of vibrations in rotating systems using elastic members or friction-damping members moving with the system F16F 15/12; rotary-body aspects in general F16C 13/00, F16C 15/00) **[6]**
15/305 . . made of plastics, e.g. fibre reinforced plastics (FRP) **[6]**
15/31 . . characterised by means for varying the moment of inertia **[6]**
15/315 . . characterised by their supporting arrangement, e.g. mountings, cages, securing inertia member to shaft (F16F 15/31 takes precedence) **[6]**
15/32 . Correcting- or balancing-weights or equivalent means for balancing rotating bodies, e.g. vehicle wheels **[2,5]**
15/34 . . Fastening arrangements therefor **[5]**
15/36 . . operating automatically **[5]**

F16G BELTS, CABLES, OR ROPES, PREDOMINANTLY USED FOR DRIVING PURPOSES; CHAINS; FITTINGS PREDOMINANTLY USED THEREFOR

Subclass index

1/00 **Driving-belts** (V-belts F16G 5/00; conveyer belts B65G)
1/02 . made of leather (F16G 1/28 takes precedence; making thereof C14B 9/00)
1/04 . made of fibrous material, e.g. textiles, whether rubber-covered or not (F16G 1/28 takes precedence; making thereof D03D)
1/06 . made of rubber (F16G 1/28 takes precedence; producing belts from plastics or substances in a plastic state B29D 29/00)
1/08 . . with reinforcement bonded by the rubber
1/10 . . . with textile reinforcement
1/12 . . . with metal reinforcement
1/14 . made of plastics (F16G 1/28 takes precedence; producing belts from plastics or substances in a plastic state B29D 29/00)
1/16 . . with reinforcement bonded by the plastic material
1/18 . made of wire (making thereof B21F 43/00)
1/20 . made of a single metal strip (making thereof B21D 53/14)
1/21 . built-up from superimposed layers, e.g. zig-zag folded
1/22 . consisting of several parts
1/24 . . in the form of links (in the shape of chain links F16G 13/08)
1/26 . . in the form of strips or lamellae
1/28 . with a contact surface of special shape, e.g. toothed

3/00 **Belt fastenings, e.g. for conveyer belts** (for V-belts F16G 7/00)
3/02 . with series of eyes or the like, interposed and linked by a pin to form a hinge (F16G 3/09 takes precedence)
3/04 . . in which the ends of separate U-shaped or like eyes are attached to the belt by parts penetrating into it
3/06 . with outwardly-bent, mutually-connected belt ends
3/07 . Friction clamps, e.g. of grommet-thimble type
3/08 . consisting of plates and screw-bolts or rivets (F16G 3/06 takes precedence)
3/09 . . the plates forming a hinge
3/10 . Joining belts by sewing, sticking, vulcanising, or the like; Constructional adaptations of the belt ends for this purpose
3/12 . Joining belts by lacing
3/14 . with extensible parts; with resilient parts
3/16 . Devices or machines for connecting driving-belts or the like

5/00 **V-belts, i.e. belts of tapered cross-section**
5/02 . made of leather (F16G 5/20 takes precedence)

5/04 . made of rubber (F16G 5/20 takes precedence)
5/06 . . with reinforcement bonded by the rubber
5/08 . . . with textile reinforcement
5/10 . . . with metal reinforcement
5/12 . made of plastics (F16G 5/20 takes precedence)
5/14 . . with reinforcement bonded by the plastic material
5/16 . consisting of several parts
5/18 . . in the form of links
5/20 . with a contact surface of special shape, e.g. toothed
5/22 . built-up from superimposed layers
5/24 . . zig-zag folded

7/00 V-belt fastenings
7/02 . locked, e.g. riveted
7/04 . quickly detachable
7/06 . adjustable, e.g. for tension

9/00 Ropes or cables specially adapted for driving, or for being driven by, pulleys or other gearing elements
9/02 . made of leather; having enveloping sheathings made of leather
9/04 . made of rubber or plastics (F16G 9/02 takes precedence)

11/00 Means for fastening cables or ropes to one another or to other objects (cable clamps for suspension bridge cables E01D 19/16); **Caps or sleeves for fixing on cables or ropes** (attaching ropes or cables to lift cars or cages B66B 7/08, to winch drums or barrels B66D 1/34; rope clamps in earth drilling E21B 19/12)
11/02 . with parts deformable to grip the cable or cables; Fastening means which engage a sleeve or the like fixed on the cable
11/03 . incorporating resiliently-mounted members for attachment of the cable end
11/04 . with wedging action, e.g. friction clamps of grommet-thimble type (F16G 11/02 takes precedence)
11/05 . . by using conical plugs insertable between the strands
11/06 . with laterally-arranged screws (F16G 11/02, F16G 11/04 take precedence)
11/08 . Fastenings for securing ends of driving-cables to one another, the fastenings having approximately the same diameter as the cables
11/09 . . incorporating hinge joints or pivots for the attachment of the cable ends
11/10 . Quick-acting fastenings; Clamps holding in one direction only
11/12 . Connections or attachments, e.g. turnbuckles, adapted for straining of cables, ropes or wire
11/14 . Devices or coupling-pieces designed for easy formation of adjustable loops, e.g. choker hooks; Hooks or eyes with integral parts designed to facilitate quick attachment to cables or ropes at any point, e.g. by forming loops

13/00 Chains (making thereof B21L)
13/02 . Driving-chains
13/04 . . Toothed chains
13/06 . . with links connected by parallel driving-pins with or without rollers
13/07 . . . the links being of identical shape, e.g. cranked
13/08 . . with links closely interposed on the joint pins (F16G 13/04 takes precedence)
13/10 . . with universal joints
13/12 . Hauling- or hoisting-chains
13/14 . . built up from readily-separable links **[3]**
13/16 . . with arrangements for holding electric cables, hoses, or the like
13/18 . Chains having special overall characteristics
13/20 . . stiff; Push-pull chains
13/22 . . extensible
13/24 . . . resilient

15/00 Chain couplings; **Shackles**; **Chain joints**; **Chain links**; **Chain bushes** (making chain elements B21L)
15/02 . for fastening more or less permanently
15/04 . Quickly-detachable chain couplings; Shackles
15/06 . . Shackles designed for attachment by joint pins to chain elements, e.g. D-shackles
15/08 . Swivels
15/10 . Emergency joints or links
15/12 . Chain links
15/14 . . made of sheet metal, e.g. profiled

17/00 Hooks as integral parts of chains (hooks for cranes B66C 1/34)

F16H GEARING

(1) Combinations including mechanical gearings are classified in groups F16H 37/00or F16H 47/00, unless they are provided for in groups F16H 1/00 to F16H 35/00. **[2009.01]**
(2) In this subclass, sets of rigidly-connected members are regarded as single members.
(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "toothed gearing" includes worm gearing and other gearing involving at least one wheel or sector provided with teeth or the equivalent, except gearing with chains or toothed belts, which is treated as friction gearing;
- "conveying motion" includes transmitting energy, and means that the applied and resultant motions are of the same kind, though they may differ in, e.g. speed, direction or extent;
- "rotary" implies that the motion may continue indefinitely.
- "oscillating" means moving about an axis to an extent which is limited by the construction of the gearing and which may exceed one revolution, the movement being alternately forwards and backwards during continued operation of the gearing;
- "reciprocating" means moving substantially in a straight line, the movement being alternately forwards and backwards during continued operation of the gearing;
- "reversing" or "reversal" means that an applied movement in one direction may produce a resultant movement in either of two opposed directions at will;
- "central gears" includes any gears whose axis is the main axis of the gearing.

(4) Attention is drawn to the following places:

A01D	69/06	Gearings in harvesters or mowers
A63H	31/00	Gearing for toys
B21B	35/12	Toothed-wheel gearing for metal-rolling mills
B60K		Arrangement of transmissions in vehicles
B61C	9/00	Transmissions for railway locomotives
B62D	3/00	Vehicle steering gears
B62M		Transmissions for cycles
B63H	23/00	Transmissions for marine propulsion
B63H	25/00	Marine steering gears
F01 to F04		Machines, engines, pumps
F15B	15/00	Gearings associated with fluid-actuated devices
G01D	5/04	Gearing used in indicating or recording apparatus in connection with measuring devices
H03J	1/00	Driving arrangements for tuning resonant circuits
H04L	13/04	Driving mechanisms for apparatus for transmission of coded digital information.

Subclass index

Toothed gearings for conveying rotary motion

1/00 Toothed gearings for conveying rotary motion (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion F16H 3/00)

1/02 . without gears having orbital motion

1/04 . . involving only two intermeshing members

1/06 . . . with parallel axes

1/08 . . . . the members having helical, herring-bone, or like teeth

1/10 . . . . one of the members being internally toothed

1/12 . . . with non-parallel axes

1/14 . . . . comprising conical gears only

1/16 . . . . comprising worm and worm-wheel

1/18 . . . . the members having helical, herring-bone, or like teeth (F16H 1/14 takes precedence)

1/20 . . involving more than two intermeshing members

1/22 . . . with a plurality of driving or driven shafts; with arrangements for dividing torque between two or more intermediate shafts

1/24 . . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (F16H 1/16 takes precedence)

1/26 . . Special means compensating for misalignment of axes

1/28 . with gears having orbital motion

1/30 . . in which an orbital gear has an axis crossing the main axis of the gearing and has helical teeth or is a worm

1/32 . . in which the central axis of the gearing lies inside the periphery of an orbital gear

1/34 . . involving gears essentially having intermeshing elements other than involute or cycloidal teeth (in worm gearing F16H 1/30)

1/36 . . with two central gears coupled by intermeshing orbital gears

1/46 . . Systems consisting of a plurality of gear trains, each with orbital gears

1/48 . . Special means compensating for misalignment of axes

3/00 Toothed gearings for conveying rotary motion with variable gear ratio or for reversing rotary motion (speed-changing or reversing mechanisms F16H 59/00 to F16H 63/00)

3/02 . without gears having orbital motion

3/04 . . with internally-toothed gears

3/06 . . with worm and worm-wheel or gears essentially having helical or herring-bone teeth

3/08 . . exclusively or essentially with continuously-meshing gears, that can be disengaged from their shafts

Note

In this group, gears which can be put out of mesh are not taken into consideration if they are used for reversal only. **[8]**

3/083 . . . with radially acting and axially controlled clutching members, e.g. sliding keys **[5]**

3/085 . . . with more than one output shaft **[5]**

3/087 . . . characterised by the disposition of the gears (F16H 3/083, F16H 3/085 take precedence) **[5]**

Note

When counting the countershafts, the reverse countershaft is not taken into consideration if it is used for reversal only. **[5]**

3/089 . . . . all of the meshing gears being supported by a pair of parallel shafts, one being the input shaft and the other the output shaft, there being no countershaft involved **[5]**
3/091 . . . . including a single countershaft **[5]**
3/093 . . . . with two or more countershafts **[5]**
3/095 . . . . . with means for ensuring an even distribution of torque between the countershafts **[5]**
3/097 . . . . . the input and output shafts being aligned on the same axis **[5]**
3/10 . . . with one or more one-way clutches as an essential feature
3/12 . . . with means for synchronisation not incorporated in the clutches (synchronised clutches F16D 23/02)
3/14 . . . Gearings for reversal only
3/16 . . essentially with both gears that can be put out of gear and continuously-meshing gears that can be disengaged from their shafts

Note

In this group, gears which can be put out of mesh are not taken into consideration if they are used for reversal only. **[8]**

3/18 . . . Gearings for reversal only
3/20 . . exclusively or essentially using gears that can be moved out of gear

Note

In this group, gears which can be put out of mesh are not taken into consideration if they are used for reversal only. **[8]**

3/22 . . . with gears shiftable only axially
3/24 . . . . with driving and driven shafts coaxial
3/26 . . . . . and two or more additional shafts
3/28 . . . . . an additional shaft being coaxial with the main shafts
3/30 . . . . with driving and driven shafts not coaxial
3/32 . . . . . and an additional shaft
3/34 . . . with gears shiftable otherwise than only axially
3/36 . . . with a single gear meshable with any of a set of coaxial gears of different diameters
3/38 . . . with synchro-meshing
3/40 . . . Gearings for reversal only
3/42 . . with gears having teeth formed or arranged for obtaining multiple gear ratios, e.g. nearly infinitely variable
3/44 . using gears having orbital motion
3/46 . . Gearings having only two central gears, connected by orbital gears (F16H 3/68 to F16H 3/78 take precedence)
3/48 . . . with single orbital gears or pairs of rigidly-connected orbital gears
3/50 . . . . comprising orbital conical gears
3/52 . . . . comprising orbital spur gears
3/54 . . . . . one of the central gears being internally toothed and the other externally toothed
3/56 . . . . . both central gears being sun gears
3/58 . . . with sets of orbital gears, each consisting of two or more intermeshing orbital gears
3/60 . . . Gearings for reversal only
3/62 . . Gearings having three or more central gears (F16H 3/68 to F16H 3/78 take precedence)
3/64 . . . composed of a number of gear trains, the drive always passing through all the trains, each train having not more than one connection for driving another train
3/66 . . . composed of a number of gear trains without drive passing from one train to another
3/68 . . in which an orbital gear has an axis crossing the main axis of the gearing and has helical teeth or is a worm
3/70 . . in which the central axis of the gearing lies inside the periphery of an orbital gear
3/72 . . with a secondary drive, e.g. regulating motor, in order to vary speed continuously
3/74 . . Complexes, not using actuatable speed-changing or regulating members, e.g. with gear ratio determined by free play of frictional or other forces
3/76 . . with an orbital gear having teeth formed or arranged for obtaining multiple gear ratios, e.g. nearly infinitely variable
3/78 . . Special adaptation of synchronisation mechanisms to these gearings

Gearing for conveying rotary motion by endless flexible members

7/00 **Gearings for conveying rotary motion by endless flexible members** (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion F16H 9/00; endless flexible members per se, e.g. belts or chains F16G)
7/02 . with belts; with V-belts
7/04 . with ropes
7/06 . with chains
7/08 . Means for varying tension of belts, ropes, or chains (pulleys of adjustable construction F16H 55/52)
7/10 . . by adjusting the axis of a pulley
7/12 . . . of an idle pulley
7/14 . . . of a driving or driven pulley
7/16 . . . . without adjusting the driving or driven shaft
7/18 . Means for guiding or supporting belts, ropes, or chains (construction of pulleys F16H 55/36)
7/20 . . Mountings for rollers or pulleys
7/22 . Belt, rope, or chain shifters
7/24 . Equipment for mounting belts, ropes, or chains

9/00 **Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by endless flexible members** (control of change-speed or reversing-gearings conveying rotary motion F16H 59/00 to F16H 63/00; endless flexible members per se, e.g. belts or chains F16G)
9/02 . without members having orbital motion
9/04 . . using belts, V-belts, or ropes (with toothed belts F16H 9/24; pulleys of adjustable construction F16H 55/52)
9/06 . . . engaging a stepped pulley
9/08 . . . engaging a conical drum (F16H 9/12 takes precedence)

9/10 . . . engaging a pulley provided with radially-actuatable elements carrying the belt
9/12 . . . engaging a pulley built-up out of relatively axially-adjustable parts in which the belt engages the opposite flanges of the pulley directly without interposed belt-supporting members
9/14 . . . . using only one pulley built-up out of adjustable conical parts
9/16 . . . . using two pulleys, both built-up out of adjustable conical parts
9/18 . . . . . only one flange of each pulley being adjustable
9/20 . . . . . both flanges of the pulleys being adjustable
9/22 . . . specially adapted for ropes
9/24 . . using chains, toothed belts, belts in the form of links; Chains or belts specially adapted to such gearing (toothed belts F16G 1/28; V-belts in the form of links F16G 5/18; toothed V-belts F16G 5/20)
9/26 . with members having orbital motion

Other friction gearing for conveying rotary motion

13/00 Gearing for conveying rotary motion with constant gear ratio by friction between rotary members (specific for conveying rotary motion with variable gear ratio or for reversing rotary motion F16H 15/00)
13/02 . without members having orbital motion
13/04 . . with balls or with rollers acting in a similar manner
13/06 . with members having orbital motion
13/08 . . with balls or with rollers acting in a similar manner
13/10 . Means for influencing the pressure between the members
13/12 . . by magnetic forces
13/14 . . for automatically varying the pressure mechanically

15/00 Gearings for conveying rotary motion with variable gear ratio, or for reversing rotary motion, by friction between rotary members (control of change-speed or reversing-gearings conveying rotary motion F16H 59/00 to F16H 63/00)
15/01 . characterised by the use of a magnetisable powder or liquid as friction medium between the rotary members **[2]**
15/02 . without members having orbital motion
15/04 . . Gearings providing a continuous range of gear ratios
15/06 . . . in which a member A of uniform effective diameter mounted on a shaft may co-operate with different parts of a member B
15/08 . . . . in which the member B is a disc with a flat or approximately-flat friction surface
15/10 . . . . . in which the axes of the two members cross or intersect
15/12 . . . . . in which one or each member is duplicated, e.g. for obtaining better transmission, for lessening the reaction forces on the bearings
15/14 . . . . . in which the axes of the members are parallel or approximately parallel
15/16 . . . . in which the member B has a conical friction surface
15/18 . . . . . externally
15/20 . . . . . co-operating with the outer rim of the member A, which is perpendicular or nearly perpendicular to the friction surface of the member B
15/22 . . . . . the axes of the members being parallel or approximately parallel
15/24 . . . . . internally
15/26 . . . . in which the member B has a spherical friction surface centered on its axis of revolution
15/28 . . . . . with external friction surface
15/30 . . . . . with internal friction surface
15/32 . . . . in which the member B has a curved friction surface formed as a surface of a body of revolution generated by a curve which is neither a circular arc centered on its axis of revolution nor a straight line
15/34 . . . . . with convex friction surface
15/36 . . . . . with concave friction surface, e.g. a hollow toroid surface
15/38 . . . . . with two members B having hollow toroid surfaces opposite to each other, the member or members A being adjustably mounted between the surfaces
15/40 . . . in which two members co-operate by means of balls, or rollers of uniform effective diameter, not mounted on shafts
15/42 . . . in which two members co-operate by means of rings or by means of parts of endless flexible members pressed between the first-mentioned members
15/44 . . . in which two members of non-uniform effective diameter directly co-operate with one another
15/46 . . Gearings providing a discontinuous or stepped range of gear ratios
15/48 . with members having orbital motion
15/50 . . Gearings providing a continuous range of gear ratios
15/52 . . . in which a member of uniform effective diameter mounted on a shaft may co-operate with different parts of another member
15/54 . . . in which two members co-operate by means of rings or by means of parts of endless flexible members pressed between the first-mentioned members
15/56 . . Gearings providing a discontinuous or stepped range of gear ratios

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19/00 Gearings comprising essentially only toothed gears or friction members and not capable of conveying indefinitely-continuing rotary motion (with intermittently-driving members F16H 27/00 to F16H 31/00; rope or like tackle for lifting or haulage B66D 3/00)
19/02 . for interconverting rotary motion and reciprocating motion
19/04 . . comprising a rack
19/06 . . comprising an endless flexible member
19/08 . for interconverting rotary motion and oscillating motion

Gearing for conveying or converting motion by means of levers, links, cams or screw-and-nut mechanisms

21/00 Gearings comprising primarily only links or levers, with or without slides (F16H 23/00 takes precedence)

21/02 . the movements of two or more independently-moving members being combined into a single movement

21/04 . Guiding mechanisms, e.g. for straight-line guidance (for drawing-machines B43L)

21/06 . which can be made ineffective when desired

21/08 . . by pushing a reciprocating rod out of its operative position

21/10 . all movement being in, or parallel to, a single plane

21/12 . . for conveying rotary motion

21/14 . . . by means of cranks, eccentrics, or like members fixed to one rotary member and guided along tracks on the other

21/16 . . for interconverting rotary motion and reciprocating motion

21/18 . . . Crank gearings; Eccentric gearings

21/20 . . . . with adjustment of throw (adjustable cranks or eccentrics F16C 3/28; adjustable connecting-rods F16C 7/06)

21/22 . . . . with one connecting-rod and one guided slide to each crank or eccentric

21/24 . . . . . without further links or guides

21/26 . . . . . with toggle action

21/28 . . . . . with cams or additional guides

21/30 . . . . . with members having rolling contact

21/32 . . . . . with additional members comprising only pivoted links or arms

21/34 . . . . with two or more connecting-rods to each crank or eccentric

21/36 . . . . without swinging connecting-rod, e.g. with epicyclic parallel motion, slot-and- crank motion

21/38 . . . . with means for temporary energy accumulation, e.g. to overcome dead-centre positions

21/40 . . for interconverting rotary motion and oscillating motion

21/42 . . . with adjustable throw

21/44 . . for conveying or interconverting oscillating or reciprocating motions

21/46 . with movements in three dimensions

21/48 . . for conveying rotary motion

21/50 . . for interconverting rotary motion and reciprocating motion

21/52 . . for interconverting rotary motion and oscillating motion

21/54 . . for conveying or interconverting oscillating or reciprocating motions

23/00 Wobble-plate gearings; **Oblique-crank gearings**

23/02 . with adjustment of throw by changing the position of the wobble-member (F16H 29/04, F16H 33/10 take precedence)

23/04 . with non-rotary wobble-members

23/06 . . with sliding members hinged to reciprocating members

23/08 . . connected to reciprocating members by connecting-rods

23/10 . with rotary wobble-plates with plane surfaces

25/00 Gearings comprising primarily only cams, cam-followers and screw-and-nut mechanisms

25/02 . the movements of two or more independently-moving members being combined into a single movement

25/04 . for conveying rotary motion

25/06 . . with intermediate members guided along tracks on both rotary members

25/08 . for interconverting rotary motion and reciprocating motion (F16H 23/00 takes precedence)

25/10 . . with adjustable throw (adjustable cams F16H 53/04)

25/12 . . with reciprocation along the axis of rotation, e.g. gearings with helical grooves and automatic reversal (screw mechanisms without automatic reversal F16H 25/20)

25/14 . . with reciprocation perpendicular to the axis of rotation (F16H 21/36 takes precedence)

25/16 . for interconverting rotary motion and oscillating motion

25/18 . for conveying or interconverting oscillating or reciprocating motions

25/20 . . Screw mechanisms (with automatic reversal F16H 25/12)

25/22 . . . with balls, rollers, or similar members between the co-operating parts; Elements essential to the use of such members

25/24 . . . Elements essential to such mechanisms, e.g. screws, nuts (F16H 25/22 takes precedence)

Gearings with intermittently-driving members

27/00 Step-by-step mechanisms without freewheel members, e.g. Geneva drives (rotary gearings with cyclically-varying velocity ratio F16H 35/02; impulse couplings F16D 5/00; clockwork escapements G04B 15/00)

27/02 . with at least one reciprocating or oscillating transmission member

27/04 . for converting continuous rotation into a step-by-step rotary movement

27/06 . . Mechanisms with driving pins in driven slots, e.g. Geneva drives

27/08 . . with driving toothed gears with interrupted toothing

27/10 . . obtained by means of disengageable transmission members, combined or not combined with mechanisms according to group F16H 27/06 or F16H 27/08

29/00 Gearings for conveying rotary motion with intermittently-driving members, e.g. with freewheel action (freewheels F16D 41/00)

29/02 . between one of the shafts and an oscillating or reciprocating intermediate member, not rotating with either of the shafts (F16H 29/20, F16H 29/22 take precedence)

29/04 . . in which the transmission ratio is changed by adjustment of a crank, an eccentric, a wobble-plate, or a cam, on one of the shafts

29/06 . . . with concentric shafts, an annular intermediate member moving around and being supported on an adjustable crank or eccentric

29/08 . . in which the transmission ratio is changed by adjustment of the path of movement, the location of the pivot, or the effective length, of an oscillating connecting member

29/10 . . in which the transmission ratio is changed by directly acting on the intermittently driving members

29/12 . between rotary driving and driven members (F16H 29/20, F16H 29/22 take precedence)

29/14 . . in which the transmission ratio is changed by adjustment of an otherwise stationary guide member for the intermittently-driving members

29/16 . . in which the transmission ratio is changed by adjustment of the distance between the axes of the rotary members

29/18 . . . in which the intermittently-driving members slide along approximately radial guides while rotating with one of the rotary members

29/20 . the intermittently-acting members being shaped as worms, screws, or racks

29/22 . with automatic speed change

31/00 Other gearings with freewheeling members or other intermittently-driving members (F16H 21/00, F16H 23/00, F16H 25/00 take precedence; gearings involving the use of automatic changing-mechanisms, e.g. cyclically-actuated reversal gearings, see the appropriate groups)

33/00 Gearings based on repeated accumulation and delivery of energy

33/02 . Rotary transmissions with mechanical accumulators, e.g. weights, springs, intermittently-connected flywheels

33/04 . . Gearings for conveying rotary motion with variable velocity ratio, in which self-regulation is sought

33/06 . . . based essentially on spring action (ratchet slip couplings F16D 7/04)

33/08 . . . based essentially on inertia

33/10 . . . . with gyroscopic action, e.g. comprising wobble-plates, oblique cranks

33/12 . . . . with a driving member connected differentially with both a driven member and an oscillatory member with large resistance to movement, e.g. Constantinesco gearing

33/14 . . . . having orbital members influenced by regulating masses

33/16 . . . . . which have their own free motion, or consist of fluid

33/18 . . . . . of which the motion is constrained

33/20 . for interconversion, based essentially on inertia, of rotary motion and reciprocating or oscillating motion

35/00 Gearings or mechanisms with other special functional features

35/02 . for conveying rotary motion with cyclically-varying velocity ratio (speed-changing mechanisms operating cyclically, see the appropriate groups)

35/06 . Gearings designed to allow relative movement between supports thereof without ill effects (F16H 1/26, F16H 1/48 take precedence)

35/08 . for adjustment of members on moving parts from a stationary place

35/10 . Arrangements or devices for absorbing overload or preventing damage by overload (couplings for transmitting rotation F16D)

35/12 . Transmitting mechanisms with delayed effect (vibration- or shock-dampers in general F16F)

35/14 . Mechanisms with only two stable positions, e.g. acting at definite angular positions

35/16 . Mechanisms for movements or movement relations conforming to mathematical formulae (devices in which computing operations are performed mechanically G06G 3/00)

35/18 . Turning devices for rotatable members, e.g. shafts (starting devices for internal-combustion engines F02N)

37/00 Combinations of mechanical gearings, not provided for in groups F16H 1/00 to F16H 35/00 (combinations of mechanical gearing with fluid clutches or fluid gearing F16H 47/00; applications of underdrives or overdrives in motor vehicles, combinations with differential gearings in motor vehicles B60K)

37/02 . comprising essentially only toothed or friction gearings

37/04 . . Combinations of toothed gearings only (F16H 37/06 takes precedence)

37/06 . . with a plurality of driving or driven shafts; with arrangements for dividing torque between two or more intermediate shafts

37/08 . . . with differential gearing

37/10 . . . . at both ends of intermediate shafts

37/12 . Gearings comprising primarily toothed or friction gearing, links or levers, and cams, or members of at least two of these three types (F16H 21/14, F16H 21/28, F16H 21/30 take precedence; toothed or friction gearing or cam gearing, with only an additional lever or link, see the appropriate group for the main gearing)

37/14 . . the movements of two or more independently-moving members being combined into a single movement

37/16 . . with a driving or driven member which both rotates or oscillates on its axis and reciprocates

Fluid gearing [3]

39/00 Rotary fluid gearing using pumps and motors of the volumetric type, i.e. passing a predetermined volume of fluid per revolution (control of exclusively fluid gearing F16H 61/38; fluid couplings or clutches with pumping sets of volumetric type F16D 31/00; application to lifting or pushing equipment B66F) **[5]**

39/01 . Pneumatic gearing; Gearing working with subatmospheric pressure (pneumatic hammers B25D 9/00) **[2]**

39/02 . with liquid motors at a distance from liquid pumps

39/04 . with liquid motor and pump combined in one unit

39/06 . . pump and motor being of the same type

39/08 . . . each with one main shaft and provided with pistons reciprocating in cylinders

39/10 . . . . with cylinders arranged around, and parallel or approximately parallel to, the main axis of the gearing

39/12 . . . . . with stationary cylinders

39/14 . . . . . with cylinders carried in rotary cylinder blocks or cylinder-bearing members

39/16 . . . . with cylinders arranged perpendicular to the main axis of the gearing

39/18 . . . . . the connections of the pistons being at the outer ends of the cylinders

39/20 . . . . . the connections of the pistons being at the inner ends of the cylinders

39/22 . . . with liquid chambers shaped as bodies of revolution concentric with the main axis of the gearing

39/24 . . . . with rotary displacement members, e.g. provided with axially or radially movable vanes passing movable sealing members
39/26 . . . with liquid chambers not shaped as bodies of revolution or shaped as bodies of revolution eccentric to the main axis of the gearing
39/28 . . . . with liquid chambers formed in rotary members
39/30 . . . . with liquid chambers formed in stationary members
39/32 . . . . . with sliding vanes carried by the rotor
39/34 . . . in which a rotor on one shaft co-operates with a rotor on another shaft
39/36 . . . . toothed-gear type
39/38 . . . . Displacement screw-pump type
39/40 . . . Hydraulic differential gearings, e.g. having a rotary input housing with interconnected liquid chambers for both outputs
39/42 . . pump and motor being of different types

41/00 Rotary fluid gearing of the hydrokinetic type (control of exclusively fluid gearing F16H 61/38; rotary fluid couplings or clutches of the hydrokinetic type F16D 33/00) **[5]**

41/02 . with pump and turbine connected by conduits or ducts
41/04 . Combined pump-turbine units
41/22 . . Gearing systems consisting of a plurality of hydrokinetic units operating alternatively, e.g. made effective or ineffective by filling or emptying or by mechanical clutches
41/24 . Details
41/26 . . Shape of runner blades or channels with respect to function
41/28 . . with respect to manufacture, e.g. blade attachment
41/30 . . relating to venting, lubrication, cooling, circulation of the cooling medium
41/32 . Selection of working fluids (chemical aspects, see the relevant classes)

43/00 Other fluid gearing, e.g. with oscillating input or output [2]

43/02 . Fluid gearing actuated by pressure waves **[2]**

45/00 Combinations of fluid gearings for conveying rotary motion with couplings or clutches (F16H 41/22 takes precedence; conjoint control of driveline clutches and change-speed gearing in vehicles B60W 10/02, B60W 10/10) **[2]**

Note

Clutches for varying working conditions in fluid torque-converters are regarded as a part of the latter.

45/02 . with mechanical clutches for bridging a fluid gearing of the hydrokinetic type (control of torque converter lock-up clutches F16H 61/14)

47/00 Combinations of mechanical gearing with fluid clutches or fluid gearing (conjoint control of driveline clutches and change-speed gearing in vehicles B60W 10/02, B60W 10/10) **[2]**

47/02 . the fluid gearing being of the volumetric type
47/04 . . the mechanical gearing being of the type with members having orbital motion
47/06 . the fluid gearing being of the hydrokinetic type
47/07 . . using two or more power-transmitting fluid circuits (F16H 47/10 takes precedence) **[2]**
47/08 . . the mechanical gearing being of the type with members having orbital motion
47/10 . . . using two or more power-transmitting fluid circuits **[2]**
47/12 . . . the members with orbital motion having vanes interacting with the fluid **[2]**

48/00 Differential gearings [6]

Note

Documents relating to transfer gears are classified both in group F16H 48/02 and in groups F16H 48/06 to F16H 48/20. **[6]**

48/02 . Transfer gears for influencing drive between outputs **[6]**
48/04 . . having unequal torque transfer between two outputs **[6]**

(1) When classifying in groups F16H 48/06 to F16H 48/20, classification is made in the last appropriate place. **[8]**

(2) When classifying in groups F16H 48/06 to F16H 48/20, constructional features of differential gearings not identified by the classification according to Note (1), and which are considered to represent information of interest for search, may also be classified. Such non-obligatory classification should be given as "additional information". **[8]**

48/06 . with gears having orbital motion **[6]**
48/08 . . with orbital conical gears **[6]**
48/10 . . with orbital spur gears **[6]**
48/12 . without gears having orbital motion **[6]**
48/14 . . with cams **[6]**
48/16 . . with freewheels **[6]**
48/18 . . with fluid gearing **[6]**
48/20 . Arrangements for suppressing or influencing the differential action, e.g. locking devices **[6]**
48/22 . . using friction clutches or brakes **[6]**
48/24 . . using positive clutches or brakes **[6]**
48/26 . . using fluid action, e.g. viscous clutches **[6]**
48/28 . . using self-locking gears **[6]**
48/30 . . using externally-actuatable locking devices **[6]**

49/00 Other gearing

Details of gearing or mechanisms

51/00 Levers of gearing mechanisms (shafts, Bowden mechanisms, cranks, eccentrics, bearings, pivotal connections, crossheads, connecting-rods F16C; manipulating levers G05G)

51/02 . adjustable

53/00 Cams or cam-followers, e.g. rollers for gearing mechanisms (shafts, Bowden mechanisms, cranks, eccentrics, bearings, pivotal connections, crossheads, connecting-rods F16C; cams specially adapted for reciprocating-piston liquid engines F03C 1/30)

53/02 . Single-track cams for single-revolution cycles; Camshafts with such cams
53/04 . . Adjustable cams

53/06 . Cam-followers (F16H 53/08 takes precedence)
53/08 . Multi-track cams, e.g. for cycles consisting of several revolutions; Cam-followers specially adapted for such cams

55/00 Elements with teeth or friction surfaces for conveying motion; **Worms, pulleys or sheaves for gearing mechanisms** (of screw-and-nut gearing F16H 25/00; shafts, Bowden mechanisms, cranks, eccentrics, bearings, pivotal connections, crossheads, connecting-rods F16C; chains, belts F16G; pulley-blocks for lifting or hauling appliances B66D 3/04) **[4]**

55/02 . Toothed members; Worms
55/06 . . Use of materials; Use of treatments of toothed members or worms to affect their intrinsic material properties **[3]**
55/08 . . Profiling **[3]**
55/10 . . Constructively simple tooth shapes, e.g. shaped as pins, as balls **[3]**
55/12 . . with body or rim assembled out of detachable parts **[3]**
55/14 . . Construction providing resilience or vibration-damping (F16H 55/06 takes precedence) **[3]**
55/16 . . . relating to teeth only **[3]**
55/17 . . Toothed wheels (worm wheels F16H 55/22; chain wheels F16H 55/30) **[3]**
55/18 . . . Special devices for taking-up backlash
55/20 . . . . for bevel gears
55/22 . . for transmissions with crossing shafts, especially worms, worm-gears (bevel gears, crown wheels, helical gears F16H 55/17)
55/24 . . . Special devices for taking up backlash
55/26 . . Racks
55/28 . . . Special devices for taking up backlash
55/30 . . Chain wheels (specially adapted for cycles B62M)
55/32 . Friction members (friction surfaces F16D 69/00)
55/34 . . Non-adjustable friction discs
55/36 . . Pulleys (with features essential for adjustment F16H 55/52)
55/38 . . . Means or measures for increasing adhesion (in general F16D 69/00)
55/40 . . . with spokes (F16H 55/48 takes precedence)
55/42 . . . Laminated pulleys
55/44 . . . Sheet-metal pulleys
55/46 . . . Split pulleys
55/48 . . . manufactured exclusively or in part of non-metallic material, e.g. plastics (F16H 55/38, F16H 55/42, F16H 55/46 take precedence)
55/49 . . . Features essential to V-belt pulleys **[2]**
55/50 . . . Features essential to rope pulleys
55/52 . . Pulleys or friction discs of adjustable construction
55/54 . . . of which the bearing parts are radially adjustable
55/56 . . . of which the bearing parts are relatively axially adjustable

57/00 General details of gearing (of fluid gearing F16H 39/00 to F16H 43/00; of screw-and-nut gearing F16H 25/00; shafts, Bowden mechanisms, cranks, eccentrics, bearings, pivotal connections, crossheads, connecting-rods F16C)

57/02 . Gear-boxes; Mounting gearing therein
57/04 . Features relating to lubrication or cooling (control of lubrication or cooling in hydrostatic gearing F16H 61/4165) **[1,2010.01]**
57/05 . . of chains (for conveyers B65G 45/08)
57/08 . of gearings with members having orbital motion
57/10 . . Braking arrangements
57/12 . Arrangements for adjusting or for taking-up backlash not provided for elsewhere **[2]**

Control of gearing conveying rotary motion [5]

(1) Attention is drawn to the Notes following the title of subclass B60W.

(2) In groups F16H 59/00 to F16H 63/00, clutches positioned within a gearbox are considered as comprising part of the gearings. **[5]**

(3) In groups F16H 59/00 to F16H 63/00, the following terms or expressions are used with the meaning indicated:
- "final output element" means the final element which is moved to establish a gear ratio, i.e. which achieves the linking between two power transmission means, e.g. reverse idler gear, gear cluster, coupling sleeve, apply piston of a hydraulic clutch;
- "mechanism" means a kinematic chain consisting either of a single element or alternatively of a series of elements, the position of each point on the kinematic chain being derivable from the position of any other point on the chain, and therefore, for a given position of a point on one of the elements forming the kinematic chain there is only one position for each of the other points on the element or series of elements forming the kinematic chain;
- "final output mechanism" means the mechanism which includes the final output element;
- "actuating mechanism" means the mechanism, the movement of which causes the movement of another mechanism by being in mutual contact;
- "final actuating mechanism" means the mechanism actuating the final output mechanism. **[5]**

(4) Combinations of features individually covered by group F16H 61/00 and one or both of groups F16H 59/00 and F16H 63/00 are classified in group F16H 61/00. **[5]**

(5) Combinations of features individually covered by groups F16H 59/00 and F16H 63/00 are classified in group F16H 63/00. **[5]**

(6) When classifying in groups F16H 59/00 to F16H 63/00, control inputs or types of gearing which are not identified by the classification according to Notes (4) and (5), and which are considered to represent information of interest for search, may also be classified. Such non-obligatory classification should be given as "additional information", e.g. selected from subgroup F16H 61/66 relating to the type of gearing controlled or from group F16H 59/00 relating to control inputs. **[8]**

59/00 Control inputs to change-speed- or reversing-gearings for conveying rotary motion [5]

59/02 . Selector apparatus **[5]**
59/04 . . Ratio selector apparatus **[5]**
59/06 . . . the ratio being infinitely variable **[5]**
59/08 . . Range selector apparatus **[5]**
59/10 . . . comprising levers **[5]**
59/12 . . . comprising push button devices **[5]**
59/14 . Inputs being a function of torque or torque demand **[5]**
59/16 . . Dynamometric measurement of torque **[5]**

59/18 . . dependent on the position of the accelerator pedal **[5]**
59/20 . . . Kickdown **[5]**
59/22 . . . Idle position **[5]**
59/24 . . dependent on the throttle opening **[5]**
59/26 . . dependent on pressure **[5]**
59/28 . . . Gasifier pressure in gas turbines **[5]**
59/30 . . . Intake manifold vacuum **[5]**
59/32 . . . Supercharger pressure in internal combustion engines **[5]**
59/34 . . dependent on fuel feed **[5]**
59/36 . Inputs being a function of speed **[5]**
59/38 . . of gearing elements **[5]**
59/40 . . . Output shaft speed **[5]**
59/42 . . . Input shaft speed **[5]**
59/44 . . dependent on machine speed (F16H 59/46 takes precedence) **[5]**
59/46 . . dependent on a comparison between speeds **[5]**
59/48 . Inputs being a function of acceleration **[5]**
59/50 . Inputs being a function of the status of the machine, e.g. position of doors or safety belts **[5]**
59/52 . . dependent on the weight of the machine, e.g. change in weight resulting from passengers boarding a bus **[5]**
59/54 . . dependent on signals from the brakes, e.g. parking brakes **[5]**
59/56 . . dependent on signals from the main clutch **[5]**
59/58 . . dependent on signals from the steering **[5]**
59/60 . Inputs being a function of ambient conditions **[5]**
59/62 . . Atmospheric pressure **[5]**
59/64 . . Atmospheric temperature **[5]**
59/66 . . Road conditions, e.g. slope, slippery **[5]**
59/68 . Inputs being a function of gearing status **[5]**
59/70 . . dependent on the ratio established **[5]**
59/72 . . dependent on oil characteristics, e.g. temperature, viscosity **[5]**
59/74 . Inputs being a function of engine parameters (F16H 59/14 takes precedence) **[5]**
59/76 . . Number of cylinders operating **[5]**
59/78 . . Temperature **[5]**

61/00 Control functions within change-speed- or reversing-gearings for conveying rotary motion [5]

61/02 . characterised by the signals used **[5]**
61/04 . Smoothing ratio shift **[5]**
61/06 . . by controlling rate of change of fluid pressure **[5]**
61/08 . . Timing control **[5]**
61/10 . Regulating shift hysteresis **[5]**
61/12 . Detecting malfunction or potential malfunction, e.g. fail safe (in control of hydrostatic gearing F16H 61/4192) **[5,2010.01]**
61/14 . Control of torque converter lock-up clutches **[5]**
61/16 . Inhibiting shift during unfavourable conditions (F16H 61/18 takes precedence) **[5]**
61/18 . Preventing unintentional or unsafe shift (constructional features of the final output mechanisms F16H 63/30) **[5]**
61/20 . Preventing gear creeping **[5]**
61/21 . Providing engine brake control **[7]**
61/22 . Locking (F16H 63/34 takes precedence) **[5]**
61/24 . Providing feel, e.g. to enable selection **[5]**
61/26 . Generation or transmission of movements for final actuating mechanisms **[5]**

(1) The generation or transmission of movements comprising only the selector apparatus, is classified in group F16H 59/00. **[5]**
(2) The generation or transmission of movements, when part of the final output mechanisms, is classified in group F16H 63/00. **[5]**

61/28 . . with at least one movement of the final actuating mechanism being caused by a non-mechanical force, e.g. power-assisted **[5]**
61/30 . . . Hydraulic motors therefor **[5]**
61/32 . . . Electric motors therefor **[5]**
61/34 . . comprising two mechanisms, one for the preselection movement, and one for the shifting movement (F16H 61/36 takes precedence) **[5]**
61/36 . . with at least one movement being transmitted by a cable **[5]**
61/38 . Control of exclusively fluid gearing **[5]**
61/40 . . hydrostatic (involving modification of the gearing F16H 39/02, F16H 39/04) **[5,2010.01]**
61/4008 . . . Control of circuit pressure **[2010.01]**
61/4017 . . . . Control of high pressure, e.g. avoiding excess pressure by a relief valve **[2010.01]**
61/4026 . . . . Control of low pressure **[2010.01]**
61/4035 . . . Control of circuit flow **[2010.01]**
61/4043 . . . Control of a bypass valve **[2010.01]**
61/4052 . . . . by using a variable restriction, e.g. an orifice valve **[2010.01]**
61/4061 . . . Control related to directional control valves, e.g. change-over valves, for crossing the feeding conduits (forward reverse switching by using swash plate F16H 61/438) **[2010.01]**
61/4069 . . . Valves related to the control of neutral, e.g. shut off valves (zero tilt rotation holding means F16H 61/439) **[2010.01]**
61/4078 . . . Fluid exchange between hydrostatic circuits and external sources or consumers **[2010.01]**
61/4096 . . . . with pressure accumulators **[2010.01]**
61/4104 . . . . Flushing, e.g. by using flushing valves or by connection to exhaust **[2010.01]**
61/4131 . . . . Fluid exchange by aspiration from reservoirs, e.g. sump **[2010.01]**
61/4139 . . . . Replenishing or scavenging pumps, e.g. auxiliary charge pumps **[2010.01]**
61/4148 . . . Open loop circuits **[2010.01]**
61/4157 . . . Control of braking, e.g. preventing pump over-speeding when motor acts as a pump **[2010.01]**
61/4165 . . . Control of cooling or lubricating **[2010.01]**
61/4174 . . . Control of venting, e.g. removing trapped air **[2010.01]**
61/4183 . . . Preventing or reducing vibrations or noise, e.g. avoiding cavitations **[2010.01]**
61/4192 . . . Detecting malfunction or potential malfunction, e.g. fail safe **[2010.01]**
61/42 . . . involving adjustment of a pump or motor with adjustable output or capacity **[5,2010.01]**
61/421 . . . . Motor capacity control by electro-hydraulic control means, e.g. using solenoid valves **[2010.01]**
61/423 . . . . Motor capacity control by fluid pressure control means **[2010.01]**
61/425 . . . . Motor capacity control by electric actuators **[2010.01]**

61/427 . . . . Motor capacity control by mechanical control means, e.g. by levers or pedals **[2010.01]**

61/431 . . . . Pump capacity control by electro-hydraulic control means, e.g. using solenoid valve **[2010.01]**

61/433 . . . . Pump capacity control by fluid pressure control means **[2010.01]**

61/435 . . . . Pump capacity control by electric actuators **[2010.01]**

61/437 . . . . Pump capacity control by mechanical control means, e.g. by levers or pedals **[2010.01]**

61/438 . . . . Control of forward-reverse switching, e.g. control of the swash plate causing discharge in two directions (using a directional control valve F16H 61/4061) **[2010.01]**

61/439 . . . . Control of the neutral position, e.g. by zero tilt rotation holding means (using a neutral valve or a shutoff valve F16H 61/4069) **[2010.01]**

61/44 . . . with more than one pump or motor unit in operation **[5]**

61/444 . . . . by changing the number of pump or motor units in operation **[2010.01]**

61/448 . . . . Control circuits for tandem pumps or motors **[2010.01]**

61/452 . . . . Selectively controlling multiple pumps or motors, e.g. switching between series or parallel **[2010.01]**

61/456 . . . . Control of the balance of torque or speed between pumps or motors (hydrostatic differentials F16H 48/18) **[2010.01]**

61/46 . . . Automatic regulation in accordance with output requirements **[5,2010.01]**

61/462 . . . . for achieving a target speed ratio **[2010.01]**

61/465 . . . . for achieving a target input speed **[2010.01]**

61/468 . . . . for achieving a target input torque **[2010.01]**

61/47 . . . . for achieving a target output speed **[2010.01]**

61/472 . . . . for achieving a target output torque **[2010.01]**

61/475 . . . . for achieving a target power, e.g. input power or output power **[2010.01]**

61/478 . . . . for preventing overload, e.g. high pressure limitation **[2010.01]**

61/48 . . hydrodynamic **[5]**

61/50 . . . controlled by changing the flow, force, or reaction of the liquid in the working circuit, while maintaining a completely filled working circuit **[5]**

61/52 . . . . by altering the position of blades **[5]**

61/54 . . . . . by means of axially-shiftable blade runners **[5]**

61/56 . . . . . to change the blade angle **[5]**

61/58 . . . . by change of the mechanical connection of, or between, the runners **[5]**

61/60 . . . . . exclusively by the use of freewheel clutches **[5]**

61/62 . . . . . involving use of a speed-changing gearing or of a clutch in the connection between runners (F16H 45/02, F16H 61/60 take precedence) **[5]**

61/64 . . . controlled by changing the amount of liquid in the working circuit **[5]**

61/66 . specially adapted for continuously variable gearings (F16H 61/38 takes precedence; orbital toothed gearings with a secondary drive in order to vary the speed continuously F16H 3/72) **[8]**

61/662 . . with endless flexible members **[8]**

61/664 . . Friction gearings **[8]**

61/68 . specially adapted for stepped gearings **[8]**

61/682 . . with interruption of drive **[8]**

61/684 . . without interruption of drive **[8]**

61/686 . . . with orbital gears **[8]**

61/688 . . . with two inputs, e.g. selection of one of two torque-flow paths by clutches **[8]**

61/70 . specially adapted for change-speed gearing in group arrangement, i.e. with separate change-speed gear trains arranged in series, e.g. range or overdrive-type gearing arrangements **[8]**

63/00 Control outputs to change-speed- or reversing-gearings for conveying rotary motion [5]

63/02 . Final output mechanisms therefor; Actuating means for the final output mechanisms **[5]**

63/04 . . a single final output mechanism being moved by a single final actuating mechanism **[5]**

63/06 . . . the final output mechanism having an indefinite number of positions **[5]**

63/08 . . Multiple final output mechanisms being moved by a single common final actuating mechanism **[5]**

63/10 . . . the final actuating mechanism having a series of independent ways of movement, each way of movement being associated with only one final output mechanism **[5]**

63/12 . . . . two or more ways of movement occurring simultaneously **[5]**

63/14 . . . the final output mechanisms being successively actuated by repeated movement of the final actuating mechanism **[5]**

63/16 . . . the final output mechanisms being successively actuated by progressive movement of the final actuating mechanism **[5]**

63/18 . . . . the final actuating mechanism comprising cams **[5]**

63/20 . . . with preselection and subsequent movement of each final output mechanism by movement of the final actuating mechanism in two different ways, e.g. guided by a shift gate **[5]**

63/22 . . . . the final output mechanisms being simultaneously moved by the final actuating mechanism **[5]**

63/24 . . each of the final output mechanisms being moved by only one of the various final actuating mechanisms **[5]**

63/26 . . . some of the movements of the final output mechanisms being caused by another final output mechanism **[5]**

63/28 . . two or more final actuating mechanisms moving the same final output mechanism **[5]**

63/30 . . Constructional features of the final output mechanisms **[5]**

63/32 . . . Gear shifter yokes **[5]**

63/34 . . . Locking or disabling mechanisms **[5]**

63/36 . . . . Interlocking devices **[5]**

63/38 . . . Detents **[5]**

63/40 . comprising signals other than signals for actuating the final output mechanisms **[5]**

63/42 . . Ratio indicator devices **[5]**

63/44 . . Signals to the control unit of auxiliary gearing **[5]**

63/46 . . Signals to a clutch outside the gearbox **[5]**
63/48 . . Signals to a parking brake **[5]**
63/50 . . Signals to an engine or motor **[7]**

F16J PISTONS; CYLINDERS; PRESSURE VESSELS IN GENERAL; SEALINGS

Note

Attention is drawn to the following places:

A47J	27/08	Pressure cookers
E04B	1/68	Sealing building joints
E05C	9/00	Multi-point fastening of wings in general
F01B		Machines or engines in general or of reciprocating type, e.g. cylinders peculiar to steam engines F01B 31/28
F02F	1/00	Cylinders for combustion engines
F02F	3/00	Pistons for combustion engines
F04D	29/08	Sealings of non-positive displacement pumps
F17B	1/04	Sealing devices for sliding parts of gas holders of variable capacity
F28F	9/04	Arrangements for sealing elements into header boxes or end plates of heat-exchangers.

Subclass index

1/00 **Pistons**; **Trunk pistons**; **Plungers** (bellows pistons F16J 3/06; piston-rings or seats therefor F16J 9/00; rotary pistons, e.g. for "Wankel" type engines, F01C; specific for combustion engines, i.e. constructed to withstand high temperature or modified for guiding, igniting, vaporising, or otherwise treating the charge, F02F; pistons specially adapted for reciprocating-piston liquid engines F03C 1/28; for pumps F04B; floats F16K 33/00)

1/01 . characterised by the use of particular materials (F16J 1/02 takes precedence) **[3]**
1/02 . Bearing surfaces
1/04 . Resilient guiding parts, e.g. skirts, particularly for trunk pistons
1/06 . . with separate expansion members; Espansion members
1/08 . Constructional features providing for lubrication
1/09 . with means for guiding fluids (F16J 1/08 takes precedence) **[3]**
1/10 . Connection to driving members
1/12 . . with piston-rods, i.e. rigid connections
1/14 . . with connecting-rods, i.e. pivotal connections
1/16 . . . with gudgeon-pin; Gudgeon-pins
1/18 . . . . Securing of gudgeon-pins
1/20 . . . with rolling contact, other than in ball or roller bearings
1/22 . . . with universal joint, e.g. ball-joint
1/24 . . designed to give the piston some rotary movement about its axis

3/00 **Diaphragms**; **Bellows**; **Bellows pistons** (connection of valves to inflatable elastic bodies B60C 29/00; bellows or the like used in instruments G12B 1/04; diaphragms for electromechanical transducers H04R 7/00)

3/02 . Diaphragms **[2]**
3/04 . Bellows **[2]**
3/06 . Bellows pistons **[2]**

7/00 **Piston-rods, i.e. rods rigidly connected to the piston** (connecting-rods or like links pivoted at both ends F16C 7/00)

9/00 **Piston-rings, seats therefor**; **Ring sealings of similar construction in general** (other sealings between pistons and cylinders F16J 3/06, F16J 15/16; tools for mounting or removing piston-rings or the like B25B; piston sealing arrangements on brake master cylinders B60T 11/236) **[2,5]**

9/02 . L-section rings
9/04 . Helical rings
9/06 . using separate springs expanding the rings; Springs therefor
9/08 . with expansion obtained by pressure of the medium
9/10 . Special members for adjusting the rings
9/12 . Details
9/14 . . Joint-closures
9/16 . . . obtained by stacking of rings
9/18 . . . with separate bridge-elements
9/20 . . Rings with special cross-section (L-section rings F16J 9/02); Oil-scraping rings
9/22 . . Rings for preventing wear of grooves or like seatings
9/24 . . Members preventing rotation of rings in grooves
9/26 . characterised by the use of particular materials **[3]**
9/28 . . of non-metals **[3]**

10/00 **Engine or like cylinders** (pressure vessels in general F16J 12/00; cylinders for engines or other apparatus of particular kinds, see the appropriate subclasses, e.g. for combustion engines F02F); **Features of hollow, e.g. cylindrical, bodies in general [3]**

10/02 . Cylinders designed to receive moving pistons or plungers **[3]**
10/04 . . Running faces; Liners **[3]**

12/00 **Pressure vessels in general** (covers therefor F16J 13/00; for particular applications, see the relevant subclasses, e.g. B01J, F17C, G21C) **[3]**

13/00 **Covers or similar closure members for pressure vessels in general** (for engine or like cylinders F16J 10/00; sealings F16J 15/02; covers for box-like containers B65D 43/00; devices for securing or retaining closure members B65D 45/00; closures for containers not otherwise provided for B65D 51/00; manholes, covers for large containers B65D 90/10; gates or closures for large containers B65D 90/54; for vessels for containing or storing compressed, liquefied or solidified gases F17C 13/06; steam boilers F22B)

13/02 . Detachable closure members; Means for tightening closures (F16J 13/16, F16J 13/22 take precedence) **[3]**
13/04 . . attached with a bridge member
13/06 . . attached only by clamps along the circumference
13/08 . . attached by one or more members actuated to project behind a part or parts of the frame (similar constructions for doors or windows E05C 9/00)
13/10 . . attached by means of a divided ring
13/12 . . attached by wedging action by means of screw-thread, interrupted screw-thread, bayonet closure, or the like
13/14 . . attached exclusively by spring action or elastic action
13/16 . Pivoted closures (F16J 13/22 takes precedence) **[3]**
13/18 . . pivoted directly on the frame
13/20 . . mounted by mobile fastening on swinging arms
13/22 . with movement parallel to the plane of the opening **[3]**
13/24 . with safety devices, e.g. to prevent opening prior to pressure release **[3]**

15/00 **Sealings** (sealing arrangements for vehicle windows, windscreens, non-fixed roofs, doors, or similar devices B60J 10/00; sealing or packing elements for container closures B65D 53/00; sealing arrangements in rotary-piston machines or engines F01C 19/00; sealings in non-positive-displacement machines or engines F01D 11/00; arrangements of sealings in combustion engines F02F 11/00; sealing arrangements in rotary-piston pumps F04C 27/00; sealing lead-in or lead-through insulators H01B 17/30) **[5]**

15/02 . between relatively-stationary surfaces (F16J 15/46, F16J 15/48 take precedence)
15/04 . . without packing between the surfaces, e.g. with ground surfaces, with cutting edge
15/06 . . with solid packing compressed between sealing surfaces
15/08 . . . with exclusively metal packing
15/10 . . . with non-metallic packing
15/12 . . . . with metal reinforcement or covering
15/14 . . by means of granular or plastic material, or fluid
15/16 . between relatively-moving surfaces (F16J 15/50, F16J 15/52 take precedence; bellows pistons F16J 3/06; piston-rings or ring sealings of similar construction in general F16J 9/00; spindle sealings for valves F16K 41/00) **[2]**
15/18 . . with stuffing-boxes for elastic or plastic packings
15/20 . . . Packing materials therefor
15/22 . . . . shaped as strands, ropes, threads, ribbons, or the like
15/24 . . . with radially or tangentially compressed packing
15/26 . . with stuffing-boxes for rigid sealing rings
15/28 . . . with sealing rings made of metal
15/30 . . . with sealing rings made of carbon
15/32 . . with elastic sealing lip
15/34 . . with slip-ring pressed against a more or less radial face on one member
15/36 . . . connected by a diaphragm to the other member
15/38 . . . sealed by a packing **[2]**
15/40 . . by means of fluid
15/42 . . . kept in sealing position by centrifugal force
15/43 . . . kept in sealing position by magnetic force **[6]**
15/44 . Free-space packings
15/447 . . Labyrinth packings **[3]**
15/453 . . . characterised by the use of particular materials **[3]**
15/46 . with packing ring expanded or pressed into place by fluid pressure, e.g. inflatable packings (connection of valves to inflatable elastic bodies B60C 29/00; specially adapted for tube connections F16L)
15/48 . . influenced by the pressure within the member to be sealed
15/50 . between relatively-movable members, by means of a sealing without relatively-moving surfaces, e.g. fluid-tight sealings for transmitting motion through a wall
15/52 . . by means of sealing bellows or diaphragms (connection of valves to inflatable elastic bodies B60C 29/00)
15/53 . using magnetic means **[6]**
15/54 . Other sealings for rotating shafts
15/56 . Other sealings for reciprocating rods

F16K VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING

(1) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

(2) Attention is drawn to Note (2) following the title of subclass G05D and also the subdivisions of that subclass, according to which pressure regulators and flow regulators, e.g. flow regulating valves with pressure compensator, even with the whole regulating system contained in a valve, operating with or without auxiliary power, are covered by groups G05D 16/00 or G05D 7/00, respectively. However, details of the valve parts, per se, are classified in the appropriate groups of this subclass. **[2]**

(3) Attention is drawn to the following places:

A47J	27/09	Safety devices for pressure cookers
A47J	31/46	Dispensing spouts, drain valves or like beverage-making apparatus
A61B	5/0235	Valves specially adapted for measuring pressure in heart or blood vessels
A61F	2/24	Heart valves
A61M	16/20	Valves specially adapted for medical respiratory devices

A61M	39/00	Tube connectors, tube couplings, valves or branch units specially adapted for medical use in general
A62B	9/02	Valves for respiratory apparatus
A62B	18/10	Valves for breathing masks or helmets
A62C		Fire extinguishers
B05B		Nozzles, spray heads or other discharge apparatus for spraying or atomising
B60C	29/00	Arrangements of tyre-inflating valves relative to tyres or wheel rims; Connection of valves to wheel rims, tyres or other inflatable elastic bodies
B60G	17/048	Valves specially adapted for adjusting vehicle fluid-spring characteristics
B60T		Valves specially adapted for vehicle brake control systems
B62D	5/08	Vehicle power-assisted steering characterised by the type of valve used
B63B	7/00,	Arrangement of inflating valves for floatable live-saving equipment
B63C	9/00	
B65D	47/04	Container closures with discharging valves
B65D	83/28,	Nozzles or valves specially adapted for aerosol containers
B65D	83/44	
B65D	90/32	Safety valves for large containers
B65D	90/54	Gates or closures on large containers
B67C	3/28	Flow control devices for bottling liquids
B67D		Dispensing, delivering or transferring liquids
E02B	8/00	Details, e.g. valves, of barrages or weirs
E02B	13/02	Closures for irrigation conduits
E03B	9/02	Arrangement of valves in hydrants
E03D		Flushing valves for water-closets or urinals
E05F	3/12	Valve arrangement in door closers
E21B	21/10	Valve arrangements in drilling-fluid circulation systems
E21B	34/00	Valve arrangements for boreholes or wells
F01B	25/10	Working-fluid valves for controlling machines or engines in general or of positive-displacement type
F01D	17/10	Final actuators for controlling non-positive displacement machines or engines
F01L		Cyclically operated valves for machines or engines
F02D	9/08	Throttle valves for controlling combustion engines
F02K	9/58	Propellant feed valves for rocket-engines
F02M		Carburettors, fuel injection
F02M	59/46	Valves for fuel injection pumps
F04		Pumps
F16F	9/34	Valves for shock absorbers
F16L	29/00,	Pipe joints or quick-acting couplings with fluid cut-off means
F16L	37/28	
F16L	55/00	Arrangement of valves in pipes
F16L	55/055	Valves specially adapted to prevent or minimise the effect of water hammer
F16L	55/46	Launching devices for pigs or moles
F16N	23/00	Check valves for lubrication systems
F17C	13/04	Arrangement of valves in pressure vessels
F22B	37/44	Arrangement of safety valves on steam boilers
F22D	5/34	Application of valves to automatic water-feed in boiler
F23L	13/00	Valves for air supply control to burners
F23Q	2/173	Valves for lighters with gaseous fuel and adjustable flame
F24C	3/12,	Arrangement of valves on stoves or ranges
F24C	5/16	
F24F		Air conditioning; Ventilation
F25B	41/04	Disposition of fluid circulation valves in refrigeration machines
G05D		Controlling non-electric variables
G10B	3/06	Valves for organs
G10D	9/04	Valves for other wind-actuated musical instruments.

Subclass index

CONSTRUCTIONAL TYPES

Lift-valves, gate valves or sliding valves, taps, diaphragm cut-off apparatus ..... 1/00 to 7/00

Multiple-way valves 11/00

Other constructional types of cut-off apparatus, arrangements for cutting off 13/00

FUNCTIONAL TYPES

Check valves; safety or equalising valves; arrangements for mixing fluids 15/00; 17/00; 11/00

Fluid-delivery valves; valves for preventing drip from nozzles 21/00; 23/00

For venting or aerating enclosures 24/00

DETAILS OR GENERAL MEANS

Handling or control 29/00, 31/00, 39/00, 43/00

Auxiliary means 47/00, 49/00

Constructional types

Note

In groups F16K 1/00 to F16K 13/00, an initial seal breaking or final sealing movement which is different from the opening or closing movement of the valve is not considered in determining the movement to be classified. **[2]**

1/00 **Lift valves, i.e. cut-off apparatus with closure members having at least a component of their opening and closing motion perpendicular to the closing faces** (diaphragm valves F16K 7/00)

1/02 . with screw-spindle (F16K 1/12 to F16K 1/28 take precedence; actuating mechanisms with screw-spindles F16K 31/50)
1/04 . . with a cut-off member rigid with the spindle, e.g. main valves
1/06 . . Special arrangements for improving the flow, e.g. special shape of passages or casings
1/08 . . . in which the spindle is perpendicular to the general direction of flow
1/10 . . . in which the spindle is inclined to the general direction of flow
1/12 . with streamlined valve member around which the fluid flows when the valve is opened
1/14 . with ball-shaped valve members (check valves F16K 15/04)
1/16 . with pivoted closure members
1/18 . . with pivoted discs or flaps
1/20 . . . with axis of rotation arranged externally of valve member
1/22 . . . with axis of rotation crossing the valve member, e.g. butterfly valves
1/226 . . . . Shape or arrangement of the sealing
1/228 . . . . . Movable sealing bodies
1/24 . with valve members that, on opening of the valve, are initially lifted from the seat and next are turned around an axis parallel to the seat
1/26 . . Shape or arrangement of the sealing
1/28 . . . Movable sealing bodies
1/30 . specially adapted for pressure containers
1/32 . Details (details of more general applicability F16K 25/00 to F16K 51/00)
1/34 . . Cutting-off parts (F16K 1/06, F16K 1/12, F16K 1/14, F16K 1/26 take precedence)
1/36 . . . Valve members (for double-seat valves F16K 1/44)
1/38 . . . . of conical shape
1/40 . . . . of helical shape
1/42 . . . Valve seats (for double-seat valves F16K 1/44)
1/44 . . . Details of seats or valve members of double-seat valves
1/46 . . . Attachment of sealing rings
1/48 . . Attaching valve members to valve-spindles **[4]**
1/50 . . Preventing rotation of valve members
1/52 . . Means for additional adjustment of the rate of flow
1/54 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve

3/00 **Gate valves or sliding valves, i.e. cut-off apparatus with closing members having a sliding movement along the seat for opening and closing** (F16K 5/00 takes precedence; in barrages or weirs E02B 8/04)

3/02 . with flat sealing faces; Packings therefor
3/03 . . with a closure member in the form of an iris-diaphragm
3/04 . . with pivoted closure members
3/06 . . . in the form of closure plates arranged between supply and discharge passages (F16K 3/10 takes precedence)
3/08 . . . . with circular closure plates rotatable around their centres
3/10 . . . with special arrangements for separating the sealing faces or for pressing them together
3/12 . . with wedge-shaped arrangements of sealing faces
3/14 . . . with special arrangements for separating the sealing faces or for pressing them together
3/16 . . with special arrangements for separating the sealing faces or for pressing them together (F16K 3/10, F16K 3/14 take precedence)
3/18 . . . by movement of the closure members
3/20 . . . by movement of the seats
3/22 . with sealing faces shaped as surfaces of solids of revolution (F16K 13/02 takes precedence; with resilient valve members F16K 3/28)
3/24 . . with cylindrical valve members
3/26 . . . with fluid passages in the valve member
3/28 . with resilient valve members
3/30 . Details
3/312 . . Line blinds
3/314 . . Forms or constructions of slides; Attachment of the slide to the spindle
3/316 . . Guiding of the slide
3/32 . . Means for additional adjustment of the rate of flow
3/34 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve
3/36 . . Features relating to lubrication

5/00 **Taps or cocks comprising only cut-off apparatus having at least one of the sealing faces shaped as a more or less complete surface of a solid of revolution, the opening and closing movement being predominantly rotary** (taps of the lift-valve type F16K 1/00)

5/02 . with plugs having conical surfaces; Packings therefor
5/04 . with plugs having cylindrical surfaces; Packings therefor
5/06 . with plugs having spherical surfaces; Packings therefor
5/08 . Details

5/10 . . Means for additional adjustment of the rate of flow
5/12 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve
5/14 . . Special arrangements for separating the sealing faces or for pressing them together
5/16 . . . for plugs with conical surfaces
5/18 . . . for plugs with cylindrical surfaces
5/20 . . . for plugs with spherical surfaces
5/22 . . Features relating to lubrication

7/00 Diaphragm cut-off apparatus, e.g. with a member deformed, but not moved bodily, to close the passage (container gates or closures operating by deformation of flexible walls B65D 90/56; means for plugging pipes or hoses F16L 55/10)
7/02 . with tubular diaphragm
7/04 . . constrictable by external radial force
7/06 . . . by means of a screw-spindle, cam, or other mechanical means
7/07 . . . by means of fluid pressure
7/08 . . constrictable by twisting
7/10 . with inflatable member
7/12 . with flat, dished, or bowl-shaped diaphragm
7/14 . . arranged to be deformed against a flat seat
7/16 . . . the diaphragm being mechanically actuated, e.g. by screw-spindle or cam
7/17 . . . the diaphragm being actuated by fluid pressure
7/18 . with diaphragm secured at one side only, e.g. to be laid on the seat by rolling action
7/20 . with a compressible solid closure member

11/00 Multiple-way valves, e.g. mixing valves; **Pipe fittings incorporating such valves**; **Arrangement of valves and flow lines specially adapted for mixing fluid [4]**
11/02 . with all movable sealing faces moving as one unit
11/04 . . comprising only lift valves
11/044 . . . with movable valve members positioned between valve seats **[4]**
11/048 . . . with valve seats positioned between movable valve members **[4]**
11/052 . . . with pivoted closure members, e.g. butterfly valves **[4]**
11/056 . . . with ball-shaped valve members **[4]**
11/06 . . comprising only sliding valves
11/065 . . . with linearly sliding closure members **[4]**
11/07 . . . . with cylindrical slides **[4]**
11/072 . . . with pivoted closure members **[4]**
11/074 . . . . with flat sealing faces **[4]**
11/076 . . . . with sealing faces shaped as surfaces of solids of revolution **[4]**
11/078 . . . with pivoted and linearly movable closure members **[4]**
11/08 . . comprising only taps or cocks
11/083 . . . with tapered plug **[2]**
11/085 . . . with cylindrical plug **[2]**
11/087 . . . with spherical plug **[2]**
11/10 . with two or more closure members not moving as a unit
11/12 . . with one plug turning in another
11/14 . . operated by one actuating member, e.g. a handle (with one plug turning in another F16K 11/12)
11/16 . . . which only slides, or only turns, or only swings in one plane
11/18 . . . with separate operating movements for separate closure members
11/20 . . operated by separate actuating members (with one plug turning in another F16K 11/12)
11/22 . . . with an actuating member for each valve, e.g. interconnected to form multiple-way valves
11/24 . . . with an electromagnetically-operated valve, e.g. for washing machines

13/00 Other constructional types of cut-off apparatus (means for plugging pipes or hoses F16L 55/10); **Arrangements for cutting-off [4]**
13/02 . with both sealing faces shaped as small segments of a cylinder and the moving member pivotally mounted
13/08 . Arrangements for cutting-off **[4]**
13/10 . . by means of liquid or granular medium **[4]**

Functional types

15/00 Check valves (valves specially adapted for inflatable balls A63B 41/00)
15/02 . with guided rigid valve members
15/03 . . with a hinged closure member
15/04 . . shaped as balls
15/06 . . with guided stems
15/08 . . shaped as rings
15/10 . . . integral with, or rigidly fixed to, a common valve plate
15/12 . . . Springs for ring valves **[3]**
15/14 . with flexible valve members
15/16 . . with tongue-shaped laminae
15/18 . with actuating mechanism; Combined check valves and actuated valves
15/20 . specially designed for inflatable bodies, e.g. tyres (connecting valves to inflatable elastic bodies B60C 29/00)

17/00 Safety valves; **Equalising valves** (pressure relief devices for aerosol containers B65D 83/70)
17/02 . opening on surplus pressure on one side; closing on insufficient pressure on one side (check valves F16K 15/00)
17/04 . . spring-loaded
17/06 . . . with special arrangements for adjusting the opening pressure
17/08 . . . with special arrangements for providing a large discharge passage
17/10 . . . with auxiliary valve for fluid operation of the main valve
17/12 . . weight-loaded
17/14 . . with fracturing member
17/16 . . . with fracturing diaphragm
17/164 . . and remaining closed after return of the normal pressure
17/168 . . combined with manually-controlled valves, e.g. a valve combined with a safety valve
17/18 . opening on surplus pressure on either side
17/19 . . Equalising valves predominantly for tanks
17/192 . . . with closure member in the form of a movable liquid column
17/194 . . . weight-loaded
17/196 . . . spring-loaded
17/20 . Excess-flow valves (actuated in consequence of shock or similar extraneous influence F16K 17/36)
17/22 . . actuated by the difference of pressure between two places in the flow line
17/24 . . . acting directly on the cutting-off member

17/26 . . . . operating in either direction
17/28 . . . . operating in one direction only
17/30 . . . . . spring-loaded
17/32 . . . acting on a servo-mechanism or on a catch-releasing mechanism
17/34 . . in which the flow-energy of the flowing medium actuates the closing mechanism
17/36 . actuated in consequence of extraneous circumstances, e.g. shock, change of position
17/38 . . of excessive temperature
17/40 . with fracturing member, e.g. fracturing diaphragm, fusible joint (valves with fracturing member opening on surplus pressure on one side F16K 17/14)
17/42 . Valves preventing penetration of air in the outlet of containers for liquids

21/00 **Fluid-delivery valves** (specially adapted for aerosol containers B65D 83/44; for liquid handling B67D; for flushing devices for water-closets or the like E03D)
21/02 . providing a continuous small flow
21/04 . Self-closing valves, i.e. closing automatically after operation
21/06 . . in which the closing movement, either retarded or not, starts immediately after opening
21/08 . . . with ball-shaped closing members
21/10 . . . with hydraulic brake cylinder acting on the closure member
21/12 . . . with hydraulically-operated opening means; with arrangements for pressure relief before opening
21/14 . . with special means for preventing the self-closing
21/16 . . closing after a predetermined quantity of fluid has been delivered (F16K 21/10 takes precedence)
21/18 . . closed when a rising liquid reaches a predetermined level (float-actuated valves F16K 31/18)
21/20 . . . by means making use of air-suction through an opening closed by the rising liquid

23/00 **Valves for preventing drip from nozzles**

24/00 **Devices, e.g. valves, for venting or aerating enclosures** (equalising valves F16K 17/00; arrangement or mounting in pipes or pipe systems F16L 55/07; venting or aerating as an additional function of steam traps or like apparatus F16T; ventilation of rooms, vehicles, see the appropriate subclass, e.g. F24F) **[2]**
24/02 . the enclosure being itself a valve, tap, or cock **[2]**
24/04 . for venting only (F16K 24/02 takes precedence) **[2]**
24/06 . for aerating only (F16K 24/02 takes precedence) **[2]**

Details

Note

Details not provided for in groups F16K 25/00 to F16K 51/00 are classified in groups F16K 1/00 to F16K 24/00.

25/00 **Details relating to contact between valve members and seats** (movement of valve members other than for opening and closing F16K 29/00; sealing constructions, see the appropriate groups according to the type of valve)
25/02 . Arrangements using fluid issuing from valve members or seats
25/04 . Arrangements for preventing erosion, not otherwise provided for

27/00 **Construction of housings** (methods for welding housings B23K); **Use of materials therefor**
27/02 . of lift valves (for reducing the flow resistance of screw-spindle lift-valves F16K 1/06)
27/04 . of sliding valves
27/06 . of taps or cocks
27/07 . of cutting-off parts of tanks, e.g. tank-cars **[4]**
27/08 . Guiding yokes for spindles; Means for closing housings; Dust caps, e.g. for tyre valves
27/10 . Welded housings
27/12 . Covers for housings

29/00 **Arrangements for movement of valve members other than for opening or closing the valve, e.g. for grinding-in, for preventing sticking**
29/02 . providing for continuous motion

31/00 **Operating means**; **Releasing devices**
31/02 . electric; magnetic
31/04 . . using a motor
31/05 . . . specially adapted for operating hand-operated valves or for combined motor and hand operation
31/06 . . using a magnet
31/08 . . . using a permanent magnet
31/10 . . . with additional mechanism between armature and closure member
31/11 . . . . with additional hand operating means **[2]**
31/12 . actuated by fluid (fluid-actuated check valves F16K 15/00; fluid-actuated safety valves F16K 17/00)
31/122 . . the fluid acting on a piston (F16K 31/143, F16K 31/163, F16K 31/363, F16K 31/383 take precedence) **[2]**
31/124 . . . servo actuated **[2]**
31/126 . . the fluid acting on a diaphragm, bellows, or the like (F16K 31/145, F16K 31/165, F16K 31/365, F16K 31/385 take precedence) **[2]**
31/128 . . . servo actuated **[2]**
31/14 . . for mounting on, or in combination with, hand-actuated valves
31/143 . . . the fluid acting on a piston
31/145 . . . the fluid acting on a diaphragm
31/16 . . with a mechanism, other than pulling- or pushing-rod, between fluid motor and closure member (with float F16K 31/18)
31/163 . . . the fluid acting on a piston
31/165 . . . the fluid acting on a diaphragm
31/18 . . actuated by a float (floats F16K 33/00; float-actuated valves in steam-traps F16T 1/20, in boilers F22D 5/08)
31/20 . . . actuating a lift valve
31/22 . . . . with the float rigidly connected to the valve
31/24 . . . . with a transmission with parts linked together from a single float to a single valve
31/26 . . . . . with the valve guided for rectilinear movement and the float attached to a pivoted arm
31/28 . . . . with two or more floats actuating one valve
31/30 . . . actuating a gate valve or sliding valve
31/32 . . . actuating a tap or cock
31/34 . . . acting on pilot valve controlling the cut-off apparatus
31/36 . . in which fluid from the conduit is constantly supplied to the fluid motor
31/363 . . . the fluid acting on a piston (F16K 31/38 takes precedence)

31/365 . . . the fluid acting on a diaphragm
31/38 . . . in which the fluid works directly on both sides of the fluid motor, one side being connected by means of a restricted passage and the motor being actuated by operating a discharge from that side (F16K 31/40 takes precedence)
31/383 . . . . the fluid acting on a piston
31/385 . . . . the fluid acting on a diaphragm
31/40 . . . with electrically-actuated member in the discharge of the motor
31/42 . . by means of electrically-actuated members in the supply or discharge conduits of the fluid motor (F16K 31/40 takes precedence)
31/44 . Mechanical actuating means
31/46 . . for remote operation
31/48 . . actuated by mechanical timing-device, e.g. with dash-pot (self-closing valves F16K 21/16)
31/50 . . with screw-spindle
31/52 . . with crank, eccentric, or cam
31/524 . . . with a cam
31/528 . . . with pin and slot
31/53 . . with toothed gearing
31/54 . . . with pinion and rack
31/56 . . without stable intermediate position, e.g. with snap action
31/58 . . comprising a movable discharge-nozzle
31/60 . . Handles
31/62 . . Pedals or like operating members, e.g. actuated by knee or hip
31/64 . responsive to temperature variation (dependant on excessive temperature F16K 17/38; control of fire-fighting equipment A62C 37/00; devices for preventing bursting of water pipes by freezing E03B 7/10) **[4]**
31/66 . . electrically or magnetically actuated, e.g. by magnets with variable magnetic characteristics **[4]**
31/68 . . actuated by fluid pressure or volumetric variation in a confined chamber **[4]**
31/70 . . mechanically actuated, e.g. by a bimetallic strip **[4]**
31/72 . Operating means or releasing devices specifically adapted to enhance the speed of valve response **[4]**

33/00 Floats for actuation of valves or other apparatus

35/00 Means to prevent accidental or unauthorised actuation

35/02 . to be locked or disconnected by means of a push or pull
35/04 . yieldingly resisting the actuation
35/06 . using a removable actuating or locking member, e.g. a key (F16K 35/10, F16K 35/12 take precedence)
35/08 . requiring setting according to a code, e.g. permutation locks
35/10 . with locking caps or locking bars
35/12 . with sealing wire
35/14 . interlocking two or more valves
35/16 . with locking member actuated by magnet

37/00 Special means in or on valves or other cut-off apparatus for indicating or recording operation thereof, or for enabling an alarm to be given

39/00 Devices for relieving the pressure on the sealing faces

39/02 . for lift valves
39/04 . for sliding valves
39/06 . for taps or cocks

41/00 Spindle sealings

41/02 . with stuffing-box
41/04 . . with at least one ring of rubber or like material between spindle and housing
41/06 . . with at least one ring attached to both spindle and housing
41/08 . . with at least one ring provided with axially-protruding peripheral closing-lip
41/10 . with diaphragm, e.g. shaped as bellows or tube
41/12 . . with approximately flat diaphragm
41/14 . with conical flange on the spindle which co-operates with a conical surface in the housing
41/16 . with a flange on the spindle which rests on a sealing ring
41/18 . . sealing only when the closure member is in the opened position

43/00 Auxiliary closure means in valves, which in case of repair, e.g. rewashering, of the valve, can take over the function of the normal closure means; **Devices for temporary replacement of parts of valves for the same purpose**

47/00 Means in valves for absorbing fluid energy (for pipes F16L 55/00)

47/02 . for preventing water-hammer or noise
47/04 . for decreasing pressure, the throttle being incorporated in the closure member
47/06 . . with a throttle in the form of a helical channel
47/08 . for decreasing pressure and having a throttling member separate from the closure member
47/10 . . in which the medium in one direction must flow through the throttling channel, and in the other direction may flow through a much wider channel parallel to the throttling channel
47/12 . . the throttling channel being of helical form
47/14 . . the throttling member being a perforated membrane
47/16 . . the throttling member being a cone

49/00 Means in or on valves for heating or cooling (for pipes F16L 53/00; thermal insulation in connection with pipes or pipe systems F16L 59/16)

51/00 Other details not peculiar to particular types of valves or cut-off apparatus

51/02 . specially adapted for high-vacuum installations **[2]**

99/00 Subject matter not provided for in other groups of this subclass [8]

F16L PIPES; JOINTS OR FITTINGS FOR PIPES; SUPPORTS FOR PIPES, CABLES OR PROTECTIVE TUBING; MEANS FOR THERMAL INSULATION IN GENERAL

(1) In this subclass, the following terms are used with the meanings indicated:
– "pipe" means a conduit of closed cross-section, which is specially adapted to convey fluids, materials or objects;
– "hose" means a pipe, as defined above, which has flexibility as an essential characteristic. **[5]**

(2) Attention is drawn to the following places:

A61M	39/00	Tube connectors, tube couplings or branch units, specially adapted for medical use
B05B	1/20	Perforated pipes
B63B	35/03	Pipe-laying vessels
B64D	39/04	Adaptation of hose constructions for refuelling aircraft during flight
B67D	7/38	Arrangements of hoses in apparatus for transferring liquids, e.g. fuel, from bulk to vehicles or portable containers
E01D	19/10	Fastening of pipes or cables to bridges
E03B		Water supply installations
E03D	11/17	Means for connecting water-closet bowls to the flushing pipe
E03D	11/18	Siphons for water-closets
E03F	3/04	Pipes or fittings specially adapted to sewers
E04D	13/08	Down pipes for roof drainage; Clamping means therefor
E04F	17/00	Vertical ducts, channels in buildings, e.g. chimneys
E21F	1/04	Air ducts for ventilation of mines or tunnels; Connections therefor
E21F	17/02	Suspension devices for tubes or the like in mines or tunnels
F01N		Gas flow silencers or exhaust apparatus for machines or engines
F16N	21/00	Conduits, junctions for lubrication systems
F17C	3/02	Thermal insulation of vessels not under pressure for storing liquified or solidified gases, e.g. Dewar flask
F22B	37/10	Water tubes of steam boilers
F23J	13/04	Joints, connections for chimneys or flues
F24H	9/12	Connecting circulation pipes to heaters
F28F	9/04	Arrangements for sealing elements into header boxes or end plates of heat-exchangers
G21C	15/22	Structural association of coolant tubes with headers or other pipes in nuclear reactors
H02G	3/04	Protective tubing or conduits for electric cables
H02G	3/30	Installations of electric cables or lines on walls, floors or ceilings
H02G	3/36	Installations of electric cables or lines in walls, floors or ceilings

Subclass index

1/00 **Laying or reclaiming pipes**; **Repairing or joining pipes on or under water** (soldering or welding B23K; lifting-gear and load-engaging elements B66; hydraulic installations, soil drainage E02B; excavations or underwater constructions E02D; machines for digging trenches in combination with pipe-assembly E02F; laying sewer pipes E03F 3/06; in earth boreholes or wells E21B; tunnelling E21D; laying electric, or combined optical and electric, cables H02G; making special pipe joints, see the relevant groups for the joints) **[2,5,6]**

1/024 . Laying or reclaiming pipes on land, e.g. above the ground (F16L 1/12 takes precedence) **[5]**

1/026 . . in or on a frozen surface **[6]**

1/028 . . in the ground (F16L 1/026 takes precedence) **[5,6]**

1/032 . . . the pipes being continuous (F16L 1/038 takes precedence) **[5,6]**

1/036 . . . the pipes being composed of sections of short length (F16L 1/038 takes precedence) **[5,6]**

1/038 . . . the pipes being made in situ **[6]**

1/06 . . Accessories therefor, e.g. anchors **[5]**

1/09 . . . for bringing two tubular members closer to each other **[6]**

1/10 . . . for aligning **[5]**

1/11 . . . for the detection or protection of pipes in the ground **[6]**

1/12 . Laying or reclaiming pipes on or under water (buoyant hoses F16L 11/133) **[5]**

1/14 . . between the surface and the bottom **[5]**

1/15 . . . vertically **[6]**

1/16 . . on the bottom **[5]**

1/18 . . . the pipes being S- or J-shaped and under tension during laying **[5]**

1/19 . . . . the pipes being J-shaped **[6]**

1/20 . . Accessories therefor, e.g. floats, weights (buoys B63B 22/00) **[5]**

1/225 . . . Stingers **[6]**

1/23 . . . Pipe tensioning apparatus **[6]**

1/235 . . . Apparatus for controlling the pipe during laying **[6]**

1/24 . . . Floats; Weights **[5]**

1/26 . Repairing or joining pipes on or under water (buoyant hoses F16L 11/133; joints per se F16L 13/00 to F16L 49/00) **[5]**

3/00 **Supports for pipes, cables or protective tubing, e.g. hangers, holders, clamps, cleats, clips, brackets** (anchors for holding pipes on or under the ground F16L 1/06; noise absorbers in the form of specially adapted hangers or supports F16L 55/035; arrangements specially adapted for supporting insulated bodies F16L 59/12) **[5,7]**

3/01 . for supporting or guiding the pipes, cables or protective tubing, between relatively movable points, e.g. movable channels (hauling- or hoisting-chains with arrangements for holding electric cables, hoses or the like F16G 13/16) **[5]**

3/015 . . using articulated- or supple-guiding elements (arrangements for cranes of means for transmitting pneumatic, hydraulic or electric power to movable parts or devices B66C 13/12) **[6]**

3/02 . partly surrounding the pipes, cables or protective tubing (bands or chains F16L 3/14)

3/04 . . and pressing it against a wall or other support

3/06 . . with supports for wires

3/08 . substantially surrounding the pipe, cable or protective tubing

3/10 . . divided, i.e. with two members engaging the pipe, cable or protective tubing

3/11 . . . and hanging from a pendant (F16L 3/14 takes precedence) **[5]**

3/12 . . comprising a member substantially surrounding the pipe, cable or protective tubing

3/123 . . . and extending along the attachment surface **[5]**

3/127 . . . and extending away from the attachment surface **[5]**

3/13 . . . and engaging it by snap action **[5]**

3/133 . . . and hanging from a pendant (F16L 3/14 takes precedence) **[5]**

3/137 . . . and consisting of a flexible band **[5]**

3/14 . Hangers in the form of bands or chains

3/16 . with special provision allowing movement of the pipe (F16L 3/01 takes precedence; supporting pipes or cables inside other pipes or sleeves F16L 7/00) **[5]**

3/18 . . allowing movement in axial direction

3/20 . . allowing movement in transverse direction

3/202 . . . the transverse movement being converted to a rotational movement (F16L 3/215 takes precedence) **[6]**

3/205 . . . having supporting springs **[5]**

3/21 . . . . providing constant supporting spring force **[5]**

3/215 . . . the movement being hydraulically or electrically controlled **[5]**

3/217 . . . . hydraulically **[6]**

3/22 . specially adapted for supporting a number of parallel pipes at intervals **[6]**

3/223 . . each support having one transverse base for supporting the pipes (F16L 3/23, F16L 3/237 take precedence) **[6]**

3/227 . . . each pipe being supported by a separate element fastened to the base **[6]**

3/23 . . for a bundle of pipes or a plurality of pipes placed side by side in contact with each other (F16L 3/237 takes precedence) **[6]**

3/233 . . . by means of a flexible band **[6]**

3/237 . . for two pipes **[6]**

3/24 . with special member for attachment to profiled girders

3/26 . specially adapted for supporting the pipes all along their length, e.g. pipe channels or ducts **[6]**

5/00 **Devices for use where pipes, cables or protective tubing pass through walls or partitions** (installations of electric cables or lines through walls, floors or ceilings H02G 3/22)

5/02 . Sealing

Note

Group F16L 5/14 takes precedence over groups F16L 5/04 to F16L 5/12. **[6]**

5/04 . . to form a firebreak device **[6]**

5/06 . . by means of a swivel nut compressing a ring or sleeve **[6]**

5/08 . . by means of axial screws compressing a ring or sleeve **[6]**

5/10 . . by using sealing rings or sleeves only **[6]**

5/12 . . the pipe being cut in two pieces **[6]**

5/14 . . for double-walled or multi-channel pipes **[6]**

7/00 **Supporting pipes or cables inside other pipes or sleeves, e.g. for enabling pipes or cables to be inserted or withdrawn from under roads or railways without interruption of traffic** (sleeves for supporting pipes, cables or protective tubing, between relatively movable points F16L 3/01) **[5]**

7/02 . and sealing the pipes or cables inside the other pipes, cables or sleeves **[6]**

Pipes

9/00 **Rigid pipes**

9/01 . of wood (F16L 9/16 to F16L 9/22 take precedence) **[6]**

9/02 . of metal (F16L 9/16 to F16L 9/22 take precedence; finned pipes F28F)

9/04 . . Reinforced pipes

9/06 . . Corrugated pipes

9/08 . of concrete, cement, or asbestos cement, with or without reinforcement (F16L 9/16 to F16L 9/22 take precedence)

9/10 . of glass or ceramics, e.g. clay, clay tile, porcelain (F16L 9/16 to F16L 9/22 take precedence)

9/12 . of plastics with or without reinforcement (F16L 9/16 to F16L 9/22 take precedence)

9/127 . . the walls consisting of a single layer **[5]**

9/128 . . . Reinforced pipes **[6]**

9/133 . . the walls consisting of two layers **[5]**

9/14 . Compound tubes, i.e. made of materials not wholly covered by any one of the preceding groups (F16L 9/16 to F16L 9/22 take precedence)

9/147 . . comprising only layers of metal and plastics with or without reinforcement **[6]**

9/153 . . comprising only layers of metal and concrete with or without reinforcement **[6]**

9/16 . wound from sheets or strips, with or without reinforcement

9/17 . obtained by bending a sheet longitudinally and connecting the edges **[6]**

9/18 . Double-walled pipes; Multi-channel pipes or pipe assemblies (joints therefor F16L 39/00)

9/19 . . Multi-channel pipes or pipe assemblies **[4]**

9/21 . made of sound-absorbing materials or with sound-absorbing structure **[7]**

9/22 . Pipes composed of a plurality of segments

11/00 **Hoses, i.e. flexible pipes** (hose-like supports for pipes, cables or protective tubing, between relatively movable points F16L 3/01; suction-cleaner hoses A47L 9/24) **[5]**

11/02 . made of fibres or threads, e.g. of textile

11/04 . made of rubber or flexible plastics

11/06 . . with homogeneous wall (F16L 11/11 takes precedence) **[2]**

11/08 . . with reinforcements embedded in the wall (F16L 11/11 takes precedence) **[2]**

11/10 . . with reinforcements not embedded in the wall (F16L 11/11 takes precedence) **[2]**

11/11 . . with corrugated wall **[2]**

11/112 . . . having reinforcements embedded in the wall **[5]**

11/115 . . . having reinforcements not embedded in the wall **[5]**

11/118 . . . having arrangements for particular purposes, e.g. electrically conducting **[5]**

11/12 . . with arrangements for particular purposes, e.g. specially profiled, with protecting layer, heated, electrically conducting (F16L 11/11 takes precedence) **[2]**

11/127 . . . electrically conducting **[5]**

11/133 . . . buoyant **[5]**

11/14 . made of rigid material, e.g. metal or hard plastics

11/15 . . corrugated (F16L 11/16 takes precedence) **[5]**

11/16 . . wound from profiled strips or bands

11/18 . . Articulated hoses, e.g. composed of a series of rings

11/20 . Double-walled hoses **[5]**

11/22 . Multi-channel hoses **[5]**

11/24 . wound from strips or bands (F16L 11/16 takes precedence) **[5]**

11/26 . made of sound-absorbing materials or with sound-absorbing structure **[7]**

Pipe joints; **Hose nipples** **[2]**

13/00 **Non-disconnectable pipe joints, e.g. soldered, adhesive, or caulked joints** (joints for rigid pipes of plastics F16L 47/00)

13/007 . specially adapted for joining pipes of dissimilar materials **[5]**

13/013 . . Accessories therefor **[5]**

13/02 . Welded joints

13/04 . . with arrangements preventing overstressing

13/06 . . . with tension-relief of the weld by means of detachable members, e.g. divided tensioning rings, bolts in flanges

13/08 . Soldered joints

13/10 . Adhesive or cemented joints

13/11 . . using materials which fill the space between parts of a joint before hardening **[2]**

13/12 . with a seal made of lead, caulked packing, or the like

13/14 . made by plastically deforming the material of the pipe, e.g. by flanging, rolling

13/16 . . the pipe joint consisting of overlapping extremities having mutually co-operating collars **[5]**

15/00 **Screw-threaded joints** (casing joints used in deep-drilling E21B 17/08; joints sealed primarily by means other than engagement of screw-threads, see the relevant groups characterised by the sealing arrangements); **Forms of screw-threads for such joints**

15/02 . allowing substantial longitudinal adjustment by the use of a long screw-threaded part

15/04 . with additional sealings **[2]**

15/06 . characterised by the shape of the screw-thread **[5]**

15/08 . with supplementary elements (F16L 15/04 takes precedence) **[5]**

17/00 **Joints with packing adapted to sealing by fluid pressure** (compensating devices F16L 51/00)

17/02 . with sealing rings arranged between outer surface of pipe and inner surface of sleeve or socket

17/025 . . the sealing rings having radially directed ribs **[5]**

17/03 . . having annular axial lips **[2]**

17/035 . . . the sealing rings having two lips parallel to each other **[5]**

17/04 . . with longitudinally split or divided sleeve

17/06 . with sealing rings arranged between the end surfaces of the pipes or flanges or arranged in recesses in the pipe ends or flanges

17/067 . . Plastics sealing rings **[6]**

17/073 . . . the sealing rings having two lips parallel to each other **[6]**

17/08 . . Metal sealing rings **[5]**
17/10 . the packing being sealed by the pressure of a fluid other than the fluid in or surrounding the pipe (expansion-compensation arrangements for pipe-lines F16L 51/00) **[5]**

19/00 **Joints in which sealing surfaces are pressed together by means of a member, e.g. a swivel nut, screwed on, or into, one of the joint parts** (F16L 17/00 takes precedence; if using bolts or equivalent connecting means F16L 23/00; connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00)
19/02 . Pipe ends provided with collars or flanges, integral with the pipe or not, pressed together by a screwed member
19/025 . . the pipe ends having integral collars or flanges **[5]**
19/028 . . . the collars or flanges being obtained by deformation of the pipe wall **[6]**
19/03 . . with flexible sealing rings between the sealing surfaces **[2]**
19/04 . using additional rigid rings, sealing directly on at least one pipe end, which is flared either before or during the making of the connection
19/05 . . with a rigid pressure ring between the screwed member and the exterior of the flared pipe end **[5]**
19/06 . in which radial clamping is obtained by wedging action on non-deformed pipe ends
19/065 . . the wedging action being effected by means of a ring **[5]**
19/07 . . adapted for use in socket or sleeve connections **[2]**
19/075 . . specially adapted for spigot-and-socket joints **[5]**
19/08 . with metal rings which bite into the wall of the pipe
19/10 . . the profile of the ring being altered **[5]**
19/12 . . . with additional sealing means **[5]**
19/14 . . . the rings being integral with one of the connecting parts **[6]**

21/00 **Joints with sleeve or socket** (F16L 13/00, F16L 17/00, F16L 19/00 take precedence; connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00; specially adapted for pipes of brittle material F16L 49/00)
21/02 . with elastic sealing rings between pipe and sleeve or between pipe and socket, e.g. with rolling or other prefabricated profiled rings (F16L 21/06, F16L 21/08 take precedence; if adjustability is essential F16L 27/00)
21/025 . . Rolling sealing rings **[5]**
21/03 . . placed in the socket before connection (F16L 21/025 takes precedence) **[5]**
21/035 . . placed around the spigot end before connection (F16L 21/025 takes precedence) **[5]**
21/04 . . in which sealing rings are compressed by axially-movable members
21/05 . . comprising a first ring being placed on a male part and a second ring in the sleeve or socket **[6]**
21/06 . with a divided sleeve or ring clamping around the pipe ends (flanged joints F16L 23/00; couplings of the quick-acting type F16L 37/00)
21/08 . with additional locking means (F16L 21/06 takes precedence; couplings of the quick-acting type F16L 37/00)

23/00 **Flanged joints** (F16L 13/00, F16L 17/00, F16L 19/00 take precedence; adjustable joints F16L 27/00; for hoses F16L 33/00; couplings of the quick-acting type F16L 37/00; for double-walled or multi-channel pipes, or pipe assemblies F16L 39/00; connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00; specially adapted for pipes of brittle material F16L 49/00)
23/02 . the flanges being connected by members tensioned axially (F16L 23/12 takes precedence) **[2,5]**
23/024 . . characterised by how the flanges are joined to, or form an extension of, the pipes **[5]**
23/026 . . . by welding **[6]**
23/028 . . . the flanges being held against a shoulder **[5]**
23/032 . . characterised by the shape or composition of the flanges **[5]**
23/036 . . characterised by the tensioning members, e.g. specially adapted bolts or C-clamps **[5]**
23/04 . the flanges being connected by members tensioned in the radial plane (F16L 23/12 takes precedence) **[2,5]**
23/06 . . connected by toggle-action levers (quick acting couplings tightened by toggle-action levers F16L 37/20) **[5]**
23/08 . . connection by tangentially arranged pin and nut **[5]**
23/10 . . . with a pivoting or swinging pin **[5]**
23/12 . specially adapted for particular pipes **[5]**
23/14 . . for rectangular pipes **[5]**
23/16 . characterised by the sealing means **[5]**
23/18 . . the sealing means being rings **[6]**
23/20 . . . made exclusively of metal **[6]**
23/22 . . . made exclusively of a material other than metal **[6]**
23/24 . . specially adapted for unequal expansion of the parts of the joint **[6]**

25/00 **Construction or details of pipe joints not provided for in, or of interest apart from, groups F16L 13/00 to F16L 23/00** (adjustable or allowing movement F16L 27/00; with fluid cut-off means F16L 29/00; quick-acting F16L 37/00; for double-walled or multi-channel pipes F16L 39/00; connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00; specially adapted for pipes of brittle material F16L 49/00)
25/01 . specially adapted for realising electrical conduction between the two pipe ends of the joint or between parts thereof (electrically-conductive connections between or with tubular conductors H01R 4/60) **[7]**
25/02 . specially adapted for electrically insulating the two pipe ends of the joint from each other **[2]**
25/03 . . in non-disconnectable pipe joints **[7]**
25/04 . comprising a collar or ring having a threaded pin rigid with the pipe-encircling member **[5]**
25/06 . comprising radial locking means **[5]**
25/08 . . in the form of screws, nails or the like **[6]**
25/10 . Sleeveless joints between two pipes, one being introduced into the other **[7]**
25/12 . Joints for pipes being spaced apart axially **[7]**
25/14 . Joints for pipes of different diameters or cross-section **[7]**

27/00 **Adjustable joints**; **Joints allowing movement** (of the quick-acting type F16L 37/50; for double-walled or multi-channel pipes or pipe assemblies F16L 39/04; swivel joints in hose lines used for flushing boreholes E21B 21/02) **[5]**

27/02 . Universal joints, i.e. with mechanical connection allowing angular movement or adjustment of the axes of the parts in any direction

27/04 . . with partly-spherical engaging surfaces

27/047 . . . held in place by a screwed member having an internal spherical surface **[5]**

27/053 . . . held in place by bolts passing through flanges **[5]**

27/06 . . . with special sealing means between the engaging surfaces

27/067 . . . . the sealing means being actuated by the medium pressure **[5]**

27/073 . . . . one of the cooperating surfaces forming the sealing means **[5]**

27/08 . allowing adjustment or movement only about the axis of one pipe

27/087 . . Joints with radial fluid passages **[6]**

27/093 . . . of the "banjo" type, i.e. pivoting right-angle couplings **[6]**

27/10 . comprising a flexible connection only

27/103 . . in which a flexible element, e.g. a rubber-metal laminate, which undergoes constraints consisting of shear and flexure, is sandwiched between partly curved surfaces **[6]**

27/107 . . the ends of the pipe being interconnected by a flexible sleeve **[5]**

27/108 . . . the sleeve having the form of a bellows with only one corrugation **[6]**

27/11 . . . the sleeve having the form of a bellows with multiple corrugations **[6]**

27/111 . . . . the bellows being reinforced **[6]**

27/113 . . the ends of the pipe being interconnected by a rigid sleeve **[5]**

27/12 . allowing substantial longitudinal adjustment or movement (by use of screw-thread F16L 15/02)

29/00 **Joints with fluid cut-off means** (quick-acting joints with cut-off means F16L 37/28)

29/02 . with a cut-off device in one of the two pipe ends, the cut-off device being automatically opened when the coupling is applied **[5]**

29/04 . with a cut-off device in each of the two pipe ends, the cut-off devices being automatically opened when the coupling is applied **[5]**

31/00 **Arrangements for connecting hoses to one another or to flexible sleeves** (F16L 33/00 takes precedence)

31/02 . for branching hoses **[6]**

33/00 **Arrangements for connecting hoses to rigid members** (hand tools for inserting fittings into hoses B25B 27/10); **Rigid hose-connectors, i.e. single members engaging both hoses** (connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00)

Note

Groups F16L 33/01 and F16L 33/26 take precedence over other subgroups **[7]**

33/01 . specially adapted for hoses having a multi-layer wall **[2]**

33/02 . Hose-clips

33/025 . . tightened by deforming radially extending loops or folds **[7]**

33/03 . . Self-locking elastic clips **[7]**

33/035 . . fixed by means of teeth or hooks **[7]**

33/04 . . tightened by tangentially-arranged threaded pin and nut

33/06 . . . in which the threaded pin is rigid with the hose-encircling member

33/08 . . in which a worm coacts with a part of the hose-encircling member that is toothed like a worm-wheel

33/10 . . with a substantially-radial tightening member

33/12 . . with a pivoted or swinging tightening or securing member, e.g. toggle lever

33/14 . . with a taping-bolt, i.e. winding up the end of the hose-encircling member

33/16 . with sealing or securing means using fluid pressure

33/18 . characterised by the use of additional sealing means

33/20 . Undivided rings, sleeves, or like members contracted on the hose or expanded inside the hose by means of tools; Arrangements using such members

33/207 . . only a sleeve being contracted on the hose **[5]**

33/213 . . only a sleeve being expanded inside the hose **[5]**

33/22 . with means not mentioned in the preceding groups for gripping the hose between inner and outer parts

33/23 . . the outer parts being segmented, the segments being pressed against the hose by tangentially arranged members **[2]**

33/24 . with parts screwed directly on or into the hose (F16L 33/22 takes precedence)

33/26 . specially adapted for hoses made of metal

33/28 . for hoses with one end terminating in a radial flange or collar **[5]**

33/30 . comprising parts inside the hoses only (F16L 33/24 takes precedence) **[7]**

33/32 . comprising parts outside the hoses only (F16L 33/24 takes precedence) **[7]**

33/34 . with bonding obtained by vulcanisation, gluing, melting, or the like **[7]**

35/00 **Special arrangements used in connection with end fittings of hoses, e.g. safety or protecting devices**

37/00 **Couplings of the quick-acting type** (radially-binding sleeves F16L 17/04, F16L 21/06; connecting hoses to rigid members F16L 33/00; connections made automatically when vehicles are brought together B60D, B61G; specially adapted for lubricating devices F16N 21/00)

37/02 . in which the connection is maintained only by friction of the parts being joined (F16L 37/22 takes precedence)

37/04 . . with an elastic outer part pressing against an inner part by reason of its elasticity (with locking members F16L 37/08)

37/05 . . . tightened by the pressure of a mechanical organ **[5]**

37/06 . . . tightened by fluid pressure

37/08 . in which the connection between abutting or axially-overlapping ends is maintained by locking members (F16L 37/22 to F16L 37/26 take precedence)

37/084 . . combined with automatic locking **[5]**

37/086 . . . by means of latching members pushed radially by spring-like elements **[7]**

37/088 . . . by means of a split elastic ring **[5]**

37/091 . . . by means of a ring provided with teeth or fingers **[7]**

37/092 . . . by means of elements wedged between the pipe and the frusto-conical surface of the body of the connector **[5]**
37/096 . . . by means of hooks hinged about an axis **[5]**
37/098 . . . by means of flexible hooks **[7]**
37/10 . . using a rotary external sleeve or ring on one part
37/107 . . . Bayonet-type couplings **[7]**
37/113 . . . the male part having lugs on its periphery penetrating into the corresponding slots provided in the female part **[7]**
37/12 . . using hooks, pawls, or other movable or insertable locking members (F16L 37/084 takes precedence) **[5]**
37/124 . . . using bolts, fixed to a flange, which are able to tilt in slots of another flange, and being maintained there by the tightening of nuts **[7]**
37/127 . . . using hooks hinged about an axis **[5]**
37/133 . . . using flexible hooks **[5]**
37/138 . . . using an axially movable sleeve **[7]**
37/14 . . . Joints secured by inserting between mating surfaces an element, e.g. a piece of wire, a pin, a chain
37/15 . . . . the element being a wedge **[7]**
37/16 . . . Joints tightened by the action of wedge-shaped hinged hooks
37/18 . . . Joints tightened by eccentrics or rotatable cams
37/20 . . . Joints tightened by toggle-action levers
37/22 . in which the connection is maintained by means of balls, rollers, or helical springs under radial pressure between the parts
37/23 . . by means of balls **[5]**
37/24 . in which the connection is made by inserting one member axially into the other and rotating it to a limited extent, e.g. with bayonet-action
37/244 . . the coupling being co-axial with the pipe **[5]**
37/248 . . . Bayonet-type couplings **[5]**
37/252 . . . the male part having lugs on its periphery penetrating into the corresponding slots provided in the female part **[5]**
37/256 . . the coupling not being coaxial with the pipe **[5]**
37/26 . in which the connection is made by transversely moving the parts together, with or without their subsequent rotation
37/28 . with fluid cut-off means
37/30 . . with fluid cut-off means in each of two pipe-end fittings **[5]**
37/32 . . . at least one of two lift valves being opened automatically when the coupling is applied **[5]**
37/33 . . . . the lift valves being of the ball type **[7]**
37/34 . . . . at least one of the lift valves being of the sleeve type, i.e. a sleeve being telescoped over an inner cylindrical wall **[5]**
37/35 . . . . at least one of the valves having an axial bore communicating with lateral apertures **[7]**
37/36 . . . with two lift valves being actuated to initiate the flow through the coupling after the two coupling parts are locked against withdrawal **[5]**
37/367 . . . with two gate valves or sliding valves **[7]**
37/373 . . . with two taps or cocks **[7]**
37/38 . . with fluid cut-off means in only one of two pipe-end fittings **[5]**
37/40 . . . with a lift valve being opened automatically when the coupling is applied **[5]**
37/407 . . . . the lift valve being of the ball type **[7]**
37/413 . . . . the lift valve being of the sleeve type, i.e. a sleeve being telescoped over an inner cylindrical wall **[7]**
37/42 . . . . the valve having an axial bore communicating with lateral apertures **[5]**
37/44 . . . with one lift valve being actuated to initiate the flow through the coupling after the two coupling parts are locked against withdrawal **[5]**
37/46 . . . with a gate valve or sliding valve **[5]**
37/47 . . . with a tap or cock **[7]**
37/48 . for fastening a pipe on the end of a tap **[5]**
37/50 . adjustable; allowing movement of the parts joined **[5]**
37/52 . . Universal joints, i.e. with a mechanical connection allowing angular movement or adjustment of the axes of the parts in any direction **[5]**
37/53 . . allowing adjustment or movement only about the axis of one pipe **[7]**
37/54 . . for pipes under pressure which are supported only on one side **[5]**
37/56 . for double-walled or multi-channel pipes **[5]**
37/58 . the extremities of the two halves of the joint being pressed against each other without being locked in position **[5]**
37/60 . with plug and fixed wall housing **[7]**
37/62 . pneumatically or hydraulically actuated **[7]**

39/00 Joints or fittings for double-walled or multi-channel pipes or pipe assemblies

39/02 . for hoses
39/04 . allowing adjustment or movement
39/06 . of the multiline swivel type, e.g. comprising a plurality of axially mounted modules **[7]**

41/00 Branching pipes; **Joining pipes to walls** (F16L 39/00 takes precedence; connections not designed for conveying fluid F16B 9/00; joints suitable for connecting together pipe ends, see the relevant groups)

41/02 . Branch units, e.g. made in one piece, welded, riveted
41/03 . . comprising junction pieces for four or more pipe members **[5]**
41/04 . Tapping pipe walls, i.e. making connections through the walls of pipes while they are carrying fluids; Fittings therefor (apparatus or operations relating to metal-working steps, see the relevant classes for metal-working)
41/06 . . making use of attaching means embracing the pipe
41/08 . Joining pipes to walls or pipes, the joined pipe axis being perpendicular to the plane of a wall or to the axis of another pipe (F16L 41/02 takes precedence) **[2]**
41/10 . . the extremity of the pipe being screwed into the wall **[5]**
41/12 . . using attaching means embracing the pipe **[5]**
41/14 . . by screwing an intermediate part against the inside or outside of the wall **[5]**
41/16 . . the branch pipe comprising fluid cut-off means **[5]**
41/18 . the branch pipe being movable **[7]**

43/00 Bends; **Siphons** (with cleaning apertures F16L 45/00; siphons for water-closets E03D 11/18; siphons in general F04F 10/00)

43/02 . adapted to make use of special securing means

45/00 Pipe units with cleaning aperture and closure therefor

47/00 **Connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics** (packing, for joints, adapted to sealing by fluid pressure F16L 17/00)

47/02 . Welded joints; Adhesive joints

47/03 . . Welded joints with an electrical resistance incorporated in the joint **[7]**

47/04 . with a swivel nut or collar engaging the pipe **[2]**

47/06 . with sleeve or socket formed by or in the pipe end **[2]**

47/08 . . with sealing rings arranged between the outer surface of one pipe end and the inner surface of the sleeve or socket, the sealing rings being placed previously in the sleeve or socket **[7]**

47/10 . . . the sealing rings being maintained in place by additional means **[7]**

47/12 . . with additional locking means **[7]**

47/14 . Flanged joints **[7]**

47/16 . Screw-threaded joints **[7]**

47/18 . Adjustable joints; Joints allowing movement **[7]**

47/20 . based principally on specific properties of plastics **[7]**

47/22 . . using shrink-down material **[7]**

47/24 . . for joints between metal and plastics pipes **[7]**

47/26 . for branching pipes; for joining pipes to walls; Adaptors therefor **[7]**

47/28 . . Joining pipes to walls or to other pipes, the axis of the joined pipe being perpendicular to the wall or to the axis of the other pipe **[7]**

47/30 . . . using attaching means embracing the pipe **[7]**

47/32 . . Branch units, e.g. made in one piece, welded, riveted **[7]**

47/34 . . Tapping pipes, i.e. making connections through walls of pipes while carrying fluids; Fittings therefor **[7]**

49/00 **Connecting arrangements, e.g. joints, specially adapted for pipes of brittle material, e.g. glass, earthenware**

49/02 . Joints with a sleeve or socket **[5]**

49/04 . Flanged joints **[5]**

49/06 . Joints in which sealing surfaces are pressed together by means of a member, e.g. swivel nut, screwed on, or into, one of the joint parts **[7]**

49/08 . Adjustable joints; Joints allowing movement **[7]**

51/00 **Expansion-compensation arrangements for pipe-lines** (telescopic pipes F16L 27/12)

51/02 . making use of a bellows or an expansible folded or corrugated tube

51/03 . . comprising two or more bellows **[5]**

51/04 . making use of bends, e.g. lyre-shaped

53/00 **Heating or cooling pipes or pipe systems** (preventing freezing of pipes, thawing frozen pipes E03B 7/12, E03B 7/14; pipe-line systems, pipe-lines F17D)

55/00 **Devices or appurtenances for use in, or in connection with, pipes or pipe systems** (F16L 1/00 to F16L 53/00, F16L 57/00, F16L 59/00 take precedence; repairing or joining pipes on or under water F16L 1/26; nozzles B05B; cleaning of pipes B08B 9/02, e.g. removal of blockages B08B 9/027; devices for preventing bursting of water pipes by freezing E03B 7/10; for domestic plumbing installations E03C 1/00; arrangements for sealing leaky tubes or conduits of heat-exchangers F28F 11/00)

55/02 . Energy absorbers; Noise absorbers (in valves F16K 47/00)

55/027 . . Throttle passages (influencing fluid flow F15D 1/00; control of fluid flow G05D 7/00) **[5]**

55/033 . . Noise absorbers (F16L 55/027 takes precedence) **[5]**

55/035 . . . in the form of specially adapted hangers or supports **[7]**

55/04 . Devices damping pulsations or vibrations in fluids

55/045 . . specially adapted to prevent or minimise the effects of water hammer **[5]**

55/05 . . . Buffers therefor (accumulators F15B 1/04) **[5]**

55/052 . . . . Pneumatic reservoirs **[7]**

55/053 . . . . . the gas in the reservoir being separated from the fluid in the pipe **[7]**

55/054 . . . . . the reservoir being placed in or around the pipe from which it is separated by a sleeve-shaped membrane **[7]**

55/055 . . . Valves therefor **[5]**

55/07 . Arrangement or mounting of devices, e.g. valves, for venting or aerating or draining (arrangement of draining devices in water-supply systems E03B 7/08; apparatus for draining F16K, F16T; venting or aerating devices per se F16K 24/00) **[2]**

55/09 . Air-conditioning, e.g. de-watering, in pneumatic systems (in general F24)

55/10 . Means for stopping flow in pipes or hoses (F16L 29/00, F16L 37/28 take precedence; for covering leaks F16L 55/16; valves F16K) **[1,7]**

55/103 . . by temporarily freezing liquid sections in the pipe **[7]**

55/105 . . Closing devices introduced radially into the pipe or hose **[5]**

55/11 . . Plugs **[5]**

55/115 . . Caps **[5]**

55/12 . . by introducing into the pipe a member expandable in situ (inflatable cut-off valves F16K 7/10)

55/124 . . . introduced radially into the pipe or hose **[5]**

55/128 . . . introduced axially into the pipe or hose **[5]**

55/13 . . . . the closure device being a plug fixed by plastic deformation **[7]**

55/132 . . . . the closure device being a plug fixed by radially deforming the packing **[5]**

55/134 . . . . . by means of an inflatable packing **[7]**

55/136 . . . . the closure device being a plug fixed by radially expanding or deforming a split ring, hooks or the like **[5]**

55/16 . Devices for covering leaks in pipes or hoses, e.g. hose-menders **[1,7]**

55/162 . . from inside the pipe (specially adapted for bends, branch units, branching pipes, or the like F16L 55/179) **[5,7]**

55/163 . . . a ring, a band or a sleeve being pressed against the inner surface of the pipe **[7]**

55/164 . . . a sealing fluid being introduced in the pipe (F16L 55/1645 takes precedence) **[7]**

55/1645 . . . a sealing material being introduced inside the pipe by means of a tool moving in the pipe **[7]**

55/165 . . . a pipe being inserted in the damaged section **[5,7]**

55/168 . . from outside the pipe (specially adapted for bends, branch units, branching pipes, or the like F16L 55/179) **[5,7]**

55/17 . . . by means of rings, bands or sleeves pressed against the outside surface of the pipe or hose (hose-clips for connecting hoses to rigid members F16L 33/02) **[5,7]**

55/172 . . . . the ring, band or sleeve being tightened by a tangentially arranged threaded pin and a nut **[5,7]**

55/175 . . . by using materials which fill a space around the pipe before hardening **[5,7]**

55/178 . . . by clamping an outer gasket against a joint with sleeve or socket **[5,7]**

55/179 . . specially adapted for bends, branch units, branching pipes or the like **[7]**

55/18 . Appliances for use in repairing pipes (F16L 55/10 takes precedence)

55/24 . Preventing accumulation of dirt or other matter in pipes, e.g. by traps, by strainers

55/26 . Pigs or moles, i.e. devices movable in a pipe or conduit with or without self-contained propulsion means (tunnel railway systems B61B 13/10; conveying articles through pipes or tubes, e.g. tube mail systems, B65G 51/00) **[5]**

(1) Pigs or moles specially adapted for particular applications are classified in the relevant places for the applications, e.g.
- stopping flow from or in pipes or hoses F16L 55/12;
- repairing pipes F16L 55/18;
- applying liquids or other fluent materials to the inside of tubes B05C 7/08;
- cleaning pipes or tubes or systems of pipes or tubes B08B 9/02;
- welding or cutting B23K 37/02;
- earth drilling E21B;
- cleaning chimneys F23J 3/02;
- cleaning internal or external surfaces of heat-exchange or heat-transfer conduits F28G;
- measuring, testing G01;
- inspection of vessels in nuclear reactors G21C 17/003;
- inspection or maintenance of pipe-lines or tubes in nuclear installations G21C 17/017;
- installing electric, or combined optical and electric, cables or lines H02G. **[5]**

(2) In this group, it is desirable to add the indexing codes of group F16L 101/00.

55/28 . . Constructional aspects **[6]**

55/30 . . . of the propulsion means, e.g. towed by cables **[6]**

55/32 . . . . being self-contained **[6]**

55/34 . . . . . the pig or mole being moved step by step **[6]**

55/36 . . . . . jet driven **[6]**

55/38 . . . . driven by fluid pressure **[6]**

55/40 . . . of the body **[6]**

55/42 . . . . gelled or degradable **[6]**

55/44 . . . . expandable **[6]**

55/46 . . Launching or retrieval of pigs or moles **[6]**

55/48 . . Indicating the position of the pig or mole in the pipe or conduit **[6]**

57/00 Protection of pipes or objects of similar shape against external or internal damage or wear (supporting of pipes inside other pipes or sleeves F16L 7/00; used in connection with end fittings of hoses F16L 35/00; protection of pipes or pipe fittings against corrosion or incrustation F16L 58/00; protection thereof during transport B65D, e.g. B65D 59/00)

57/02 . against cracking or buckling **[7]**

57/04 . against fire or other external sources of extreme heat **[7]**

57/06 . against wear (F16L 57/04 takes precedence) **[7]**

58/00 Protection of pipes or pipe fittings against corrosion or incrustation (supporting of pipes inside other pipes or sleeves F16L 7/00; compound tubes F16L 9/14; cleaning pipes or tubes B08B 9/02)

58/02 . by means of internal or external coatings (coatings for thermal insulation F16L 59/00; methods or machines for applying coatings, see the relevant places, e.g. B28B 21/94) **[2]**

58/04 . . Coatings characterised by the materials used (F16L 58/16 takes precedence; compositions, see the relevant classes, e.g. C04B) **[2]**

58/06 . . . by cement, concrete, or the like **[2]**

58/08 . . . by metal **[2]**

58/10 . . . by rubber or plastics **[2]**

58/12 . . . by tar or bitumen **[2]**

58/14 . . . by ceramic or vitreous materials **[2]**

58/16 . . the coating being in the form of a bandage (apparatus for covering cores by winding B65H 81/00) **[2]**

58/18 . specially adapted for pipe fittings **[2]**

59/00 Thermal insulation in general (heat, sound insulation in buildings E04B; heat insulation of steam engines F01B 31/08; heat insulation in rotary piston machines or engines F01C 21/06; heat insulation of pumps F04C 29/04; thermal insulation of pressure vessels F17C 1/12; vessels not under pressure, with provision for insulation F17C 3/02)

59/02 . Shape or form of insulating materials, with or without coverings integral with the insulating materials (chemical aspects, see the relevant classes)

59/04 . Arrangements using dry fillers, e.g. using slag wool

59/05 . . in prefabricated shells or covers **[2]**

59/06 . Arrangements using an air layer or vacuum

59/065 . . using vacuum (F16L 59/075 takes precedence) **[7]**

59/07 . . the air layer being enclosed by one or more layers of insulation **[7]**

59/075 . . the air layer or the vacuum being delimited by longitudinal channels distributed around the circumference of a tube **[7]**

59/08 . Means for preventing radiation, e.g. with metal foil

59/10 . Bandages or covers for the protection of the insulation, e.g. against the influence of the environment or against mechanical damage (integral with insulating materials F16L 59/02)

59/11 . . Rigid covers for elbows **[7]**

59/12 . Arrangements for supporting insulation from the wall or body insulated, e.g. by means of spacers between pipe and heat-insulating material; Arrangements specially adapted for supporting insulated bodies

59/125 . . Helical spacers **[7]**

59/13 . . Resilient supports **[7]**

59/135 . . Hangers or supports specially adapted for insulated pipes **[7]**

59/14 . Arrangements for the insulation of pipes or pipe systems (F16L 59/02 to F16L 59/12 take precedence)

59/147 . . the insulation being located inwardly of the outer surface of the pipe **[5]**

59/15 . . for underground pipes **[7]**

59/153 . . for flexible pipes **[5]**

59/16 . . Arrangements specially adapted to local requirements at flanges, junctions, valves, or the like (means in or on valves for heating or cooling F16K 49/00)

59/18 . . . adapted for joints **[5]**
59/20 . . . . for non-disconnectable joints **[5]**
59/21 . . . adapted for expansion-compensation devices **[7]**
59/22 . . . adapted for bends **[5]**

Indexing scheme associated with groups F16L 55/26 to F16L 55/48, relating to uses and applications of pigs or moles. [6]

101/00 Uses or applications of pigs or moles [6]
101/10 . Treating the inside of pipes **[6]**
101/12 . . Cleaning **[6]**
101/14 . . Drying **[6]**
101/16 . . Coating by application of fluent materials, e.g. painting **[6]**
101/18 . . Lining other than coating **[6]**
101/20 . Expelling gases or fluids **[6]**
101/30 . Inspecting, measuring or testing **[6]**
101/40 . Separating transported fluids **[6]**
101/50 . Pulling cables or the like **[6]**
101/60 . Stopping leaks **[6]**
101/70 . Drill-well operations **[6]**

F16M FRAMES, CASINGS, OR BEDS, OF ENGINES OR OTHER MACHINES OR APPARATUS, NOT SPECIFIC TO AN ENGINE, MACHINE, OR APPARATUS PROVIDED FOR ELSEWHERE; STANDS OR SUPPORTS

Note

Attention is drawn to the following places:
B21B 31/02 Metal-rolling stand frames
G01D 11/30 Supports specially adapted for indicating or recording instruments.

Subclass index

1/00 Frames or casings of engines, machines, or apparatus; Frames serving as machinery beds [2]
1/02 . for reciprocating engines or similar machines
1/021 . . for housing crankshafts
1/022 . . . of tunnel type, i.e. wherein the crankshaft can only be introduced axially (for engines or machines with star-shaped cylinder arrangement F16M 1/023)
1/023 . . . specially adapted for engines or machines with star-shaped cylinder arrangement
1/024 . . . facilitating assembly of power-transmitting parts of engines or machines, e.g. of connecting-rods
1/025 . . . Assembling bearings in casings, e.g. having anchor bolts
1/026 . . for housing movable engine or machine parts other than crankshafts, e.g. valve-gear housings
1/04 . for rotary engines or similar machines
1/08 . characterised by being built-up of sheet material or welded parts

3/00 Portable or wheeled frames or beds, e.g. for emergency power-supply aggregates, compressor sets (construction of vehicles in general B60 to B62)

5/00 Engine beds, i.e. means for supporting engines or machines on foundations

7/00 Details of attaching or adjusting engine beds, frames, or supporting-legs on foundation or base; Attaching non-moving engine parts, e.g. cylinder blocks (elastic or equivalent mounting for absorbing vibrations F16F, especially F16F 15/04)

9/00 Special layout of foundations with respect to machinery to be supported (foundations for machinery E02D 27/44)

11/00 Stands or trestles as supports for apparatus or articles placed thereon (without heads F16M 13/00; easels or stands for blackboards or the like A47B 97/04; show-stands A47F 7/00; for workmen E04G 1/32; supporting, suspending for lighting devices F21V 21/00; special modifications for particular apparatus or articles, see the appropriate subclasses)
11/02 . Heads
11/04 . . Means for attachment of apparatus; Means allowing adjustment of the apparatus relatively to the stand
11/06 . . . allowing pivoting
11/08 . . . . around a vertical axis
11/10 . . . . around a horizontal axis
11/12 . . . . in more than one direction
11/14 . . . . . with ball-joint (ball-jointed hinges F16C 11/06)
11/16 . . Details concerning attachment of head-supporting legs, with or without actuation of locking members therefor
11/18 . . with mechanism for moving the apparatus relatively to the stand
11/20 . Undercarriages with or without wheels
11/22 . . with approximately constant height, e.g. with constant length of column or of legs (F16M 11/42 takes precedence)
11/24 . . changeable in height or length of legs, also for transport only (F16M 11/42 takes precedence)
11/26 . . . by telescoping, with or without folding (details concerning the constructional features of telescoping parts only F16B 7/10)
11/28 . . . . Undercarriages for supports with one single telescoping pillar
11/30 . . . . . with co-moving side-struts
11/32 . . . . Undercarriages for supports with three or more telescoping legs

11/34 . . . . . Members limiting spreading of legs
11/36 . . . . . Members preventing slipping of the feet
11/38 . . . by folding
11/40 . . . by means of coilable or bendable legs
11/42 . with arrangement for propelling the support

13/00 Other supports for positioning apparatus or articles (heads thereof F16M 11/02; adapted to be stuck in the ground A45F 3/44); **Means for steadying hand-held apparatus or articles**
13/02 . for supporting on, or attaching to, an object, e.g. tree, gate, window-frame, cycle
13/04 . for supporting on, or holding steady relative to, a person, e.g. by chains
13/06 . also serviceable for other purposes, e.g. to be used as spade, chair, ski-stick
13/08 . . for use as a walking-cane

F16N LUBRICATING

Note

Attention is drawn to the following places, which cover lubrication of specific apparatus or in particular processes:

A01D	69/12	Harvesters
B21B	25/04	Mandrels for metal tube rolling mills
B21B	27/06	Rolls for metal rolling mills
B21D	37/18	Tools for machines for working metal without removing material
B21J	3/00	Forging or pressing
B22D	11/07	Moulds for continuous casting of metals
B23C	5/28	Milling cutters
B23D	59/02,	Metal saws
B23D	59/04	
B23Q	11/10,	Machine tools
B23Q	11/12	
B25D	17/26	Portable power-driven percussive tools
B26B	19/40	Hair-clippers or dry-shavers
B27B	13/12	Band saw blades for wood or the like
B60R	17/00	Vehicles
B61B	12/08	Cable systems for railways
B61C	17/08	Railway locomotives
B61F	17/00	Axle-boxes of rail vehicles
B61K	3/00	Rail or wheel flanges of railways
B62D	55/092	Endless-track units for vehicles
B62J	31/00	Cycles
B65G	45/02	Conveyers
B66B	7/12	Ropes, cables or guides of elevators
D01H	7/20	Spindles of machines for spinning or twisting threads or fibres
D04B	35/28	Knitting machines
D05B	71/00	Sewing machines
D05C	13/04	Embroidering machines
E01B	7/26	Switches for railways
E05B	17/08	Locks
E05D	11/02	Hinges
E21B	10/22	Roller bits for earth drilling
F01C	21/04	Rotary-piston or oscillating-piston machines or engines
F01D	25/18	Non-positive-displacement machines
F01M		Machines or engines in general
F02C	7/06	Gas-turbine plants
F02F	1/20	Cylinders of combustion engines
F04B	39/02	Pumps for liquids
F04C	29/02	Rotary-piston or oscillating-piston pumps for liquids
F04D	29/04	Non-positive-displacement pumps
F16C	1/24	Flexible shafts
F16C	33/10	Sliding-contact bearings
F16C	33/66	Ball or roller bearings
F16F	1/24	Springs
F16H	57/04	Transmissions
F41A	29/04	Smallarms or ordnance
G04B	31/08	Clocks
H01R	39/56	Rotary current collectors, distributors or interrupters

Subclass index

Lubrication devices or arrangements for oil or grease

1/00 Constructional modifications of parts of machines or apparatus for the purpose of lubrication

3/00 Devices for supplying lubricant by manual action
3/02 . delivering oil
3/04 . . Oil cans; Oil syringes
3/06 . . . delivering on squeezing
3/08 . . . incorporating a piston-pump
3/10 . delivering grease
3/12 . . Grease guns

5/00 Apparatus with hand-positioned nozzle supplied with lubricant under pressure (F16N 3/00 takes precedence)
5/02 . Nozzles or nozzle-valve arrangements therefor, e.g. high-pressure grease guns

7/00 Arrangements for supplying oil or unspecified lubricant from a stationary reservoir or the equivalent in or on the machine or member to be lubricated
7/02 . with gravity feed or drip lubrication
7/04 . . with oil flow promoted by vibration
7/06 . . Arrangements in which the droplets are visible
7/08 . . controlled by means of the temperature of the member to be lubricated
7/10 . . incorporating manually-operated regulating means, e.g. spindles
7/12 . with feed by capillary action, e.g. by wicks
7/14 . the lubricant being conveyed from the reservoir by mechanical means (by pumping devices F16N 7/36, F16N 7/38)
7/16 . . the oil being carried up by a lifting device
7/18 . . . with one or more feed members fixed on a shaft
7/20 . . . with one or more members moving around the shaft to be lubricated
7/22 . . . . shaped as rings
7/24 . . . with discs, rollers, belts, or the like contacting the shaft to be lubricated
7/26 . . Splash lubrication
7/28 . . Dip lubrication
7/30 . the oil being fed or carried along by another fluid
7/32 . . Mist lubrication
7/34 . . . Atomising devices for oil
7/36 . with feed by pumping action of the member to be lubricated or of a shaft of the machine; Centrifugal lubrication
7/38 . with a separate pump; Central lubrication systems
7/40 . . in a closed circulation system

9/00 Arrangements for supplying oil or unspecified lubricant from a moving reservoir or the equivalent (also usable with a stationary reservoir F16N 7/00)
9/02 . with reservoir on or in a rotary member
9/04 . with reservoir on or in a reciprocating, rocking, or swinging member

11/00 Arrangements for supplying grease from a stationary reservoir or the equivalent in or on the machine or member to be lubricated; **Grease cups**
11/02 . Hand-actuated grease cups, e.g. Stauffer cups
11/04 . Spring-loaded devices
11/06 . Weight-loaded devices
11/08 . with mechanical drive, other than directly by springs or weights (lubricating-pumps F16N 13/00)
11/10 . by pressure of another fluid
11/12 . by centrifugal action

13/00 Lubricating-pumps (oil cans with pump F16N 3/08)
13/02 . with reciprocating piston (pumps with distributing equipment F16N 13/22)
13/04 . . Adjustable reciprocating pumps
13/06 . . Actuation of lubricating-pumps
13/08 . . . by hand
13/10 . . . with mechanical drive (F16N 13/18 takes precedence)
13/12 . . . . with ratchet
13/14 . . . . with cam or wobble-plate on shaft parallel to the pump cylinder or cylinders
13/16 . . . with fluid drive
13/18 . . . relative movement of pump parts being produced by inertia of one of the parts or of a driving member
13/20 . Rotary pumps (with distributing equipment F16N 13/22)
13/22 . with distributing equipment

15/00 Lubrication with substances other than oil or grease; **Lubrication characterised by the use of particular lubricants in particular apparatus or conditions** (F16N 17/00 takes precedence; lubricating compositions, selection of particular substances as lubricants in general C10M; lubrication specially adapted to machines or apparatus provided for in a single other class, see the relevant class for the machine or apparatus)
15/02 . with graphite or graphite-containing compositions
15/04 . with water

17/00 Lubrication of machines or apparatus working under extreme conditions (additives to lubricating oil or lubricating grease C10M)
17/02 . at high temperature

17/04 . at low temperature
17/06 . in vacuum or under reduced pressure (of rotary anodes of X-ray tubes H01J 35/10)

Details of lubricators or lubrication systems

19/00 Lubricant containers for use in lubricators or lubrication systems

21/00 Conduits; **Junctions**; **Fittings for lubrication apertures**
21/02 . Lubricating nipples
21/04 . Nozzles for connection of lubricating equipment to nipples
21/06 . Covering members for nipples, conduits, or apertures

23/00 Special adaptations of check valves

25/00 Distributing equipment (combined with oil pump F16N 13/22)
25/02 . with reciprocating distributing slide valve
25/04 . with rotary distributing member

27/00 Proportioning devices
27/02 . Gating equipment

29/00 Special means in lubricating arrangements or systems providing for the indication or detection of undesired conditions; **Use of devices responsive to conditions in lubricating arrangements or systems** (constructions of apparatus outside the lubricating arrangements or systems, see the relevant classes)
29/02 . for influencing the supply of lubricant
29/04 . enabling a warning to be given; enabling moving parts to be stopped

31/00 Means for collecting, retaining, or draining-off lubricant in or on machines or apparatus
31/02 . Oil catchers; Oil wipers (oil-scraping rings for pistons F16J 9/20)

33/00 Mechanical arrangements for cleaning lubricating equipment; **Special racks or the like for use in draining lubricant from machine parts**

Care of lubricants

35/00 Storage of lubricants in engine-rooms or the like

37/00 Equipment for transferring lubricant from one container to another
37/02 . for filling grease guns

39/00 Arrangements for conditioning of lubricants in the lubricating system (cleaning of lubricating oil, lubricating compositions C10M)
39/02 . by cooling
39/04 . by heating
39/06 . by filtration
39/08 . by diluting, e.g. by addition of fuel

99/00 Subject matter not provided for in other groups of this subclass [8]

F16P SAFETY DEVICES IN GENERAL

Note

Attention is drawn to the following places:

A01D	75/18, 75/20	Harvesters or mowers
A01F	21/00	Threshing machines or baling presses
B02C	23/04	Crushing or disintegrating machines
B21B	33/00	Rolling of metal
B21D	55/00	Working sheet metal or tubes, rods or profiles without essentially removing material
B23B	25/04	Turning-machines
B23Q	11/00	Machine tools
B24B	55/00	Grinding or polishing machines
B25D	17/10	Portable power-driven percussive tools
B25J	19/06	Manipulators
B26D	7/22	Cutting machines
B27G	19/00	Wood saws
B65B	57/00	Packaging machines or apparatus
B65G	43/00	Conveyers
B65H	26/00	Web-advancing mechanisms
B65H	63/00	Handling or winding of thin or filamentary material
D01G	31/00	Treatment of fibres
D01H	13/14	Spinning or twisting
D05B	83/00	Sewing machines
F21V	25/00	Lighting devices.

Devices protecting or preventing injuries to people

1/00 **Safety devices independent of the control or operation of any machine** (protective devices for the eyes or ears, worn on the body or carried in the hand, A61F 9/00, A61F 11/00)

1/02 . Fixed screens or hoods

1/04 . Screens or hoods rotating with rotary shafts

1/06 . specially designed for welding

3/00 **Safety devices acting in conjunction with the control or operation of a machine**; **Control arrangements requiring the simultaneous use of two or more parts of the body** (F16P 5/00 takes precedence)

3/02 . Screens or other safety members moving in synchronism with members which move to and fro

3/04 . . for machines with parts which approach one another during operation, e.g. for stamping presses

3/06 . . . in which body parts of the operator are removed from the danger zone on approach of the machine parts

3/08 . in connection with the locking of doors, covers, guards, or like members giving access to moving machine parts

3/10 . . in which the operation of locking the door or other member causes the machine to start

3/12 . with means, e.g. feelers, which in case of the presence of a body part of a person in or near the danger zone influence the control or operation of the machine (F16P 3/08 takes precedence)

3/14 . . the means being photocells or other devices sensitive without mechanical contact

3/16 . . with feeling members moved by the machine

3/18 . Control arrangements requiring the use of both hands

3/20 . . for electric control systems

3/22 . . for hydraulic or pneumatic control systems

3/24 . . for mechanical controls

5/00 **Emergency means for rendering ineffective a coupling conveying reciprocating movement if the motion of the driven part is prematurely resisted**

7/00 **Emergency devices preventing damage to a machine or apparatus** (F16P 1/00, F16P 3/00, F16P 5/00 take precedence; indicating means, see the appropriate classes)

7/02 . by causing the machine to stop on the occurrence of dangerous conditions therein (devices in bearings affected by abnormal conditions F16C)

F16S **CONSTRUCTIONAL ELEMENTS IN GENERAL**; **STRUCTURES BUILT-UP FROM SUCH ELEMENTS, IN GENERAL**

Note

This subclass does not cover similar elements and structures, restricted to use in the building art, which are covered by subclass E04C.

1/00 **Sheets, panels, or other members of similar proportions**; **Constructions comprising assemblies of such members** (built-up gratings F16S 3/00; layered products B32B)

Note

In this group, the members may be generally flat or curved, but they may depart from such shape in detail over part or all of their area, e.g. they may be corrugated, ribbed, flanged; ribs, flanges, or the like may be separately formed.

1/02 . designed for being secured together edge to edge, e.g. at an angle; Assemblies thereof

1/04 . produced by deforming or otherwise working a flat sheet (honeycomb or other core members for layered products B32B 3/00, e.g. B32B 3/12, B32B 3/24, B32B 3/26)

1/06 . . by deforming only

1/08 . . by cutting or perforating, with or without deformation

1/10 . Composite members, e.g. with ribs or flanges attached (F16S 1/02 takes precedence)

1/12 . of substantial thickness, e.g. with varying thickness, with channels

1/14 . Assemblies of such members with members of forms covered by group F16S 3/00 or F16S 5/00 (such other members being for jointing only F16S 1/02)

3/00 **Elongated members, e.g. profiled members**; **Assemblies thereof**; **Gratings or grilles** (gratings or grilles formed from a sheet or the like F16S 1/00, particularly F16S 1/08; frames for doors, windows or the like E06B 1/00, E06B 3/00)

3/02 . composed of two or more elongated members secured together side by side

3/04 . designed for being joined to similar members in various relative positions

3/06 . Assemblies of elongated members (F16S 3/02, F16S 3/04 take precedence)

3/08 . . forming frameworks, e.g. gratings

5/00 **Other constructional members not restricted to an application fully provided for in a single class**

F16T STEAM TRAPS OR LIKE APPARATUS FOR DRAINING-OFF LIQUIDS FROM ENCLOSURES PREDOMINANTLY CONTAINING GASES OR VAPOURS

1/00 Steam traps or like apparatus for draining-off liquids from enclosures predominantly containing gases or vapours, e.g. gas lines, steam lines, containers

1/02 . with valves controlled thermally

1/04 . . by expansion rods

1/06 . . by expansion tubes

1/08 . . by bimetallic strips or plates

1/10 . . by thermally-expansible liquids

1/12 . with valves controlled by excess or release of pressure

1/14 . . involving a piston, diaphragm, or bellows, e.g. displaceable under pressure of incoming condensate

1/16 . . involving a high-pressure chamber and a low-pressure chamber communicating with one another, i.e. thermodynamic steam chambers

1/18 . . involving a vacuum chamber

1/20 . with valves controlled by floats

1/22 . . of closed-hollow-body type

1/24 . . . using levers

1/26 . . of upright-open-bucket type

1/28 . . . using levers

1/30 . . of inverted-open-bucket type; of bell type

1/32 . . of rocking or tilting type

1/34 . without moving parts other than hand valves, e.g. labyrinth type

1/36 . specially adapted for steam lines of low pressure

1/38 . Component parts; Accessories

1/40 . . Actuating mechanisms of ball valves

1/42 . . Actuating mechanisms of slide valves

1/45 . . Means for venting or aerating (separate devices therefor F16K 24/00) **[2]**

1/48 . . Monitoring arrangements for inspecting, e.g. flow of steam and steam condensate

F17 STORING OR DISTRIBUTING GASES OR LIQUIDS

F17B **GAS-HOLDERS OF VARIABLE CAPACITY** (self-acting gas cut-off devices A47J 27/62, G05D; flame traps A62C 4/00; gas mixers B01F, F16K 11/00, G05D 11/00; construction or assembling of bulk storage containers employing civil-engineering techniques E04H 7/00; gas compressors F04; valves F16K; damping pulsations in valves or pipes F16K, F16L; pipes F16L; stopping devices for gas mains F16L 55/10; vessels adapted for storing compressed, liquefied, or solidified gases F17C; gas distribution systems F17D 1/04; detecting leakage F17D 5/02, G01M; supervising or alarm devices F17D 5/02, G08B; control of combustion in burners F23N; gas flow or pressure regulators G05D)

1/00 **Gas-holders of variable capacity** (large containers in general B65D 88/00; storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00)

1/007 . with telescopically movable ring-shaped parts (F17B 1/10 takes precedence; sealing of rings F17B 1/04) **[2]**

1/013 . with movables discs (F17B 1/10 takes precedence; sealing of discs F17B 1/04) **[2]**

1/02 . Details

1/04 . . Sealing devices for sliding parts (in general F16J 15/00)

1/06 . . . using sealing liquids

1/08 . . . using resilient materials for packing, e.g. leather

1/10 . . Guiding moving parts

1/12 . . Gas admission or discharge arrangements

1/14 . . Safety devices, e.g. prevention of excess pressure

1/16 . of wet type

1/18 . . bell-shaped

1/20 . . telescopic

1/22 . . . spirally-guided

1/24 . of dry type

1/26 . . with flexible walls, e.g. bellows (connection of valves to inflatable elastic bodies B60C 29/00)

F17C **VESSELS FOR CONTAINING OR STORING COMPRESSED, LIQUEFIED, OR SOLIDIFIED GASES**; **FIXED-CAPACITY GAS-HOLDERS**; **FILLING VESSELS WITH, OR DISCHARGING FROM VESSELS, COMPRESSED, LIQUEFIED, OR SOLIDIFIED GASES** (storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00; construction or assembling of bulk storage containers employing civil-engineering techniques E04H 7/00; variable-capacity gas-holders F17B; liquefaction or refrigeration machines, plants, or systems F25)

Subclass index

1/00 **Pressure vessels, e.g. gas cylinder, gas tank, replaceable cartridge** (pressurised apparatus for purposes other than storage, see the relevant subclasses such as A62C, B05B; associated with vehicles, see the appropriate subclass of classes B60 to B64; pressure vessels in general F16J 12/00)

1/02 . involving reinforcing arrangements **[4]**

1/04 . . Protecting sheatings

1/06 . . . built-up from wound-on bands or filamentary material, e.g. wires **[4]**

1/08 . . Integral reinforcements, e.g. ribs

1/10 . with provision for protection against corrosion, e.g. due to gaseous acid (inhibiting corrosion of metallic material or incrustation in general C23F) **[4]**

1/12 . with provision for thermal insulation (thermal insulation in general F16L 59/00) **[4]**

1/14 . constructed of aluminium; constructed of non-magnetic steel

1/16 . constructed of plastics materials

3/00 **Vessels not under pressure**

3/02 . with provision for thermal insulation (thermal insulation in general F16L 59/00)

3/04 . . by insulating layers (F17C 3/08 takes precedence)

3/06 . . . on the inner surface, i.e. in contact with the stored fluid **[4]**

3/08 . . by vacuum spaces, e.g. Dewar flask (for household use A47J 41/02)

3/10 . . by liquid-circulating or vapour-circulating jackets

3/12 . with provision for protection against corrosion, e.g. due to gaseous acid (protection against corrosion in general C23F)

5/00 **Methods or apparatus for filling pressure vessels with liquefied, solidified, or compressed gases** (adding propellants to aerosol containers B65B 31/00)

Note

This group covers:
- the filling of vessels for storage of compressed or liquefied gases;
- the filling of pressurised apparatus insofar as it is not covered by a single other subclass, e.g. A62C, B05B.

5/02 . for filling with liquefied gases

5/04 . . requiring the use of refrigeration, e.g. filling with helium or hydrogen

5/06 . for filling with compressed gases

6/00 **Methods or apparatus for filling vessels not under pressure with liquefied or solidified gases [3]**

7/00 **Methods or apparatus for discharging liquefied, solidified, or compressed gases from pressure vessels, not covered by another subclass**

7/02 . Discharging liquefied gases

7/04 . . with change of state, e.g. vaporisation **[3]**

9/00 **Methods or apparatus for discharging liquefied or solidified gases from vessels not under pressure**

9/02 . with change of state, e.g. vaporisation

9/04 . . Recovery of thermal energy **[3]**

11/00 **Use of gas-solvents or gas-sorbents in vessels**

13/00 **Details of vessels or of the filling or discharging of vessels**

13/02 . Special adaptations of indicating, measuring, or monitoring equipment (measuring in general G01)

13/04 . Arrangement or mounting of valves (valves per se F16K)

13/06 . Closures, e.g. cap, breakable member (closures for containers in general B65D)

13/08 . Mounting arrangements for vessels

13/10 . Arrangements for preventing freezing

13/12 . Arrangements or mounting of devices for preventing or minimising the effect of explosion (flame traps A62C 4/00)

F17D **PIPE-LINE SYSTEMS**; **PIPE-LINES** (distributing water E03B; pumps or compressors F04; fluid dynamics F15D; valves or the like F16K; pipes, laying pipes, supports, joints, branches, repairing, work on the entire line, accessories F16L; steam traps or the like F16T; fluid-pressure electric cables H01B 9/06)

Note

In this subclass, the following expression is used with the meaning indicated:
– "pipe-line systems" means systems described in flow sheets as well as arrangements of co-operating elements, the elements per se being covered by the relevant subclasses.

1/00 **Pipe-line systems** (conveying articles or materials through a pipe-line by means of a fluid carrier B65G 51/00, B65G 53/00; dispensing, delivering or transferring liquids B67D; apparatus or devices for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers, e.g. for retail sale purposes, B67D 7/00; conveying material which has been excavated by a dredger or soil shifter through a pipe-line E02F 7/10; sewer pipe-line systems E03F 3/00; thermal insulation of pipe-lines F16L 59/00; central heating systems F24D) **[2]**

1/02 . for gases or vapours

1/04 . . for distribution of gas

1/05 . . . Preventing freezing (by heating F16L 53/00)

1/06 . . for steam

1/065 . . Arrangements for producing propulsion of gases or vapours **[2]**

1/07 . . . by compression **[2]**

1/075 . . . by mere expansion from an initial pressure level, e.g. by arrangement of a flow-control valve **[2]**

1/08 . for liquids or viscous products (water-main or service pipe systems E03B 7/04; domestic hot-water supply systems F24D 17/00) **[2]**

1/12 . . Conveying liquids or viscous products by pressure of another fluid **[2]**

1/13 . . Conveying liquids or viscous products by gravity **[2]**

1/14 . . Conveying liquids or viscous products by pumping **[2]**

1/16 . . Facilitating the conveyance of liquids or effecting the conveyance of viscous products by modification of their viscosity **[2]**

1/17 . . . by mixing with another liquid **[2]**

1/18 . . . by heating **[2]**

1/20 . Arrangements or systems of devices for influencing or altering dynamic characteristics of the systems, e.g. for damping pulsations caused by opening or closing of valves (fluid dynamics F15D; damping pulsations in fluids in pipes in general F16L 55/04) **[2]**

3/00 **Arrangements for supervising or controlling working operations**

3/01 . for controlling, signalling, or supervising the conveyance of a product **[2]**

3/03 . for controlling, signalling, or supervising the conveyance of several different products following one another in the same conduit, e.g. for switching from one receiving tank to another **[2]**

3/05 . . the different products not being separated (separation of contaminants by distillation B01D 3/00) **[2]**

3/08 . . the different products being separated by "go-devils", e.g. spheres (cleaning devices moved along the inside of pipe-lines by a fluid B08B 9/053) **[2]**

3/10 . for taking out the product in the line (investigating or analysing materials by determinating their chemical or physical properties G01N) **[2]**

3/12 . for injecting a composition into the line **[2]**

3/14 . for eliminating water (separation of liquids B01D, e.g. B01D 17/00; separation of gases or vapours B01D 53/00) **[2]**

3/16 . for eliminating particles in suspension (from liquids by sedimentation B01D 21/00; separation by filtration or otherwise B01D 24/00 to B01D 51/00; centrifugal apparatus B04) **[2]**

3/18 . for measuring the quantity of conveyed product (measuring volume or volume flow, in general G01F) **[2]**

5/00 Protection or supervision of installations (arrangements for protecting foundations E02D 31/00; protecting pipes from damage or internal or external wear F16L 57/00, against corrosion or scale F16L 58/00; investigation of the fluid-tightness of structures G01M 3/00) **[2]**

5/02 . Preventing, monitoring, or locating loss **[2]**

5/04 . . by means of a signalling fluid enclosed in a double wall **[2]**

5/06 . . using electric or acoustic means **[2]**

5/08 . Protection of installations or persons from the effects of high voltage induced in the pipe-line (emergency protective circuit arrangements H02H) **[2]**

LIGHTING; HEATING

F21 LIGHTING

Note

Attention is drawn to Note III of Section H, and in particular that subclass H05B covers electrical aspects of the same technical subjects that are covered by class F21.

F21H INCANDESCENT MANTLES; **OTHER INCANDESCENT BODIES HEATED BY COMBUSTION** (arrangements thereof F21V 36/00; burners F23D)

1/00 Incandescent mantles; **Selection of imbibition liquids therefor**

1/02 . characterised by the material thereof

3/00 Manufacturing incandescent mantles; **Treatment prior to use, e.g. burning-off**; **Machines for manufacturing**

5/00 Solid incandescent bodies (incandescent mantles F21H 1/00)

7/00 Other incandescent bodies [2009.01]

F21K LIGHT SOURCES NOT OTHERWISE PROVIDED FOR

2/00 Light sources using luminescence (luminescent materials C09K 11/00; selection of luminescent materials for light screens F21V 9/16; using excitation by radioactivity G21H 3/02, H01J 65/06, H01J 65/08; transforming the wavelength of the light of gas- or vapour-discharge lamps by luminescence H01J 61/42; electroluminescent light sources H05B 33/00) **[2,7]**

2/04 . using triboluminescence; using thermoluminescence

2/06 . using chemiluminescence **[3]**

2/08 . . activated by an electric field, i.e. electrochemiluminescence **[3]**

5/00 Light sources using charges of combustible material, e.g. illuminating flash devices (explosive or thermic compositions C06B; fireworks F42B 4/00; photographic flash units G03B 15/03) **[3,5]**

5/04 . Plural charges, e.g. associated for sequential ignition (F21K 5/06, F21K 5/12 take precedence) **[5]**

5/06 . Charge containment **[5]**

5/08 . . Charge held in non-disrupting container, e.g. photo-flash bulb **[5]**

5/10 . . . bearing a coating **[5]**

5/12 . Charge ignition **[5]**

5/14 . . percussive **[5]**

5/16 . . electrical (circuit arrangements H05B 43/02) **[5]**

5/18 . . . Electrically-ignited primers **[5]**

5/20 . Charge feeding means **[5]**

5/22 . Protective light shields **[5]**

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

F21L LIGHTING DEVICES OR SYSTEMS THEREOF, BEING PORTABLE OR SPECIALLY ADAPTED FOR TRANSPORTATION (burners F23D; electric aspects or elements, see section H, e.g. electric light sources H01J, H01K, H05B) **[1,7]**

(1) This subclass covers devices or systems designed or specially adapted to be carried, e.g. by hand, or otherwise transported from place to place, e.g. on wheeled supports, in order to provide illumination as and where required. **[7]**

(2) This subclass does not cover devices or systems intended for fixed installation, e.g. vehicle lighting, or for use essentially at a permanent location, which are covered by subclass F21S. **[7]**

(3) Non-electric lighting devices are classified in groups F21L 17/00 to F21L 26/00 only if a special adaptation related to the use of a non-electric light source is of interest. **[2009.01]**

(4) In this subclass, it is desirable to add the indexing codes of subclasses F21W and F21Y. **[7]**

Subclass index

2/00 **Systems of electric lighting devices** (systems employing both electric and non-electric light sources or exchangeable light sources F21L 27/00) **[7]**

4/00 **Electric lighting devices with self-contained electric batteries or cells [7]**

4/02 . characterised by provision of two or more light sources **[7]**

4/04 . characterised by provision of a light source housing portion adjustably fixed to the remainder of the device **[7]**

4/06 . with light source coupled to the remainder of the device solely by cable **[7]**

4/08 . characterised by means for in situ recharging of the batteries or cells **[7]**

13/00 **Electric lighting devices with built-in electric generators** (with solar cells F21L 4/00) **[1,7]**

13/02 . with fluid drive

13/04 . . actuated by hand

13/06 . with mechanical drive, e.g. spring

13/08 . . by reciprocating pusher actuated by hand

14/00 **Electric lighting devices without a self-contained power source, e.g. for mains connection [7]**

14/02 . capable of hand-held use, e.g. inspection lamps **[7]**

14/04 . carried on wheeled supports **[7]**

17/00 **Non-electric torches**; **Non-electric flares**

19/00 **Lanterns, e.g. hurricane lamps or candle lamps** (candle holders F21V 35/00)

21/00 **Non-electric pocket-lamps, e.g. lamps producing sparks**

23/00 **Non-electric hand-lamps for miners**

26/00 **Non-electric portable lighting devices, or systems thereof, not provided for in groups F21L 17/00 to F21L 23/00 [8]**

27/00 **Lighting devices or systems, employing combinations of electric and non-electric light sources**; **Replacing or exchanging electric light sources with non-electric light sources or vice versa in lighting devices or systems**

F21S **NON-PORTABLE LIGHTING DEVICES OR SYSTEMS THEREOF** (burners F23D; electric aspects or elements, see section H, e.g. electric light sources H01J, H01K, H05B) **[1,7]**

(1) This subclass covers devices or systems intended for fixed installation, e.g. vehicle lighting, or for use at a permanent location, e.g. free-standing floor- or table-lamps. **[7]**

(2) This subclass does not cover devices or systems specially adapted for transportation, which are covered by subclass F21L. **[7]**

(3) Non-electric lighting devices or systems are classified in groups F21S 11/00 to F21S 15/00 only if a special adaptation related to the use of a non-electric light source is of interest. **[2009.01]**

(4) In this subclass, it is desirable to add the indexing codes of subclasses F21W and F21Y. **[7]**

Subclass index

2/00 **Systems of lighting devices, not provided for in main groups F21S 4/00 to F21S 10/00 or F21S 19/00, e.g. of modular construction [7]**

4/00 **Lighting devices or systems using a string or strip of light sources [7]**

6/00 **Lighting devices intended to be free-standing** (F21S 9/00, F21S 10/00 take precedence) **[7]**

8/00 **Lighting devices intended for fixed installation** (F21S 9/00, F21S 10/00 take precedence; using a string or strip of light sources F21S 4/00) **[7]**

8/02 . of recess-mounted type, e.g. downlighters (F21S 8/10 takes precedence) **[7]**

8/04 . intended only for mounting on a ceiling or like overhead structure (F21S 8/02 takes precedence) **[7]**

8/06 . . by suspension **[7]**

8/08 . with a standard **[7]**

8/10 . specially adapted for vehicles **[7]**
8/12 . . providing a single shaped beam, e.g. asymmetric beam, e.g. for penetrating fog or for preventing glare **[7]**

9/00 Lighting devices with a built-in power supply; **Systems employing lighting devices with a built-in power supply**
9/02 . the power supply being a battery or accumulator
9/03 . . rechargeable by exposure to light **[7]**
9/04 . the power supply being a generator

10/00 Lighting devices or systems producing a varying lighting effect [7]
10/02 . changing colours (F21S 10/04 takes precedence) **[7]**
10/04 . simulating flames **[7]**
10/06 . flashing, e.g. with rotating reflector or light source **[7]**

11/00 Non-electric lighting devices or systems using daylight

13/00 Non-electric lighting devices or systems employing a point-like light source (candle holders F21V 35/00); **Non-electric lighting devices or systems employing a light source of unspecified shape**
13/02 . Devices intended to be fixed, e.g. ceiling lamp, wall lamp
13/04 . . with a pendant
13/06 . . . multi-branched, e.g. chandelier
13/08 . . with suspension from a stretched wire
13/10 . . with a standard, e.g. street lamp
13/12 . Devices intended to be free-standing, e.g. table lamp, floor lamp
13/14 . Lighting systems

15/00 Non-electric lighting devices or systems employing light sources not covered by main groups F21S 11/00, F21S 13/00 or F21S 19/00

19/00 Lighting devices or systems employing combinations of electric and non-electric light sources; **Replacing or exchanging electric light sources with non-electric light sources or vice versa**

F21V FUNCTIONAL FEATURES OR DETAILS OF LIGHTING DEVICES OR SYSTEMS THEREOF; **STRUCTURAL COMBINATIONS OF LIGHTING DEVICES WITH OTHER ARTICLES, NOT OTHERWISE PROVIDED FOR [1,7]**

(1) Groups F21V 1/00 to F21V 14/00 cover details of those parts involved in light emission or distribution. Groups F21V 15/00 to F21V 31/00 cover details of those parts not so involved. **[2009.01]**
(2) Details of non-electric lighting devices or systems are classified in groups F21V 35/00 to F21V 37/00 only if a special adaptation related to the use of a non-electric light source is of interest. **[2009.01]**
(3) In this subclass, it is desirable to add the indexing codes of subclasses F21W and F21Y. **[7]**

Subclass index

1/00 Shades for light sources
1/02 . Frames
1/04 . . rigid (F21V 1/08 takes precedence)
1/06 . . foldable or collapsible
1/08 . . adjustable
1/10 . Rotating shades
1/12 . Composite shades
1/14 . Covers for frames; Frameless shades
1/16 . . characterised by the material
1/18 . . . the material being paper
1/20 . . . the material being glass
1/22 . . . the material being plastics
1/24 . . . the material being metal
1/26 . Manufacturing shades

3/00 Globes; **Bowls**; **Cover glasses** (with refracting properties F21V 5/00; with reflecting properties F21V 7/00)
3/02 . characterised by the shape
3/04 . characterised by the material; characterised by surface treatments or coatings

5/00 Refractors for light sources
5/02 . of prismatic shape (F21V 5/04 takes precedence)
5/04 . of lens shape

5/06 . Hanging lustres for chandeliers
5/08 . producing an asymmetric light distribution **[1,7]**

7/00 Reflectors for light sources
7/04 . Optical design (F21V 7/22 takes precedence) **[1,7]**
7/05 . . plane **[1,7]**
7/06 . . with parabolic curvature **[1,7]**
7/07 . . with hyperbolic curvature **[1,7]**
7/08 . . with elliptical curvature **[1,7]**
7/09 . . with a combination of different curvatures **[1,7]**
7/10 . Construction (F21V 7/22 takes precedence) **[1,7]**
7/16 . . with provision for adjusting the curvature **[1,7]**
7/18 . . with provision for folding or collapsing **[1,7]**
7/20 . . specially adapted for facilitating cooling, e.g. with fins **[1,7]**
7/22 . characterised by the material; characterised by surface treatments or coatings

8/00 Use of light guides, e.g. fibre optic devices, in lighting devices or systems (light guides per se, structural details of arrangements with other optical elements G02B 6/00) **[4]**

9/00 Light filters (coloured shades F21V 1/00); **Selection of luminescent materials for light screens** (luminescent materials per se C09K 11/00; electroluminescent light sources per se H05B 33/00)
9/02 . for simulating daylight (F21V 9/04, F21V 9/06, F21V 9/16 take precedence)
9/04 . for filtering out infra-red radiation (using liquid-filled chambers F21V 9/12)
9/06 . for filtering out ultra-violet radiation (F21V 9/16 takes precedence)
9/08 . for producing coloured light, e.g. monochromatic; for reducing intensity of light (F21V 9/16 takes precedence)
9/10 . . with provision for variation of the colour or intensity (F21V 9/12 takes precedence)
9/12 . . with liquid-filled chambers
9/14 . for producing polarised light
9/16 . Selection of luminescent materials for light screens

11/00 Screens not covered by groups F21V 1/00, F21V 3/00, F21V 7/00 or F21V 9/00
11/02 . using parallel laminae or strips, e.g. of Venetian-blind type (F21V 11/06 takes precedence)
11/04 . . adjustable
11/06 . using crossed laminae or strips; using lattices or honeycombs
11/08 . using diaphragms containing one or more apertures
11/10 . . of iris type
11/12 . . of slot type
11/14 . . with many small apertures
11/16 . using sheets without apertures, e.g. fixed (F21V 11/02, F21V 11/06 take precedence)
11/18 . . movable, e.g. flaps, slides

13/00 Producing particular characteristics or distribution of the light emitted by means of a combination of elements specified in two or more of main groups F21V 1/00 to F21V 11/00 (changing the characteristics or distribution of the light emitted by adjustment of parts F21V 14/00) **[1,7]**
13/02 . Combinations of only two kinds of elements
13/04 . . the elements being reflectors and refractors
13/06 . . . a reflector being rotatable
13/08 . . the elements being reflectors and filters
13/10 . . the elements being reflectors and screens
13/12 . Combinations of only three kinds of elements
13/14 . . the elements being reflectors, refractors, and filters

14/00 Changing the characteristics or distribution of the light emitted by adjustment of parts (reflectors with provision for adjusting the curvature F21V 7/16; light filters with provision for variation of colour or intensity F21V 9/10; screens using iris-type diaphragms F21V 11/10; adjustable mountings for lighting devices F21V 21/14) **[7]**
14/02 . by movement of light sources **[7]**
14/04 . by movement of reflectors **[7]**
14/06 . by movement of refractors **[7]**
14/08 . by movement of screens **[7]**

15/00 Protecting lighting devices from damage (cooling or heating arrangements F21V 29/00; gas-tight or water-tight arrangements F21V 31/00)
15/01 . Housings, e.g. material or assembling of housing parts (F21V 15/02 takes precedence) **[7]**
15/015 . . Devices for covering joints between adjacent lighting devices; End coverings **[7]**
15/02 . Cages
15/04 . Resilient mountings, e.g. shock-absorbers
15/06 . Thermal insulation **[7]**

17/00 Fastening of component parts of lighting devices, e.g. shades, globes, refractors, reflectors, filters, screens, grids or protective cages (of light sources or light holders F21V 19/00; gas-tight or water-tight arrangements F21V 31/00)
17/02 . with provision for adjustment (F21V 17/04 to F21V 17/08 take precedence; changing the characteristics or distribution of the light emitted by adjustment of parts F21V 14/00) **[1,7]**
17/04 . onto or by the light source
17/06 . onto or by the lamp holder
17/08 . onto the supporting or suspending arrangements of the lighting device, e.g. power cords, standards **[7]**
17/10 . characterised by specific fastening means or way of fastening (F21V 17/02 to F21V 17/08 take precedence) **[7]**
17/12 . . by screwing **[7]**
17/14 . . Bayonet-type fastening **[7]**
17/16 . . by deformation of parts of the lighting device; Snap action mounting **[7]**
17/18 . . Latch-type fastening, e.g. with rotary action **[7]**
17/20 . . by toggle-action levers **[7]**

19/00 Fastening of light sources or lamp holders (fastening electric light source solely by the coupling device H01R 33/00)
19/02 . with provision for adjustment, e.g. for focusing (changing the characteristics or distribution of the light emitted by adjustment of parts F21V 14/00) **[1,7]**
19/04 . with provision for changing light source, e.g. turret
19/06 . Fastening incandescent mantles or other incandescent bodies to lamp parts; Suspension devices for incandescent mantles or other incandescent bodies **[1,7]**

21/00 Supporting, suspending, or attaching arrangements for lighting devices (F21V 17/00, F21V 19/00 take precedence); **Hand grips [1,7]**
21/002 . making direct electrical contact, e.g. by piercing (F21V 21/35 takes precedence) **[7]**
21/005 . for several lighting devices in an end-to-end arrangement, i.e. light tracks **[7]**

21/008 . Suspending from a cable or suspension line **[7]**
21/02 . Wall, ceiling, or floor bases; Fixing pendants or arms to the bases (F21V 21/08 takes precedence; bases for movable standing lamps F21V 21/06)
21/03 . . Ceiling bases, e.g. ceiling roses (F21V 21/04 takes precedence) **[7]**
21/04 . . Recessed bases
21/06 . Bases for movable standing lamps; Fixing standards to the bases (F21V 21/08 takes precedence)
21/08 . Devices for easy attachment to a desired place
21/084 . . Head fittings (for medical purposes A61B 1/06) **[7]**
21/088 . . Clips; Clamps **[7]**
21/092 . . Suction devices **[7]**
21/096 . . Magnetic devices **[7]**
21/10 . Pendants, arms or standards; Fixing lighting devices to pendants, arms or standards (adjustable mounting F21V 21/14)
21/104 . . Pendants **[7]**
21/108 . . Arms **[7]**
21/112 . . Fixing lighting devices to pendants (F21V 21/002 takes precedence) **[7]**
21/116 . . Fixing lighting devices to arms or standards (F21V 21/002 takes precedence) **[7]**
21/12 . . capable of being elongated or shortened by the insertion or removal of intermediate pieces
21/13 . Spring-loaded poles fixed at both ends **[7]**
21/14 . Adjustable mountings
21/15 . . specially adapted for power operation, e.g. by remote control **[7]**
21/16 . . using wires or cords
21/18 . . . operated by springs
21/20 . . . operated by weights
21/22 . . telescopic
21/24 . . Lazy-tongs
21/26 . . Pivoted arms
21/28 . . . adjustable in more than one plane
21/29 . . . . employing universal joints
21/30 . . Pivoted housings or frames
21/32 . . Flexible tubes
21/34 . Supporting elements displaceable along a guiding element
21/35 . . with direct electrical contact between the supporting element and electric conductors running along the guiding element **[7]**
21/36 . Hoisting or lowering devices, e.g. for maintenance (F21V 21/14 takes precedence)
21/38 . . with a cable
21/40 . Hand grips **[7]**

23/00 Arrangement of electric circuit elements in or on lighting devices
23/02 . the elements being transformers or impedances
23/04 . the elements being switches (safety devices F21V 25/00)
23/06 . the elements being coupling devices

25/00 Safety devices structurally associated with lighting devices (gas-tight or water-tight arrangements F21V 31/00)
25/02 . coming into action when lighting device is disturbed, dismounted, or broken
25/04 . . breaking the electric circuit
25/06 . . feeding a quenching fluid to the light source
25/08 . . cutting the incandescent filament
25/10 . coming into action when lighting device is over-loaded, e.g. thermal switch
25/12 . Flameproof or explosion-proof arrangements

27/00 Cable-stowing arrangements structurally associated with lighting devices, e.g. reels
27/02 . Cable inlets **[7]**

29/00 Cooling or heating arrangements (reflectors specially adapted for cooling F21V 7/20; cooling of air-treatment systems with air-flow over lighting fixtures F24F 3/056; lighting fixtures combined with outlets for air-treatment systems F24F 13/078; cooling of projectors G03B 21/16) **[1,7]**
29/02 . Cooling by forcing air over or around the light source (cooling arrangements structurally associated with electric lamps H01J 61/52, H01K 1/58) **[7]**

31/00 Gas-tight or water-tight arrangements
31/03 . with provision for venting **[7]**
31/04 . Provision of filling media (safety devices F21V 25/00; cooling arrangements F21V 29/00)

33/00 Structural combinations of lighting devices with other articles, not otherwise provided for [1,7]

35/00 Candle holders

36/00 Arrangements of mantles or other incandescent bodies on burners (attaching to lamp parts F21V 19/06)
36/02 . in ceiling lamps

37/00 Details of lighting devices employing combustion as light source, not otherwise provided for [1,7]
37/02 . Special adaptation for protection against draughts **[7]**

99/00 Subject matter not provided for in other groups of this subclass [8]

F21W INDEXING SCHEME ASSOCIATED WITH SUBCLASSES F21L, F21S AND F21V, RELATING TO USES OR APPLICATIONS OF LIGHTING DEVICES OR SYSTEMS [7]

Note

This subclass constitutes an indexing scheme associated with subclasses F21L, F21S and F21V, relating to uses or applications of lighting devices or systems. **[7]**

101/00 Use or application of lighting devices on or in vehicles [7]
101/02 . for land vehicles **[7]**
101/023 . . for cycles **[7]**
101/027 . . . for motorcycles **[7]**
101/04 . for water vehicles **[7]**
101/06 . for aircraft **[7]**
101/08 . Interior lights **[7]**

101/10 . Head-, spot- or fog-lights **[7]**
101/12 . Direction indicator lights **[7]**
101/14 . Rear or stop lights **[7]**

111/00 Use or application of lighting devices or systems for signalling, marking or indicating, not provided for in group F21W 101/00 [7]
111/02 . for roads, paths or the like **[7]**
111/023 . . for pedestrian walkways **[7]**
111/027 . . for indicating kerbs, steps or stairs **[7]**
111/04 . for waterways **[7]**
111/043 . . for lighthouses or lightships **[7]**
111/047 . . for light-buoys **[7]**
111/06 . for aircraft runways or the like **[7]**
111/08 . for handles or handrails **[7]**
111/10 . for personal use, e.g. hand-held **[7]**

121/00 Use or application of lighting devices or systems for decorative purposes [7]
121/02 . for fountains **[7]**
121/04 . for Christmas trees **[7]**
121/06 . for personal wear **[7]**

131/00 Uses or applications of lighting devices or systems not provided for in groups F21W 101/00 to F21W 121/00 [7]
131/10 . Outdoor lighting **[7]**
131/101 . . of tunnels or the like, e.g. under bridges **[7]**
131/103 . . of streets or roads **[7]**
131/105 . . of arenas or the like **[7]**
131/107 . . of the exterior of buildings **[7]**
131/109 . . of gardens **[7]**
131/20 . Lighting for medical use **[7]**
131/202 . . for dentistry **[7]**
131/205 . . for operating theatres **[7]**
131/208 . . for hospital wards **[7]**
131/30 . Lighting for domestic or personal use **[7]**
131/301 . . for furniture **[7]**
131/302 . . for mirrors **[7]**
131/304 . . for pictures **[7]**
131/305 . . for refrigerators **[7]**
131/307 . . for ovens **[7]**
131/308 . . for aquaria **[7]**
131/40 . Lighting for industrial, commercial, recreational or military use **[7]**
131/401 . . for swimming pools **[7]**
131/402 . . for working places **[7]**
131/403 . . for machines **[7]**
131/4035 . . . for sewing machines **[7]**
131/405 . . for shop-windows or displays **[7]**
131/406 . . for theatres, stages or film studios **[7]**
131/407 . . for indoor arenas **[7]**
131/409 . . for furnaces or kilns **[7]**
131/411 . . for inspection of the interior of hollow structures, e.g. vessels, tubes **[7]**

F21Y INDEXING SCHEME ASSOCIATED WITH SUBCLASSES F21L, F21S AND F21V, RELATING TO THE FORM OF THE LIGHT SOURCES [7]

Note

This subclass constitutes an indexing scheme associated with subclasses F21L, F21S and F21V, relating to the form of the light sources. **[7]**

101/00 Point-like light sources [7]
101/02 . Miniature, e.g. light emitting diodes (LED) **[7]**

103/00 Elongated light sources, e.g. fluorescent tubes [7]
103/02 . curved, e.g. ring-shaped **[7]**
103/025 . . U-shaped **[7]**

105/00 Planar light sources [7]

111/00 Light sources of form not covered by groups F21Y 101/00 to F21Y 105/00 [7]

113/00 Combination of light sources [7]
113/02 . of different form **[7]**

F22 STEAM GENERATION

Note

In this class, the following term is used with the meaning indicated:
– "steam" covers also other condensable vapours, e.g. mercury, diphenyl, diphenyl oxide.

F22B **METHODS OF STEAM GENERATION**; **STEAM BOILERS** (steam engine plants where engine aspects predominate F01K; removal of combustion products or residues, e.g. cleaning of the combustion contaminated surfaces of tubes of boilers, F23J 3/00; domestic central-heating systems using steam F24D; heat exchange or heat transfer in general F28; generation of vapour in the cores of nuclear reactors G21)

Note

This subclass covers only methods of, or apparatus for, the generation of steam under pressure for heating or power purposes.

Subclass index

1/00 **Methods of steam generation characterised by form of heating method** (use of solar heat F24J 2/00; jackets or other cooling means in which steam is generated and which serve for cooling other apparatus, see the subclasses for such apparatus)

1/02 . by exploitation of the heat content of hot heat carriers

1/04 . . the heat carrier being hot slag, hot residues, or heated blocks, e.g. iron blocks

1/06 . . the heat carrier being molten; Use of molten metal, e.g. zinc, as heat transfer medium

1/08 . . the heat carrier being steam

1/10 . . . released from heat accumulators

1/12 . . . produced by an indirect cyclic process

1/14 . . . coming in direct contact with water in bulk or in sprays

1/16 . . the heat carrier being hot liquid or hot vapour, e.g. waste liquid, waste vapour

1/18 . . the heat carrier being a hot gas, e.g. waste gas such as exhaust gas of internal-combustion engines (use of waste heat of combustion engines, in general, F02)

1/20 . using heat evolved in a solution absorbing steam; Soda steam boilers

1/22 . using combustion under pressure substantially exceeding atmospheric pressure

1/24 . . Pressure-fired steam boilers, e.g. using turbo air compressors actuated by hot gases from boiler furnace

1/26 . . Steam boilers of submerged-flame type, i.e. the flame being surrounded by, or impinging on, the water to be vaporised

1/28 . in boilers heated electrically

1/30 . . Electrode boilers

3/00 **Other methods of steam generation**; **Steam boilers not provided for in other groups of this subclass**

3/02 . involving the use of working media other than water

3/04 . by drop in pressure of high-pressure hot water within pressure-reducing chambers, e.g. in accumulators (steam accumulators per se F01K 1/00)

3/06 . by transformation of mechanical, e.g. kinetic, energy into heat energy

3/08 . at critical or supercritical pressure values

5/00 **Steam boilers of drum type, i.e. without internal furnace or fire tubes, the boiler body being contacted externally by flue gas**

5/02 . with auxiliary water tubes outside the boiler body

5/04 . Component parts thereof; Accessories therefor (covers or similar closure members for pressure vessels in general F16J 13/00)

7/00 **Steam boilers of furnace-tube type, i.e. the combustion of fuel being performed inside one or more furnace tubes built-in in the boiler body**

7/02 . without auxiliary water tubes

7/04 . with auxiliary water tubes

7/06 . . inside the furnace tube in transverse arrangement

7/08 . . inside the furnace tube in longitudinal arrangement

7/10 . . outside the boiler body

7/12 . with auxiliary fire tubes; Arrangement of header boxes providing for return diversion of flue gas flow

7/14 . with both auxiliary water tubes and auxiliary fire tubes
7/16 . Component parts thereof; Accessories therefor, e.g. stay-bolt connections
7/18 . . Walling of flues; Flue-gas header boxes
7/20 . . Furnace tubes

9/00 Steam boilers of fire-tube type, i.e. the flue gas from a combustion chamber outside the boiler body flowing through tubes built-in in the boiler body

9/02 . the boiler body being disposed upright, e.g. above the combustion chamber
9/04 . . the fire tubes being in upright arrangement
9/06 . . . Arrangement of header boxes providing for return diversion of flue gas flow
9/08 . . the fire tubes being in horizontal arrangement
9/10 . the boiler body being disposed substantially horizontally, e.g. at the side of the combustion chamber
9/12 . . the fire tubes being in substantially-horizontal arrangement
9/14 . . . Arrangement of header boxes providing for return diversion of flue gas flow
9/16 . the boiler body containing fire tubes disposed crosswise in inclined upward arrangement
9/18 . Component parts thereof; Accessories therefor, e.g. stay-bolt connections

11/00 Steam boilers of combined fire-tube type and water-tube type, i.e. steam boilers of fire-tube type having auxiliary water tubes

11/02 . the fire tubes being in upright arrangement
11/04 . the fire tubes being in horizontal arrangement

13/00 Steam boilers of fire-box type, i.e. the combustion of fuel being performed in a chamber or fire-box with subsequent flue(s) or fire tube(s), both chamber or fire-box and flues or fire tubes being built-in in the boiler body

13/02 . mounted in fixed position with the boiler body disposed upright
13/04 . mounted in fixed position with the boiler body disposed substantially horizontally
13/06 . Locomobile, traction-engine, steam-roller, or locomotive boilers
13/08 . . without auxiliary water tubes inside the fire-box
13/10 . . with auxiliary water tubes inside the fire-box
13/12 . . . the auxiliary water tubes lining the fire-box
13/14 . Component parts thereof; Accessories therefor
13/16 . . Stay-bolt connections, e.g. rigid connections
13/18 . . . Flexible connections, e.g. of ball-and-socket type

15/00 Water-tube boilers of horizontal type, i.e. the water-tube sets being arranged horizontally

17/00 Water-tube boilers of horizontally-inclined type, i.e. the water-tube sets being inclined slightly with respect to the horizontal plane

17/02 . built-up from water-tube sets in abutting connection with two header boxes in common for all sets, e.g. with flat header boxes
17/04 . . the water-tube sets being inclined in opposite directions, e.g. crosswise
17/06 . . the water-tube sets being bent angularly
17/08 . . the water-tube sets being curved
17/10 . built-up from water-tube sets in abutting connection with two sectional headers each for every set, i.e. with headers in a number of sections across the width or height of the boiler
17/12 . . the sectional headers being in vertical or substantially-vertical arrangement
17/14 . . the sectional headers being in horizontal or substantially-horizontal arrangement
17/16 . Component parts thereof; Accessories therefor
17/18 . . Header boxes; Sectional headers

19/00 Water-tube boilers of combined horizontally-inclined type and vertical type, i.e. water-tube boilers of horizontally-inclined type having auxiliary water-tube sets in vertical or substantially-vertical arrangement

21/00 Water-tube boilers of vertical or steeply-inclined type, i.e. the water-tube sets being arranged vertically or substantially vertically

21/02 . built-up from substantially-straight water tubes
21/04 . . involving a single upper drum and a single lower drum, e.g. the drums being arranged transversely
21/06 . . . the water tubes being arranged annularly in sets, e.g. in abutting connection with drums of annular shape
21/08 . . . the water tubes being arranged sectionally in groups or in banks, e.g. bent over at their ends
21/10 . . . the water tubes being arranged in staggered rows
21/12 . . involving two or more upper drums and two or more lower drums, e.g. with crosswise-arranged water-tube sets in abutting connection with drums
21/14 . . involving a single upper drum and two or more lower drums
21/16 . . . the lower drums being interconnected by further water tubes
21/18 . . involving two or more upper drums and a single lower drum
21/20 . . involving sectional or subdivided headers in separate arrangement for each water-tube set
21/22 . built-up from water tubes of form other than straight or substantially straight
21/24 . . bent in serpentine or sinuous form
21/26 . . bent helically, i.e. coiled
21/28 . . bent spirally
21/30 . . bent in U-loop form
21/32 . . . disposed horizontally in abutting connection with upright headers or rising water mains
21/34 . built-up from water tubes grouped in panel form surrounding the combustion chamber, i.e. radiation boilers
21/36 . . involving an upper drum or headers mounted at the top of the combustion chamber
21/38 . . Component parts thereof, e.g. prefabricated panels
21/40 . built-up from water tubes arranged in a comparatively long vertical shaft, i.e. tower boilers

23/00 Water-tube boilers built-up from sets of spaced double-walled water tubes of return type in unilaterial abutting connection with a boiler drum or with a header box, i.e. built-up from Field water tubes comprising an inner tube arranged within an outer unilaterally-closed tube

23/02 . the water-tube, i.e. Field-tube, sets being horizontal or substantially horizontal

23/04 . the water-tube, i.e. Field-tube, sets being vertical or substantially vertical

23/06 . Component parts thereof, e.g. Field water tubes (heat-exchange tubes in general F28F)

25/00 Water-tube boilers built-up from sets of water tubes with internally-arranged flue tubes, or fire tubes, extending through the water tubes

27/00 Instantaneous or flash steam boilers

27/02 . built-up from fire tubes

27/04 . built-up from water tubes (F22B 27/12 to F22B 27/16 take precedence)

27/06 . . bent in serpentine or sinuous form

27/08 . . bent helically, i.e. coiled

27/10 . . bent spirally

27/12 . built-up from rotary heat-exchange elements, e.g. from tube assemblies

27/14 . built-up from heat-exchange elements arranged within a confined chamber having heat-retaining walls

27/16 . involving spray nozzles for sprinkling or injecting water particles on to or into hot heat-exchange elements, e.g. into tubes

29/00 Steam boilers of forced-flow type

29/02 . of forced-circulation type

29/04 . of combined-circulation type, i.e. in which convection circulation due to the difference in specific gravity between cold and hot water is promoted by additional measures, e.g. by injecting pressure-water temporarily

29/06 . of once-through type, i.e. built-up from tubes receiving water at one end and delivering superheated steam at the other end of the tubes (F22B 33/00 takes precedence)

29/08 . . operating with fixed point of final state of complete evaporation

29/10 . . operating with sliding point of final state of complete evaporation

29/12 . . operating with superimposed recirculation during starting and low-load periods, e.g. composite boilers

31/00 Modifications of boiler construction, or of tube systems, dependent on installation of combustion apparatus; **Arrangements or dispositions of combustion apparatus** (steam generation characterised by heating method F22B 1/00; combustion apparatus per se F23)

31/02 . Installation of water-tube boilers in chimneys, e.g. in converter chimneys

31/04 . Heat supply by installation of two or more combustion apparatus, e.g. of separate combustion apparatus for the boiler and the superheater respectively

31/06 . . Installation of emergency heat supply

31/08 . Installation of heat-exchange apparatus or of means in boilers for heating air supplied for combustion

Steam-generation plants; **Control systems**

33/00 Steam-generation plants, e.g. comprising steam boilers of different types in mutual association (arrangements or dispositions of steam-generation plants in marine vessels B63H 21/00)

33/02 . Combinations of boilers having a single combustion apparatus in common

33/04 . . of boilers of furnace-tube type with boilers of water-tube type

33/06 . . of boilers of furnace-tube type with boilers of fire-tube type

33/08 . . of boilers of water-tube type with boilers of fire-tube type

33/10 . . of two or more superposed boilers with separate water volumes and operating with two or more separate water levels

33/12 . Self-contained steam boilers, i.e. comprising as a unit the steam boiler, the combustion apparatus, the fuel storage, accessory machines, and equipment

33/14 . Combinations of low- and high-pressure boilers

33/16 . . of forced-flow type

33/18 . Combinations of steam boilers with other apparatus

35/00 Control systems for steam boilers (regulation or control of steam power plants F01K 7/00; for regulating feed-water supply F22D; for controlling superheat temperature F22G 5/00; control of combustion F23N)

35/02 . for steam boilers with natural convection circulation

35/04 . . during starting-up periods, i.e. during the periods between the lighting of the furnaces and the attainment of the normal operating temperature of the steam boilers

35/06 . for steam boilers of forced-flow type

35/08 . . of forced-circulation type

35/10 . . of once-through type

35/12 . . . operating at critical or supercritical pressure

35/14 . . during the starting-up periods, i.e. during the periods between the lighting of the furnaces and the attainment of the normal operating temperature of the steam boilers

35/16 . . responsive to the percentage of steam in the mixture of steam and water

35/18 . Applications of computers to steam-boiler control

37/00 Component parts or details of steam boilers (venting devices F16K 24/00; steam traps or like apparatus F16T)

37/02 . applicable to more than one kind or type of steam boiler

37/04 . . and characterised by material, e.g. use of special steel alloy

37/06 . . Flue or fire tubes; Accessories therefor, e.g. fire-tube inserts

37/08 . . . Fittings preventing burning-off of the tube edges

37/10 . . Water tubes; Accessories therefor (working of metal tubes B21D; pipes in general F16L; repairing leaks in water tubes F16L 55/16, F28F 11/00; cleaning water tubes of boilers F23J, F28G; baffles, screens, or deflectors formed of water tubes F23M 9/10)

37/12 . . . Forms of water tubes, e.g. of varying cross-section

37/14 . . . Supply mains, e.g. rising mains, down-comers, in connection with water tubes

37/16 . . . Return bends

37/18 . . . Inserts, e.g. for receiving deposits from water

37/20 . . . Supporting arrangements, e.g. for securing water-tube sets (construction of tube walls of furnaces including boiler furnaces F23M 5/08)

37/22 . . Drums; Headers; Accessories therefor (making boilers from sheet metal B21D 51/24; pressure vessels in general F16J 12/00; covers or similar closure members for pressure vessels in general F16J 13/00)

37/24 . . Supporting, suspending, or setting arrangements, e.g. heat shielding (frames, engine beds F16M)

37/26 . . Steam-separating arrangements (vapour-liquid separators, e.g. for drying steam, B01D, B04)

37/28 . . . involving reversal of direction of flow

37/30 . . . using impingement against baffle separators

37/32 . . . using centrifugal force

37/34 . . Adaptations of boilers for promoting water circulation (auxiliary devices for promoting water circulation F22D 7/00)

37/36 . . Arrangements for sheathing or casing boilers

37/38 . . Determining or indicating operating conditions in steam boilers, e.g. monitoring direction or rate of water flow through water tubes (measuring or indicating instruments in general G01)

37/40 . . Arrangements of partition walls in flues of steam boilers, e.g. built-up from baffles (in flues or chimneys F23J 13/00)

37/42 . . Applications, arrangements, or dispositions of alarm or automatic safety devices (for feed-water heaters F22D 1/14; alarms responsive to undesired or abnormal conditions G08B)

37/44 . . . of safety valves (safety valves per se F16K)

37/46 . . . responsive to low or high water level, e.g. for checking, suppressing, extinguishing combustion in boilers (fire-fighting, fire extinction in general A62)

37/47 . . . responsive to abnormal temperature, e.g. actuated by fusible plugs (such alarms or devices per se G08B)

37/48 . . Devices or arrangements for removing water, minerals, or sludge from boilers (cleaning water tubes, furnace tubes, or the like of boilers F23J, F28G)

Note

Group F22B 37/48 covers only systems used while the boiler is in operation, or which remain in position while the boiler is in operation, or are specifically adapted to boilers without any other utility. **[4]**

37/50 . . . for draining or expelling water

37/52 . . . Washing-out devices

37/54 . . . De-sludging or blow-down devices

37/56 . . Boiler-cleaning control devices, e.g. for ascertaining proper duration of boiler blow-down

37/58 . . Removing tubes from headers or drums; Extracting tools

37/60 . specially adapted for steam boilers of instantaneous or flash type

37/62 . specially adapted for steam boilers of forced-flow type

37/64 . . Mounting of, or supporting arrangements for, tube units (construction of tube walls of furnaces, e.g. boiler furnaces F23M 5/08)

37/66 . . . involving vertically-disposed water tubes

37/68 . . . involving horizontally-disposed water tubes

37/70 . . Arrangements for distributing water into water tubes

37/72 . . . involving injection devices

37/74 . . . Throttling arrangements for tubes or sets of tubes

37/76 . Adaptations or mounting of devices for observing existence or direction of fluid flow (devices per se G01P)

37/78 . Adaptations or mounting of level indicators (level indicators per se G01F)

F22D PREHEATING, OR ACCUMULATING PREHEATED, FEED-WATER; FEED-WATER SUPPLY; CONTROLLING WATER LEVEL; AUXILIARY DEVICES FOR PROMOTING WATER CIRCULATION WITHIN BOILERS (chemical treatment of water, e.g. purification, C02F; enclosed heat-exchange apparatus in general F28D; controlling in general G05)

1/00 Feed-water heaters, e.g. preheaters

1/02 . with water tubes arranged in the boiler furnace, fire tubes, or flue ways (heat-exchange tubes in general F28F)

1/04 . . the tubes having plain outer surfaces, e.g. in vertical arrangement

1/06 . . . in horizontal arrangement

1/08 . . the tubes having fins, ribs, gills, corrugations, or the like on their outer surfaces, e.g. in vertical arrangement

1/10 . . . in horizontal arrangement (hollow fire-bars, grates, or the like used as water tubes F23H 3/02)

1/12 . . Control devices, e.g. for regulating steam temperature

1/14 . . Safety or venting devices (safety devices for boilers in general F22B 37/42)

1/16 . with water tubes arranged otherwise than in the boiler furnace, fire tubes, or flue ways

1/18 . . and heated indirectly

1/20 . . and directly connected to boilers

1/22 . . and provided for rotary movement

1/24 . with fire tubes or flue ways traversing feed-water vessels

1/26 . with means, other than tubes, to separate water and heating medium, e.g. bulk heaters without internal flues or tubes, jacketted smoke-boxes or flues

1/28 . for direct heat transfer, e.g. by mixing water and steam

1/30 . . with stages, steps, baffles, dishes, circular troughs, or other means to cause interrupted or cascading fall of water

1/32 . arranged to be heated by steam, e.g. bled from turbines

1/34 . . and returning condensate to boiler with main feed supply

1/36 . Water and air preheating systems

1/38 . . Constructional features of water and air preheating systems

1/40 . Combinations of exhaust-steam and smoke-gas preheaters (for locomotives F22D 1/42)

1/42 . specially adapted for locomotives

1/44 . . Smoke-gas preheaters
1/46 . . Exhaust-steam preheaters
1/48 . . Details
1/50 . incorporating thermal de-aeration of feed-water (de-aeration produced in the course of direct heat transfer F22D 1/28; thermal de-aeration of water per se B01D 19/00, C02F 1/20; valves for venting F16K 24/04) **[3]**

3/00 Accumulators for preheated water
3/02 . arranged within combustion chambers
3/04 . combined with steam accumulators
3/06 . directly connected to boilers
3/08 . specially adapted for locomotives (locomotive boilers F22B 13/06)
3/10 . . Control devices (controlling water feed to boilers, or water level F22D 5/00)

5/00 Controlling water feed or water level; **Automatic water feeding or water-level regulators** (steam traps F16T; measuring or indicating instruments G01; for indicating water level G01F; level control in general G05D 9/00)
5/02 . with an intermediate compartment from which the water is fed by gravity after mechanically moving the compartment, the movement being controlled according to water level
5/04 . with pivoting buckets
5/06 . with receptacles external to, but in free communication with, the boilers and adapted to move up and down in accordance with change in water level
5/08 . with float-actuated valves
5/10 . . and with pistons or membranes unitary with the feed inlet valves
5/12 . . and with dipping tubes
5/14 . responsive to thermal expansion and contraction, e.g. of solid elements
5/16 . . of fluids
5/18 . for varying the speed or delivery pressure of feed pumps
5/20 . . without floats
5/22 . . with floats
5/24 . with electric switches
5/26 . Automatic feed-control systems (automatic safety devices F22B 37/42; controlling in general G05)
5/28 . . responsive to amount of steam withdrawn; responsive to steam pressure
5/30 . . responsive to both water level and amount of steam withdrawn or steam pressure
5/32 . . influencing the speed or delivery pressure of the feed pumps
5/34 . . Applications of valves (valves per se F16K)
5/36 . . for feeding a number of steam boilers designed for different ranges of temperature and pressure

7/00 Auxiliary devices for promoting water circulation (adaptation of boilers for promoting water circulation F22B 37/34)
7/02 . Saddles or like directing plates fitted to furnace tubes
7/04 . Injectors for water or steam
7/06 . Rotary devices, e.g. propellers
7/08 . . Arrangements of pumps, e.g. outside the boilers
7/10 . . . within the boilers
7/12 . Control devices
7/14 . specially adapted for locomotive boilers

11/00 Feed-water supply not provided for in other main groups
11/02 . Arrangements of feed-water pumps (F22D 11/06 takes precedence; pumps per se F04)
11/04 . . with means to eliminate steam formation
11/06 . . for returning condensate to boiler

F22G SUPERHEATING OF STEAM (steam-separating arrangements in boilers F22B 37/26; removal of combustion products or residues, e.g. cleaning of the combustion contaminated surfaces of tubes of boilers, F23J 3/00)

1/00 Steam superheating characterised by heating method (exothermal chemical reactions not involving a supply of free oxygen gas, apparatus or devices for using the heat therefrom F24J)
1/02 . with heat supply by hot flue gases from the furnace of the steam boiler
1/04 . . by diverting flow or hot flue gases to separate superheaters operating in reheating cycle, e.g. for reheating steam between a high-pressure turbine stage and an intermediate turbine stage
1/06 . with heat supply predominantly by radiation
1/08 . . from heated brickwork or the like
1/10 . with provision for superheating by throttling
1/12 . by mixing steam with furnace gases or other combustion products
1/14 . using heat generated by chemical reactions
1/16 . by using a separate heat source independent from heat supply of the steam boiler, e.g. by electricity, by auxiliary combustion of fuel oil

3/00 Steam superheaters characterised by constructional features; **Details or component parts thereof** (general aspects of enclosed heat-exchangers F28D)

5/00 Controlling superheat temperature (control systems for steam boilers F22B; regulating or controlling in general G05)
5/02 . Applications of combustion-control devices, e.g. tangential-firing burners, tilting burners
5/04 . by regulating flue gas flow, e.g. by proportioning or diverting
5/06 . by recirculating flue gases
5/08 . . preventing furnace gas backflow through recirculating fan
5/10 . by displacing superheater sections
5/12 . by attemperating the superheated steam, e.g. by injected water sprays (spray-mixers B01F 5/18)
5/14 . . by live steam
5/16 . by indirectly cooling or heating the superheated steam in auxiliary enclosed heat-exchanger
5/18 . by by-passing steam around superheater sections
5/20 . by combined controlling procedures

7/00 Steam superheaters characterised by location, arrangement, or disposition
7/02 . in fire tubes
7/04 . in jackets around fire tubes

7/06 . in furnace tubes
7/08 . in fire-boxes
7/10 . in smoke-boxes
7/12 . in flues
7/14 . in water-tube boilers, e.g. between banks of water tubes

F23 COMBUSTION APPARATUS; COMBUSTION PROCESSES

Note

In this class, the following terms or expressions are used with the meanings indicated:
- "combustion" means the direct combination of oxygen gas, e.g. in air, and a burnable substance. Any other heat-producing combination of chemical substances, e.g. hydrogen peroxide and methane, iron oxide and aluminium, is covered by section C or by subclass F24J;
- "combustion chamber" means a chamber in which fuel is burned to establish a self-supporting fire or flame and which surrounds that fire or flame;
- "burner" means a device by which fluent fuel is passed to a combustion space where it burns to produce a self-supporting flame;
- "air" means a mixture of gases containing free oxygen and able to promote or support combustion.

F23B METHODS OR APPARATUS FOR COMBUSTION USING ONLY SOLID FUEL (for combustion of fuels that are solid at room temperatures, but burned in melted form, e.g. candle wax, C11C 5/00, F23C, F23D; using solid fuel suspended in air F23C, F23D 1/00; using solid fuel suspended in liquids F23C, F23D 11/00; using solid fuel and fluent fuel simultaneously or alternately F23C, F23D 17/00)

(1) This subclass only covers combustion wherein the main body of fuel is either essentially stationary during combustion or mechanically transported, as opposed to pneumatically transported or suspended in air, during combustion. **[8]**

(2) In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[8]**

(3) In this subclass, methods are classified in the groups that cover the apparatus used. Methods that are not related to a particular type of apparatus are classified in group F23B 90/00. **[8]**

(4) In this subclass, it is desirable to add the indexing codes of groups F23B 101/00 to F23B 103/00. **[8]**

Subclass index

10/00 ***Combustion apparatus characterised by the combination of two or more combustion chambers* [8,2011.01]**

10/02 . *including separate secondary combustion chambers* **[2011.01]**

20/00 Combustion apparatus specially adapted for portability or transportability [8]

30/00 Combustion apparatus with driven means for agitating the burning fuel; Combustion apparatus with driven means for advancing the burning fuel through the combustion chamber [8]

30/02 . with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts **[8]**

30/04 . . with fuel-supporting surfaces that are rotatable around a horizontal or inclined axis and support the fuel on their inside, e.g. cylindrical grates **[8]**

30/06 . . with fuel-supporting surfaces that are specially adapted for advancing the fuel through the combustion zone **[8]**

30/08 . . . with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates **[8]**

30/10 . . . with fuel-supporting surfaces having fuel advancing elements that are movable, but remain essentially in the same place, e.g. with rollers or reciprocating grate bars **[8]**

40/00 Combustion apparatus with driven means for feeding fuel into the combustion chamber [8]

40/02 . the fuel being fed by scattering over the fuel-supporting surface **[8]**

40/04 . the fuel being fed from below through an opening in the fuel-supporting surface **[8]**

40/06 . the fuel being fed along the fuel-supporting surface **[8]**

40/08 . . into pot- or trough-shaped grates **[8]**

50/00 Combustion apparatus in which the fuel is fed into or through the combustion zone by gravity, e.g. from a fuel storage situated above the combustion zone [8]

50/02 . the fuel forming a column, stack or thick layer with the combustion zone at its bottom **[8]**

50/04 . . the movement of combustion air and flue gases being substantially transverse to the movement of the fuel **[8]**

50/06 . . the flue gases being removed downwards through one or more openings in the fuel-supporting surface **[8]**

50/08 . . with fuel-deflecting bodies forming free combustion spaces inside the fuel layer **[8]**

50/10 . . with the combustion zone at the bottom of fuel-filled conduits ending at the surface of a fuel bed **[8]**

50/12 . the fuel being fed to the combustion zone by free fall or by sliding along inclined surfaces, e.g. from a conveyer terminating above the fuel bed **[8]**

60/00 Combustion apparatus in which the fuel burns essentially without moving [8]

60/02 . with combustion air supplied through a grate **[8]**

70/00 Combustion apparatus characterised by means for returning solid combustion residues to the combustion chamber [8]

80/00 Combustion apparatus characterised by means creating a distinct flow path for flue gases or for non-combusted gases given off by the fuel [8]

80/02 . by means for returning flue gases to the combustion chamber or to the combustion zone **[8]**

80/04 . by means for guiding the flow of flue gases, e.g. baffles **[8]**

***90/00 Combustion methods not related to a particular type of apparatus* [8,2011.01]**

90/02 . *Start-up techniques* **[2011.01]**

90/04 . *including secondary combustion (in separate combustion chambers F23B 10/02)* **[2011.01]**

90/06 . . *the primary combustion being a gasification or pyrolysis in a reductive atmosphere* **[2011.01]**

90/08 . . *in the presence of catalytic material* **[2011.01]**

99/00 Subject matter not provided for in other groups of this subclass [8]

Indexing scheme related to adaptation of combustion apparatus to boilers [8]

101/00 Adaptation of combustion apparatus to boilers in which the combustion chamber is situated inside the boiler vessel, e.g. surrounded by cooled surfaces [8]

103/00 Adaptation of combustion apparatus for placement in or against an opening of a boiler, e.g. for replacing an oil burner [8]

103/02 . for producing an essentially horizontal flame **[8]**

F23C METHODS OR APPARATUS FOR COMBUSTION USING FLUENT FUEL (burners F23D)

Note

In this subclass, methods are classified in the groups that cover the apparatus used. **[8]**

Subclass index

1/00 Combustion apparatus specially adapted for combustion of two or more kinds of fuel simultaneously or alternately, at least one kind of fuel being fluent (combustion apparatus characterised by the combination of two or more combustion chambers F23C 6/00; pilot flame igniters F23Q 9/00) **[1,7,8]**

1/02 . lump and liquid fuel

1/04 . lump and gaseous fuel

1/06 . lump and pulverulent fuel

1/08 . liquid and gaseous fuel

1/10 . liquid and pulverulent fuel

1/12 . gaseous and pulverulent fuel

3/00 Combustion apparatus characterised by the shape of the combustion chamber (F23C 15/00 takes precedence) **[1,7,8]**

5/00 Combustion apparatus characterised by the arrangement or mounting of burners [1,7,8]

5/02 . Structural details of mounting

5/06 . . Provision for adjustment of burner position during operation

5/08 . Disposition of burners

5/14 . . to obtain a single flame of concentrated or substantially planar form, e.g. pencil or sheet flame (F23C 5/32 takes precedence) **[3]**

5/24 . . to obtain a loop flame

5/28 . . to obtain flames in opposing directions, e.g. impacting flames

5/32 . . to obtain rotating flames, i.e. flames moving helically or spirally **[3]**

6/00 **Combustion apparatus characterised by the combination of two or more combustion chambers [3,7,8]**

6/02 . in parallel arrangement **[3]**

6/04 . in series connection **[3]**

7/00 **Combustion apparatus characterised by arrangements for air supply** (inlets for fluidisation air F23C 10/20) **[1,7,8]**

7/02 . Disposition of air supply not passing through burner

7/04 . . to obtain maximum heat transfer to wall of combustion chamber

7/06 . . for heating the incoming air (arrangements of regenerators or recuperators F23L 15/00)

7/08 . . . indirectly by a secondary fluid other than the combustion products

9/00 **Combustion apparatus characterised by arrangements for returning combustion products or flue gases to the combustion chamber** (fluidised bed combustion apparatus with means for recirculation of particles entrained from the bed F23C 10/02; fluidised bed combustion apparatus with devices for removal and partial reintroduction of material from the bed F23C 10/26) **[1,7,8]**

9/06 . for completing combustion **[3]**

9/08 . for reducing temperature in combustion chamber, e.g. for protecting walls of combustion chamber **[3]**

10/00 **Apparatus in which combustion takes place in a fluidised bed of fuel or other particles [7]**

Note

In this group, it is desirable to add the indexing code of group F23C 101/00. **[7]**

10/01 . in a fluidised bed of catalytic particles **[8]**

10/02 . with means specially adapted for achieving or promoting a circulating movement of particles within the bed or for a recirculation of particles entrained from the bed **[7]**

10/04 . . the particles being circulated to a section, e.g. a heat-exchange section or a return duct, at least partially shielded from the combustion zone, before being reintroduced into the combustion zone **[7]**

10/06 . . . the circulating movement being promoted by inducing differing degrees of fluidisation in different parts of the bed **[7]**

10/08 . . . characterised by the arrangement of separation apparatus, e.g. cyclones, for separating particles from the flue gases **[7]**

10/10 . . . . the separation apparatus being located outside the combustion chamber **[7]**

10/12 . . the particles being circulated exclusively within the combustion zone **[7]**

10/14 . . . the circulating movement being promoted by inducing differing degrees of fluidisation in different parts of the bed **[7]**

10/16 . specially adapted for operation at superatmospheric pressures, e.g. by the arrangement of the combustion chamber and its auxiliary systems inside a pressure vessel **[7]**

10/18 . Details; Accessories **[7]**

10/20 . . Inlets for fluidisation air, e.g. grids; Bottoms **[7]**

10/22 . . Fuel feeders specially adapted for fluidised bed combustion apparatus (F23C 10/26 takes precedence) **[7]**

10/24 . . Devices for removal of material from the bed (devices for controlling the level of the bed or the amount of material in the bed F23C 10/30) **[7]**

10/26 . . . combined with devices for partial reintroduction of material into the bed, e.g. after separation of agglomerated parts **[7]**

10/28 . . Control devices specially adapted for fluidised bed combustion apparatus **[7]**

10/30 . . . for controlling the level of the bed or the amount of material in the bed **[7]**

10/32 . . . . by controlling the rate of recirculation of particles separated from the flue gases **[7]**

13/00 **Apparatus in which combustion takes place in the presence of catalytic material** (in a fluidised bed of catalytic particles F23C 10/01; radiant gas burners using catalysis for flameless combustion F23D 14/18) **[8]**

13/02 . characterised by arrangements for starting the operation, e.g. for heating the catalytic material to operating temperature **[8]**

13/04 . characterised by the arrangement of two or more catalytic elements in series connection **[8]**

13/06 . in which non-catalytic combustion takes place in addition to catalytic combustion, e.g. downstream of a catalytic element **[8]**

13/08 . characterised by the catalytic material **[8]**

15/00 **Apparatus in which combustion takes place in pulses influenced by acoustic resonance in a gas mass [8]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

Indexing scheme associated with group F23C 10/00, relating to combustion in entrained fluidised beds. [7]

101/00 **Combustion in entrained fluidised beds, i.e. fluidised beds which have no distinct upper surface [7]**

F23D **BURNERS** (generating combustion products of high pressure or high velocity F23R)

Subclass index

1/00 Burners for combustion of pulverulent fuel (arrangement or mounting of burners F23C 5/00)
1/02 . Vortex burners, e.g. for cyclone-type combustion apparatus
1/04 . Burners producing cylindrical flames without centrifugal action
1/06 . Burners producing sheet flames

Combustion of a liquid

3/00 Burners using capillary action
3/02 . Wick burners
3/04 . . with flame spreaders (F23D 3/12 takes precedence)
3/06 . . Inverted wick burners, e.g. for illumination
3/08 . . characterised by shape, construction, or material, of wick
3/10 . . Blue-flame burners
3/12 . . . with flame spreaders
3/14 . . . with mixing of air and fuel vapour in a chamber before the flame
3/16 . . using candles (candles per se C11C)
3/18 . . Details of wick burners
3/20 . . . Flame spreaders
3/22 . . . Devices for mixing evaporated fuel with air
3/24 . . . Carriers for wicks
3/26 . . . . Safety devices thereon
3/28 . . . Wick-adjusting devices
3/30 . . . . directly engaging with the wick
3/32 . . . . engaging with a tube carrying the wick
3/34 . . . . Wick stop devices; Wick-fixing devices
3/36 . . . Devices for trimming wicks
3/38 . . . Devices for replacement of wicks
3/40 . the capillary action taking place in one or more rigid porous bodies

5/00 Burners in which liquid fuel evaporates in the combustion space, with or without chemical conversion of evaporated fuel
5/02 . the liquid forming a pool, e.g. bowl-type evaporators, dish-type evaporators
5/04 . . Pot-type evaporators, i.e. using a partially-enclosed combustion space
5/06 . the liquid forming a film on one or more plane or convex surfaces
5/08 . . on cascaded surfaces
5/10 . . on grids
5/12 . Details
5/14 . . Maintaining predetermined amount of fuel in evaporator
5/16 . . Safety devices
5/18 . . Preheating devices

7/00 Burners in which drops of liquid fuel impinge on a surface

9/00 Burners in which a stream of liquid fuel impinges intermittently on a hot surface

11/00 Burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space (spraying in general B05B, B05D)
11/02 . the combustion space being a chamber substantially at atmospheric pressure
11/04 . the spraying action being obtained by centrifugal action
11/06 . . using a horizontal shaft
11/08 . . using a vertical shaft
11/10 . the spraying being induced by a gaseous medium, e.g. water vapour
11/12 . . characterised by the shape or arrangement of the outlets from the nozzle
11/14 . . . with a single outlet, e.g. slit
11/16 . . in which an emulsion of water and fuel is sprayed
11/18 . . the gaseous medium being water vapour generated at the nozzle
11/20 . . . the water vapour being superheated
11/22 . . the gaseous medium being vaporised fuel, e.g. for a soldering lamp
11/24 . by pressurisation of the fuel before a nozzle through which it is sprayed by a substantial pressure reduction into a space
11/26 . . with provision for varying the rate at which the fuel is sprayed
11/28 . . . with flow-back of fuel at the burner, e.g. using by-pass
11/30 . . . with return feed of uncombusted sprayed fuel to reservoir
11/32 . by electrostatic means
11/34 . by ultrasonic means
11/36 . Details
11/38 . . Nozzles (nozzles in general B05B); Cleaning devices therefor
11/40 . . Mixing tubes; Burner heads
11/42 . . Starting devices (igniting F23Q)
11/44 . . Preheating devices; Vaporising devices
11/46 . . Devices on the vaporiser for controlling the feeding of the fuel

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14/00 Burners for combustion of a gas, e.g. of a gas stored under pressure as a liquid [4]
14/02 . Premix gas burners, i.e. in which gaseous fuel is mixed with combustion air upstream of the combustion zone **[4]**
14/04 . . induction type, e.g. Bunsen burner **[4]**
14/06 . . . with radial outlets at the burner head **[4]**
14/08 . . . with axial outlets at the burner head **[4]**
14/10 . . . with elongated tubular burner head **[4]**
14/12 . Radiant burners **[4]**
14/14 . . using screens or perforated plates **[4]**
14/16 . . using permeable blocks **[4]**
14/18 . . using catalysis for flameless combustion **[4]**
14/20 . Non-premix gas burners, i.e. in which gaseous fuel is mixed with combustion air on arrival at the combustion zone (F23D 14/30 to F23D 14/44 take precedence) **[4]**
14/22 . . with separate air and gas feed ducts, e.g. with ducts running parallel or crossing each other **[4]**
14/24 . . . at least one of the fluids being submitted to a swirling motion **[4]**
14/26 . with provision for a retention flame (pilot flame igniters F23Q 9/00) **[4]**
14/28 . in association with a gaseous fuel source, e.g. acetylene generator, or a container for liquefied gas **[4]**
14/30 . Inverted burners, e.g. for illumination **[4]**
14/32 . using a mixture of gaseous fuel and pure oxygen or oxygen-enriched air (F23D 14/38 takes precedence) **[4]**
14/34 . Burners specially adapted for use with means for pressurising the gaseous fuel or the combustion air (F23D 14/38 takes precedence) **[4]**

14/36 . . in which the compressor and burner form a single unit **[4]**
14/38 . Torches, e.g. for cutting, brazing, welding or heating (nozzles F23D 14/48) **[4]**
14/40 . . for welding (F23D 14/44 takes precedence) **[4]**
14/42 . . for cutting (F23D 14/44 takes precedence) **[4]**
14/44 . . for use under water **[4]**
14/46 . Details **[4]**
14/48 . . Nozzles (for spraying or coating B05B) **[4]**
14/50 . . . Cleaning devices therefor **[4]**
14/52 . . . for torches; for blow-pipes **[4]**
14/54 . . . . for cutting or welding metal **[4]**
14/56 . . . for spreading the flame over an area, e.g. for desurfacing of solid material, for surface hardening, for heating workpieces (scarfing by applying flames B23K 7/00) **[4]**
14/58 . . . characterised by the shape or arrangement of the outlet or outlets from the nozzle, e.g. of annular configuration **[4]**
14/60 . . Devices for simultaneous control of gas and combustion air (regulation of combustion in general F23N) **[4]**
14/62 . . Mixing devices; Mixing tubes **[4]**
14/64 . . . with injectors **[4]**
14/66 . . Preheating the combustion air or gas **[4]**
14/68 . . Treating the combustion air or gas, e.g. by filtering, by moistening (in general B01) **[4]**
14/70 . . Baffles or like flow-disturbing devices **[4]**
14/72 . . Safety devices, e.g. operative in case of failure of gas supply (protection or supervision of pipe-line systems F17D 5/00) **[4]**
14/74 . . . Preventing flame lift-off (F23D 14/70 takes precedence) **[4]**
14/76 . . . Protecting flame and burner parts **[4]**
14/78 . . . Cooling burner parts **[4]**
14/80 . . . Selection of a non-toxic gas **[4]**
14/82 . . . Preventing flashback or blowback (F23D 14/70 takes precedence; in gas feed lines A62C 4/02) **[4]**
14/84 . . Flame spreading or otherwise shaping (F23D 14/70 takes precedence) **[4]**

Other burners

17/00 **Burners for combustion simultaneously or alternately of gaseous or liquid or pulverulent fuel**

23/00 **Assemblies of two or more burners** (gas burners with provision for a retention flame F23D 14/26; arrangement or mounting of burners F23C 5/00; for industrial furnaces F27)

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

F23G CREMATION FURNACES; CONSUMING WASTE OR LOW GRADE FUELS BY COMBUSTION

Subclass index

1/00 **Methods or apparatus specially adapted for cremation of human or animal carcasses**

5/00 **Methods or apparatus, e.g. incinerators, specially adapted for combustion of waste or low-grade fuels [4]**

5/02 . including pretreatment **[4]**
5/027 . . pyrolising or gasifying (pyrolisation of sludge C02F 11/00; destructive distillation of carbonaceous materials C10B 53/00) **[4]**
5/033 . . comminuting or crushing **[4]**
5/04 . . drying **[4]**
5/05 . . . using drying grates **[4]**
5/08 . including supplementary heating **[4]**
5/10 . . using electric means **[4]**
5/12 . . using gaseous or liquid fuel (F23G 5/14 takes precedence) **[4]**
5/14 . . including secondary combustion **[4]**
5/16 . . . in a separate combustion chamber **[4]**
5/18 . . . in a stack **[4]**
5/20 . with combustion in rotating or oscillating drums **[4]**
5/22 . . the drums being conically shaped **[4]**
5/24 . with combustion in a vertical, substantially cylindrical, combustion chamber **[4]**
5/26 . . having rotating bottom **[4]**
5/28 . . having raking arms **[4]**
5/30 . with combustion in a fluidised bed **[4]**
5/32 . in which the waste or low-grade fuel is subjected to a whirling movement, e.g. cyclonic incinerators **[4]**
5/34 . in which the waste or low-grade fuel is burnt in a pit or arranged in a heap for combustion **[4]**
5/36 . with combustion in a conical combustion chamber, e.g. "teepee" incinerators (F23G 5/22 takes precedence) **[4]**
5/38 . having multi-hearth arrangements **[4]**
5/40 . Portable or mobile apparatus **[4]**
5/42 . . of the basket type **[4]**
5/44 . Details; Accessories **[4]**
5/46 . . Recuperation of heat **[4]**
5/48 . . Preventing corrosion **[4]**
5/50 . Control or safety arrangements **[4]**

7/00 **Methods or apparatus, e.g. incinerators, specially adapted for combustion of specific waste or low grade fuels, e.g. chemicals** (F23G 1/00 takes precedence; incinerator closets A47K 11/02; oxidation of sludge C02F 11/06; incinerating radioactive waste G21F 9/00) **[4,8]**

7/02 . of bagasse, megasse or the like **[4]**
7/04 . of waste liquors, e.g. sulfite liquors **[4]**

7/05 . of waste oils **[4]**
7/06 . of waste gases or noxious gases, e.g. exhaust gases (exhaust apparatus for engines with means for rendering the exhaust innocuous, e.g. by thermal or catalytic conversion, F01N 3/08; combustion of uncombusted material from primary combustion within apparatus for combustion of solid or fluent fuel F23B, F23C) **[4]**
7/07 . . in which combustion takes place in the presence of catalytic material **[8]**
7/08 . . using flares, e.g. in stacks **[4]**
7/10 . of field or garden waste **[4]**
7/12 . of plastics, e.g. rubber **[4]**
7/14 . of contaminated soil, e.g. soil contaminated by oil **[4]**

F23H GRATES (inlets for fluidisation air for fluidised bed combustion apparatus F23C 10/20); **CLEANING OR RAKING GRATES**

Subclass index

1/00 Grates with solid bars (double grates F23H 5/00)
1/02 . having provision for air supply or air preheating, e.g. air-supply or blast fittings which form part of the grate structure or serve as supports
1/04 . having a variable burning surface
1/06 . having bars at different levels
1/08 . Vertical grates

3/00 Grates with hollow bars
3/02 . internally cooled
3/04 . externally cooled, e.g. with water, steam, or air

5/00 Double grates

7/00 Inclined grates (inclined travelling grates F23H 11/12)
7/02 . with fixed bars
7/04 . . in parallel disposition
7/06 . with movable bars disposed parallel to direction of fuel feeding
7/08 . . reciprocating along their axes
7/10 . . rocking about their axes
7/12 . with movable bars disposed transversely to direction of fuel feeding
7/14 . . reciprocating along their axes
7/16 . . rocking about their axes
7/18 . . reciprocating in an upward direction

9/00 Revolving grates; **Rocking grates** (F23H 7/00 takes precedence)
9/02 . Revolving cylindrical grates
9/04 . Grates rocked as a whole
9/06 . the bars being rocked about axes transverse to their lengths
9/08 . the bars being rocked about their longitudinal axes
9/10 . . and modified to move fuel along the grate
9/12 . the bars being vertically movable in a plane

11/00 Travelling grates
11/02 . with the bars disposed on transverse bearers
11/04 . with the bars pivoted at one side
11/06 . with the bars movable relatively to one another
11/08 . with several individually-movable grate surfaces
11/10 . with special provision for supply of air from below and for regulating air supply
11/12 . inclined travelling grates; Stepped travelling grates
11/14 . serving as auxiliary grates
11/16 . for multi-layer stoking
11/18 . Details
11/20 . . Driving means
11/22 . . Moving fuel along grate; Cleaning of grate
11/24 . . Removal of ashes; Removal of clinker
11/26 . . . by dumping
11/28 . . Replaceable burning-surface

13/00 Grates not covered by any of groups F23H 1/00 to F23H 11/00
13/02 . Basket grates, e.g. with shaking arrangement
13/04 . Telescoping grates
13/06 . Dumping-grates
13/08 . Grates specially adapted for gas generators and also applicable to furnaces

15/00 Cleaning arrangements for grates (not forming part of the grate F23J 1/00); **Moving fuel along grate** (rocking grates modified for moving fuel F23H 9/10; for travelling grates F23H 11/22)

17/00 Details of grates
17/02 . End fittings on bars
17/04 . . of travelling grates
17/06 . Provision for vertical adjustment of grate
17/08 . Bearers; Frames; Spacers; Supports
17/10 . . Dead plates; Imperforate fuel supports
17/12 . Fire-bars

F23J **REMOVAL OR TREATMENT OF COMBUSTION PRODUCTS OR COMBUSTION RESIDUES**; **FLUES** (precipitating dust from flue gases B01D; composition of fuels C10; combustion apparatus for consuming smoke or fumes, e.g. exhaust gases, F23G 7/06)

(1) This subclass covers also the cleaning of surfaces of furnace tubes, flame tubes, water tubes, flues or the like of boilers, heat-exchange or heat-transfer conduits, which surfaces are contaminated by combustion products or combustion residues.

(2) This subclass does not cover the cleaning of surfaces of boilers, heat exchange or heat-transfer conduits contaminated by other than combustion products or combustion residues, which is covered by subclass F28G.

Subclass index

1/00 **Removing ash, clinker, or slag from combustion chambers** (devices for removal of material from the bed of fluidised bed combustion apparatus F23C 10/24)

1/02 . Apparatus for removing ash, clinker, or slag from ash-pits, e.g. by employing trucks or conveyers, by employing suction devices

1/04 . Hand tools, e.g. rakes, prickers, tongs

1/06 . Mechanically-operated devices, e.g. clinker pushers (forming part of the grate F23H)

1/08 . Liquid slag removal **[3]**

3/00 **Removing solid residues from passages or chambers beyond the fire, e.g. from flues by soot blowers**

3/02 . Cleaning furnace tubes; Cleaning flues or chimneys (by means which do not differ materially from the cleaning of any other tube once the fire is out B08B)

3/04 . Traps

3/06 . Systems for accumulating residues from different parts of furnace plant

7/00 **Arrangement of devices for supplying chemicals to fire** (supplying chemicals to fire C10L)

9/00 **Preventing premature solidification of molten combustion residues**

11/00 **Devices for conducting smoke or fumes, e.g. flues** (heat insulation therefor E04B 1/94; chimneys E04H 12/28; removing cooking fumes from domestic stoves or ranges F24C 15/20) **[5]**

11/02 . for conducting smoke or fumes originating from various locations to the outside, e.g. in locomotive sheds, in garages

11/04 . in locomotives; in road vehicles; in ships

11/06 . . for conducting smoke horizontally

11/08 . for portable apparatus

11/10 . for tents; for log huts; for other inflammable structures

11/12 . Smoke conduit systems for factories or large buildings

13/00 **Fittings for chimneys or flues** (staying, stiffening E04H; means for facilitating climbing E06C; draught-inducing apparatus associated with chimneys or flues F23L)

13/02 . Linings; Jackets; Casings

13/04 . Joints; Connections (pipe joints in general F16L)

13/06 . Mouths; Inlet holes

13/08 . Doors or covers specially adapted for smoke-boxes, flues, or chimneys (in general E06B)

15/00 **Arrangements of devices for treating smoke or fumes** (such devices per se, methods for treating smoke or fumes, see the relevant places for the treatment, e.g. B01D 53/00)

15/02 . of purifiers, e.g. for removing noxious material (traps for solid residues F23J 3/04) **[6]**

15/04 . . using washing fluids **[6]**

15/06 . of coolers **[6]**

15/08 . of heaters **[6]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

F23K FEEDING FUEL TO COMBUSTION APPARATUS (fuel feeders specially adapted for fluidised bed combustion apparatus F23C 10/22; regulating or controlling combustion F23N)

1/00 Preparation of lump or pulverulent fuel in readiness for delivery to combustion apparatus (filtration B01D; mixing B01F; pulverising B02C; drying F26B)
1/02 . Mixing solid fuel with a liquid, e.g. preparing slurries
1/04 . Heating fuel prior to delivery to combustion apparatus

3/00 Feeding or distributing of lump or pulverulent fuel to combustion apparatus (conveying in general B65G)
3/02 . Pneumatic feeding arrangements, i.e. by air blast
3/04 . for locomotive boiler furnaces
3/06 . for shaft-type furnaces
3/08 . for furnaces having movable grate bars
3/10 . Under-feed arrangements
3/12 . . feeding by piston
3/14 . . feeding by screw
3/16 . Over-feed arrangements
3/18 . . Spreader stokers
3/20 . . . with moving hoppers
3/22 . Controlling thickness of fuel bed

5/00 Feeding or distributing other fuel to combustion apparatus
5/02 . Liquid fuel **[5]**
5/04 . . Feeding or distributing systems using pumps (F23K 5/06 takes precedence) **[5]**
5/06 . . from a central source to a plurality of burners **[5]**
5/08 . . Preparation of fuel **[5]**
5/10 . . . Mixing with other fluids **[5]**
5/12 . . . . Preparing emulsions (burners spraying an emulsion of water and fuel into the combustion space F23D 11/16) **[5]**
5/14 . . Details thereof **[5]**
5/16 . . . Safety devices (F23K 5/18 takes precedence; safety arrangements for combustion chambers F23M 11/00) **[5]**
5/18 . . . Cleaning or purging devices, e.g. filters **[5]**
5/20 . . . Preheating devices (in burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space F23D 11/44) **[5]**
5/22 . . . Vaporising devices (in burners using a direct spraying action of liquid droplets or vaporised liquid into the combustion space F23D 11/44) **[5]**

F23L AIR SUPPLY; **DRAUGHT-INDUCING**; **SUPPLYING NON-COMBUSTIBLE LIQUID OR GAS** (air-supply arrangements for combustion apparatus using fluent fuel, e.g. fluidised bed combustion apparatus, F23C; dampers or throat restrictors for open fire-places F24; air inlet valves for open fire fronts F24)

Subclass index

1/00 Passages or apertures for delivering primary air for combustion
1/02 . by discharging the air below the fire

3/00 Arrangements of valves or dampers before the fire

5/00 Blast-producing apparatus before the fire
5/02 . Arrangements of fans or blowers (fans or blowers per se F04)
5/04 . by induction of air for combustion, e.g. using steam jet

7/00 Supplying non-combustible liquids or gases, other than air, to the fire, e.g. oxygen, steam

9/00 Passages or apertures for delivering secondary air for completing combustion of fuel
9/02 . by discharging the air above the fire
9/04 . by discharging the air beyond the fire, i.e. nearer the smoke outlet
9/06 . by discharging the air into the fire bed

11/00 Arrangements of valves or dampers after the fire
11/02 . for reducing draught by admission of air to flues

13/00 Construction of valves or dampers for controlling air supply or draught (in general F16K)
13/02 . pivoted about a single axis but having no other movement (formed as linked slats each pivoted about an axis F23L 13/08)
13/04 . . with axis perpendicular to face
13/06 . slidable only
13/08 . operating as a roller blind; operating as a venetian blind
13/10 . having a compound movement involving both sliding and pivoting

15/00 **Heating of air supplied for combustion**
15/02 . Arrangements of regenerators
15/04 . Arrangements of recuperators

17/00 **Inducing draught**
17/02 . Tops for chimneys or ventilating shafts; Terminals for flues
17/04 . . Balanced-flue arrangements, i.e. devices which combine air inlet to combustion unit with smoke outlet
17/06 . . branched; T-headed
17/08 . . with coaxial cones or louvres
17/10 . . wherein the top moves as a whole
17/12 . . Devices for fastening the top or terminal to chimney, shaft, or flue
17/14 . . Draining devices
17/16 . Induction apparatus, e.g. steam jet, acting on combustion products beyond the fire

99/00 **Subject matter not provided for in other groups of this subclass [8]**

F23M **CONSTRUCTIONAL DETAILS OF COMBUSTION CHAMBERS, NOT OTHERWISE PROVIDED FOR** (construction or support of tube walls for steam boilers F22B; generating combustion products of high pressure or high velocity F23R)

3/00 **Firebridges** (baffles not confining the fire F23M 9/06)
3/02 . modified for circulation of fluids, e.g. air, steam, water
3/04 . . for delivery of gas, e.g. air, steam
3/06 . . . into or towards fire
3/08 . . . away from fire, e.g. towards smoke outlet
3/10 . . . transversely
3/12 . characterised by shape or construction (F23M 3/02 takes precedence)
3/14 . . with apertures for passage of combustion products
3/16 . . built-up in sections, e.g. using bars or blocks
3/18 . . double; multiple
3/20 . . comprising loose refractory material, wholly or in part
3/22 . movable; adjustable

5/00 **Casings**; **Linings**; **Walls** (casings, linings, or walls of heat-treatment chambers of ovens, kilns, or retorts F27D)
5/02 . characterised by the shape of the bricks or blocks used (ceramic materials C04B 33/00, C04B 35/00)
5/04 . Supports for linings
5/06 . Crowns or roofs for combustion chambers (F23M 5/02, F23M 5/04 take precedence)
5/08 . Cooling thereof; Tube walls

7/00 **Doors specially adapted for combustion chambers** (in general E06B; for flues or smoke-boxes F23J 13/08)
7/02 . Frames therefor
7/04 . Cooling doors or door frames

9/00 **Baffles or deflectors for air or combustion products**; **Flame shields**
9/02 . in air inlets
9/04 . with air-supply passages in the baffle or shield
9/06 . in fire-boxes
9/08 . Helical or twisted baffles or deflectors
9/10 . Baffles or deflectors formed as tubes, e.g. in water-tube boilers (interconnection of such tubes in boilers for fluid flow F22)

11/00 **Safety arrangements** (by controlling combustion F23N 5/24)
11/02 . Preventing emission of flames or hot gases, or admission of air, through working or charging apertures
11/04 . Means for supervising combustion, e.g. window (alarm systems G08B)

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

F23N **REGULATING OR CONTROLLING COMBUSTION** (control devices specially adapted for combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles F23C 10/28; condition responsive controls for regulating combustion in domestic stoves with open fires for solid fuel F24B 1/187)

1/00 **Regulating fuel supply**
1/02 . conjointly with air supply
1/04 . conjointly with air supply and with draught
1/06 . conjointly with draught
1/08 . conjointly with another medium, e.g. boiler water
1/10 . . and with air supply or draught

3/00 **Regulating air supply or draught** (conjointly with fuel supply F23N 1/00)
3/02 . Regulating draught by direct pressure operation of single valves or dampers
3/04 . by operation of single valves or dampers by temperature-sensitive elements
3/06 . by conjoint operation of two or more valves or dampers (F23N 3/08 takes precedence)
3/08 . by power-assisted systems

5/00 **Systems for controlling combustion** (F23N 1/00, F23N 3/00 take precedence)
5/02 . using devices responsive to thermal changes or to thermal expansion of a medium
5/04 . . using bimetallic elements
5/06 . . using bellows; using diaphragms
5/08 . . using light-sensitive elements
5/10 . . using thermocouples
5/12 . . using ionisation-sensitive elements, i.e. flame rods
5/14 . . using thermo-sensitive resistors
5/16 . using noise-sensitive detectors
5/18 . using detectors sensitive to rate of flow of air or fuel
5/20 . with a time programme acting through electrical means, e.g. using time-delay relays

5/22 . with a time programme acting through mechanical means, e.g. using cams

5/24 . Preventing development of abnormal or undesired conditions, i.e. safety arrangements (F23N 5/02 to F23N 5/18 take precedence)

5/26 . Details

F23Q IGNITION (devices for igniting matches A24F; chemical igniters C06C 9/00); **EXTINGUISHING DEVICES**

Subclass index

1/00 Mechanical ignition (lighters containing fuel F23Q 2/00; matches C06F)

1/02 . using friction or shock effects

1/04 . . on a part moved by the fuel-controlling member, e.g. by a tap on a gas cooker

1/06 . . Portable igniters

2/00 Lighters containing fuel, e.g. for cigarettes

2/02 . Lighters with liquid fuel

2/04 . . with cerium-iron alloy and wick

2/06 . . . with friction wheel

2/08 . . . . with ignition by spring action of the cover

2/10 . . . with other friction member

2/12 . . with cerium-iron alloy without wick

2/14 . . with cerium-iron alloy and torch ignited by striking or pushing

2/16 . Lighters with gaseous fuel, e.g. the gas being stored in liquid phase

2/167 . . with adjustable flame **[3]**

2/173 . . . Valves therefor **[3]**

2/18 . Lighters with solid fuel

2/20 . . with cerium-iron alloy and friction wheel

2/22 . . with cerium-iron alloy and tinder

2/24 . . with ignition pills or strips with inflammable parts

2/26 . . combined with liquid-fuel lighters

2/28 . Lighters characterised by electrical ignition of the fuel

2/30 . Lighters characterised by catalytic ignition of fuel

2/32 . Lighters characterised by being combined with other objects (combinations with smokers' equipment A24F)

2/34 . Component parts or accessories

2/36 . . Casings

2/38 . . . with containers for flints or tools

2/40 . . Cover fastenings

2/42 . . Fuel containers; Closures for fuel containers

2/44 . . Wicks; Wick guides or fastenings

2/46 . . Friction wheels; Arrangement of friction wheels

2/48 . . Flints (composition, manufacture C06C 15/00); Guides for, or arrangements of, flints

2/50 . . Protecting coverings

2/52 . . Filling devices

3/00 Ignition using electrically-produced sparks (lighters containing fuel F23Q 2/28; sparking-plugs H01T 13/00)

3/01 . Hand-held lighters, e.g. for cigarettes

5/00 Make-and-break ignition, i.e. with spark generated between electrodes by breaking contact therebetween

7/00 Incandescent ignition; **Ignition using electrically-produced heat, e.g. lighters for cigarettes**; **Electrically-heated glowing plugs**

7/02 . for igniting solid fuel

7/04 . . with fans for transfer of heat to fuel

7/06 . Igniters structurally associated with fluid-fuel burners (lighters containing fuel F23Q 2/00)

7/08 . . for evaporating and igniting liquid fuel, e.g. in hurricane lanterns

7/10 . . for gaseous fuel, e.g. in welding appliances

7/12 . . . actuated by gas-controlling device

7/14 . Portable igniters

7/16 . . with built-in battery

7/18 . . with built-in generator

7/20 . . with built-in mains transformer

7/22 . Details

7/24 . . Safety arrangements

7/26 . . . Provision for re-ignition

9/00 Ignition by a pilot flame

9/02 . without interlock with main fuel supply

9/04 . . for upright burners, e.g. gas-cooker burners

9/06 . . for inverted burners, e.g. gas lamps

9/08 . with interlock with main fuel supply

9/10 . . to determine the sequence of supply of fuel to pilot and main burners

9/12 . . to permit the supply to the main burner in dependence upon existence of pilot flame

9/14 . . . using electric means, e.g. by light-sensitive elements

11/00 Arrangement of catalytic igniters

11/04 . at the burner

11/06 . remote from the burner, e.g. on the chimney of a lamp

11/08 . on a part moved by the fuel-controlling member

11/10 . . and moving out of the flame after ignition

13/00 Ignition not otherwise provided for

13/02 . using gas burners, e.g. gas pokers

13/04 . using portable burners, e.g. torches, fire pots

21/00 Devices for effecting ignition from a remote location

23/00 **Testing of ignition installations** (peculiar to internal-combustion engines F02P 17/00; testing of sparking plugs H01T 13/58)

23/02 . Testing of ignition timing

23/08 . Testing of components

23/10 . . electrically

25/00 **Extinguishing devices, e.g. for blowing-out or snuffing candle flames**

F23R **GENERATING COMBUSTION PRODUCTS OF HIGH PRESSURE OR HIGH VELOCITY, E.G. GAS-TURBINE COMBUSTION CHAMBERS** (fluidised bed combustion apparatus specially adapted for operation at superatmospheric pressures F23C 10/16)

3/00 **Continuous combustion chambers using liquid or gaseous fuel [3]**

3/02 . characterised by the air-flow or gas-flow configuration (reverse-flow combustion chambers F23R 3/54; cyclone or vortex type combustion chambers F23R 3/58) **[3]**

3/04 . . Air inlet arrangements **[3]**

3/06 . . . Arrangement of apertures along the flame tube **[3]**

3/08 . . . . between annular flame tube sections, e.g. flame tubes with telescopic sections **[3]**

3/10 . . . for primary air (F23R 3/06 takes precedence) **[3]**

3/12 . . . . inducing a vortex **[3]**

3/14 . . . . . by using swirl vanes **[3]**

3/16 . . with devices inside the flame tube or the combustion chamber to influence the air or gas flow **[3]**

3/18 . . . Flame stabilising means, e.g. flame holders for after-burners of jet-propulsion plants **[3]**

3/20 . . . . incorporating fuel injection means **[3]**

3/22 . . . . movable, e.g. to an inoperative position; adjustable, e.g. self-adjusting **[3]**

3/24 . . . . of the fluid-screen type **[3]**

3/26 . . Controlling the air flow **[3]**

3/28 . characterised by the fuel supply **[3]**

3/30 . . comprising fuel prevapourising devices **[3]**

3/32 . . . being tubular **[3]**

3/34 . . Feeding into different combustion zones **[3]**

3/36 . . Supply of different fuels **[3]**

3/38 . . comprising rotary fuel injection means **[3]**

3/40 . characterised by the use of catalytic means **[3]**

3/42 . characterised by the arrangement or form of the flame tubes or combustion chambers **[3]**

3/44 . . Combustion chambers comprising a tubular flame tube within a tubular casing (reverse-flow combustion chambers F23R 3/54) **[3]**

3/46 . . Combustion chambers comprising an annular arrangement of flame tubes within a common annular casing or within individual casings **[3]**

3/48 . . . Flame tube interconnectors, e.g. cross-over tubes **[3]**

3/50 . . Combustion chambers comprising an annular flame tube within an annular casing (toroidal combustion chambers F23R 3/52) **[3]**

3/52 . . Toroidal combustion chambers **[3]**

3/54 . . Reverse-flow combustion chambers **[3]**

3/56 . . Combustion chambers having rotary flame tubes **[3]**

3/58 . . Cyclone or vortex type combustion chambers **[3]**

3/60 . . Support structures; Attaching or mounting means **[3]**

5/00 **Continuous combustion chambers using solid or pulverulent fuel [3]**

7/00 **Intermittent or explosive combustion chambers [3]**

F24 HEATING; RANGES; VENTILATING

Note

In this class, the following terms are used with the meanings indicated:
– "stove" includes apparatus which may have an open fire, e.g. fireplace;
– "range" means an apparatus for cooking having elements that perform different cooking operations or cooking and heating operations.

F24B DOMESTIC STOVES OR RANGES FOR SOLID FUELS; IMPLEMENTS FOR USE IN CONNECTION WITH STOVES OR RANGES [6]

1/00 **Stoves or ranges**
1/02 . Closed stoves
1/04 . . built-up from glazed tiles (F24B 1/08, F24B 1/16 take precedence)
1/06 . . . Construction of tiles or bracing means therefor, e.g. shim liner (forming of tiles B28B; glazing of tiles C04B)
1/08 . . with fuel storage in a single undivided hopper within stove or range
1/10 . . . with combustion in horizontal direction (F24B 1/14 takes precedence)
1/14 . . . with predistillation in the hopper
1/16 . . with fuel storage in multiple or divided hoppers within the stove or range
1/18 . Stoves with open fires, e.g. fireplaces
1/181 . . Free-standing fireplaces, e.g. for mobile homes **[4]**
1/182 . . with additional provisions for cooking (other stoves with additional provisions for cooking F24B 1/26) **[4]**
1/183 . . with additional provisions for heating water **[4]**
1/185 . . with air-handling means, heat exchange means, or additional provisions for convection heating (F24B 1/183 takes precedence; component parts or accessories having air-handling means, heat exchange means, or additional provisions for convection heating F24B 1/191); Regulating combustion; Controls therefor **[4]**
1/187 . . . Condition responsive controls for regulating combustion (valves or dampers for air supply F23L) **[4]**
1/188 . . . characterised by use of heat exchange means (F24B 1/187 takes precedence) **[4]**
1/189 . . . characterised by air-handling means, i.e. of combustion-air, heated-air, or flue-gases, e.g. draught control dampers (F24B 1/187, F24B 1/188 take precedence) **[4]**
1/19 . . . . Supplying combustion-air **[4]**
1/191 . . Component parts; Accessories **[4]**
1/192 . . . Doors; Screens; Fuel guards **[4]**
1/193 . . . Grates; Irons **[4]**
1/195 . . . Fireboxes; Frames; Hoods; Heat reflectors **[4]**
1/197 . . . Hearths **[4]**
1/198 . . . Surrounds-fronts **[4]**
1/199 . . . Fuel-handling equipment **[4]**
1/20 . Ranges
1/22 . . in which the baking oven is arranged above the fire-box
1/24 . . with built-in masses for heat storage or heat insulation
1/26 . Stoves with additional provisions for cooking (stoves with open-fires with additional provisions for cooking F24B 1/182) **[4]**
1/28 . Combined installations of stoves or ranges, e.g. back-to-back stoves with a common fire-box

3/00 **Heaters not covered by group F24B 1/00, e.g. charcoal brazier** (for cooking A47J 27/00 to A47J 37/00)

5/00 **Combustion-air or flue-gas circulation in or around stoves or ranges** (stoves with open fires with air-handling means F24B 1/185) **[4]**
5/02 . in or around stoves
5/04 . . the air or gas passing downwards through the bottom of the stove or fire grate
5/06 . in or around ranges
5/08 . . around the baking oven

7/00 **Stoves, ranges, or flue-gas ducts, with additional provisions for convection heating** (stoves with open fires characterised by use of heat exchange means F24B 1/185; air heaters having heat generating means F24H 3/00) **[4]**
7/02 . with external air ducts
7/04 . with internal air ducts
7/06 . without air ducts

9/00 **Stoves, ranges, or flue-gas ducts, with additional provisions for heating water** (F24B 1/182, F24B 1/183 take precedence) **[3,4]**
9/02 . in open containers, e.g. bain-marie
9/04 . in closed containers **[4]**

13/00 **Details solely applicable to stoves or ranges burning solid fuels** (component parts or accessories for stoves with open-fires F24B 1/191; removing ash, clinker or slag from combustion chambers F23J 1/00; removing solid residues from passages or chambers beyond the fire F23J 3/00; joints or connections for chimneys or flues F23J 13/04; mouths or inlet holes for chimneys or flues F23J 13/06; means for supervising combustion F23M 11/04) **[4]**
13/02 . Arrangement or mounting of fire-grate assemblies (grates F23H); Arrangement or mounting of linings for fire-boxes, e.g. fire-back (ceramic materials C04B 33/00, C04B 35/00; casings, linings, walls for combustion chambers F23M)
13/04 . Arrangements for feeding solid fuel, e.g. hoppers (feeding solid fuel to combustion apparatus in general F23K)

15/00 **Implements for use in connection with stoves or ranges** (ash sieves B07B; firelighters C10L 11/00; removal of ashes F23J; other devices for igniting F23Q) **[6]**
15/02 . for breaking coal **[6]**
15/04 . Coal hods; Coal boxes **[6]**
15/06 . Shovels with ejectors **[6]**
15/08 . Shovels with sifters **[6]**
15/10 . Coal tongs **[6]**

F24C **OTHER DOMESTIC STOVES OR RANGES**; **DETAILS OF DOMESTIC STOVES OR RANGES, OF GENERAL APPLICATION** (radiator stoves of the fluid-circulating type F24H)

Subclass index

1/00 **Stoves or ranges in which the fuel or energy supply is not restricted to solid fuel or to a type covered by a single one of groups F24C 3/00 to F24C 9/00**; **Stoves or ranges in which the type of fuel or energy supply is not specified**
1/02 . adapted for the use of two or more kinds of fuel or energy supply (F24C 1/16 takes precedence; combinations of two or more stoves or ranges each having a different kind of fuel or energy supply F24C 11/00)
1/04 . . simultaneously
1/06 . . by replacing parts, e.g. replacing burner by electric heater
1/08 . solely adapted for radiation heating (F24C 1/16 takes precedence)
1/10 . . with reflectors
1/12 . . . of circular shape
1/14 . Radiation heating stoves or ranges, with additional provision for convection heating (F24C 1/02, F24C 1/16 take precedence; solely adapted for convection heating F24H)
1/16 . with special adaptation for travelling, e.g. collapsible

3/00 **Stoves or ranges for gaseous fuels**
3/02 . with heat produced solely by flame (F24C 3/14 takes precedence)
3/04 . with heat produced wholly or partly by a radiant body, e.g. by a perforated plate (F24C 3/14 takes precedence)
3/06 . . without any visible flame
3/08 . Arrangement or mounting of burners (burners per se F23D)
3/10 . Arrangement or mounting of ignition devices (ignition devices per se F23Q)
3/12 . Arrangement or mounting of control or safety devices (control valves F16K; safety devices for burners F23D 14/72; regulating or controlling combustion F23N)
3/14 . with special adaptation for travelling, e.g. collapsible

5/00 **Stoves or ranges for liquid fuels**
5/02 . with evaporation burners, e.g. dish type (F24C 5/20 takes precedence)
5/04 . . wick type
5/06 . . . adjustable
5/08 . . with heat produced wholly or partly by a radiant body
5/10 . with atomising burners (F24C 5/20 takes precedence)
5/12 . Arrangement or mounting of burners (burners per se F23D)
5/14 . Arrangement or mounting of ignition devices (ignition devices per se F23Q)
5/16 . Arrangement or mounting of control or safety devices (control valves F16K; safety devices for burners F23D; regulating or controlling combustion F23N)
5/18 . Liquid-fuel supply arrangements forming parts of stoves or ranges (feeding liquid fuel to combustion apparatus in general F23K)
5/20 . with special adaptation for travelling, e.g. collapsible

7/00 **Stoves or ranges heated by electric energy** (electric heating elements or arrangements H05B)
7/02 . using microwaves (heating using microwaves in general H05B 6/64)
7/04 . with heat radiated directly from the heating element (F24C 7/10 takes precedence)
7/06 . Arrangement or mounting of electric heating elements
7/08 . Arrangement or mounting of control or safety devices (switches H01H; circuit arrangements for electric heating H05B)
7/10 . with special adaptation for travelling, e.g. collapsible

9/00 **Stoves or ranges heated by a single type of energy supply not covered by groups F24C 3/00 to F24C 7/00 or subclass F24B** (using the heat from an exothermal reaction not involving a supply of free oxygen gas, using solar energy F24J)

11/00 **Combinations of two or more stoves or ranges, e.g. each having a different kind of energy supply**

13/00 **Stoves or ranges with additional provisions for heating water [3]**

14/00 **Stoves or ranges having self-cleaning provisions, e.g. continuous or catalytic cleaning, electrostatic cleaning [3]**
14/02 . pyrolytic type **[3]**

15/00 **Details** (electric heating elements or arrangements H05B)
15/02 . Doors specially adapted for stoves or ranges (in general E06B; for combustion chambers F23M)
15/04 . . with transparent panels
15/06 . Ornamental features, e.g. grate front, surround
15/08 . Foundations or support plates; Legs or pillars; Casings; Wheels (F24C 15/10 takes precedence)
15/10 . Tops, e.g. hot plate; Rings (F24C 15/12, F24C 15/14 take precedence)
15/12 . Side rests; Side plates; Cover lids; Splash guards; Racks outside ovens, e.g. for drying plates
15/14 . Spillage trays or grooves
15/16 . Shelves, racks, or trays inside ovens; Supports therefor
15/18 . Arrangement of compartments additional to cooking compartments, e.g. for warming, for storing utensils or fuel containers; Arrangement of additional heating or cooking apparatus, e.g. grills (grills per se A47J)
15/20 . Removing cooking fumes (parts, details or accessories of cooking-vessels for withdrawing or condensing cooking vapours from such vessels A47J 36/38) **[5]**
15/22 . Reflectors for radiation heaters
15/24 . Radiant bodies or panels for radiation heaters (radiant gas burners F23D 14/12)
15/26 . Handles for carrying
15/28 . Draught shields
15/30 . Arrangements for mounting stoves or ranges in particular locations
15/32 . Arrangements of ducts for hot gases, e.g. in or around baking ovens
15/34 . Elements or arrangements for heat storage or insulation
15/36 . Protective guards, e.g. for preventing access to heated parts

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F24D **DOMESTIC- OR SPACE-HEATING SYSTEMS, E.G. CENTRAL HEATING SYSTEMS**; **DOMESTIC HOT-WATER SUPPLY SYSTEMS**; **ELEMENTS OR COMPONENTS THEREFOR** (preventing corrosion C23F; water supply in general E03; using steam or condensate extracted or exhausted from steam engine plants for heating purposes F01K 17/02; steam traps F16T; domestic stoves or ranges F24B, F24C; water or air heaters having heat generating means F24H; combined heating and refrigeration systems F25B; heat exchange apparatus or elements F28; removing furring F28G; electric heating elements or arrangements H05B)

Note

In this subclass, the following expression is used with the meaning indicated:
– "central heating system" means a system in which heat is generated or stored at central sources and is distributed by means of a transfer fluid to the spaces or areas to be heated. **[5]**

Subclass index

Central heating systems

1/00 **Steam central heating systems** (F24D 10/00, F24D 11/00 take precedence)
1/02 . operating with live steam
1/04 . operating with exhaust steam
1/06 . operating with superheated steam
1/08 . Feed-line arrangements, e.g. providing for one-pipe system

3/00 **Hot-water central heating systems** (F24D 10/00, F24D 11/00 take precedence)
3/02 . with forced circulation, e.g. by pumps
3/04 . with the water under high pressure
3/06 . . Arrangements or devices for maintaining high pressure
3/08 . in combination with systems for domestic hot-water supply
3/10 . Feed-line arrangements, e.g. providing for heat-accumulator tanks, expansion tanks
3/12 . Tube and panel arrangements for ceiling, wall, or underfloor heating (electric underfloor heating F24D 13/02; special adaptations of floors for incorporating ducts, e.g. for heating or ventilating, E04B 5/48; building elements of block or other shape for the construction of parts of buildings characterised by special adaptations, e.g. serving for locating conduits, E04C 1/39; building elements of relatively thin form for the construction of parts of buildings with special adaptations for auxiliary purposes, e.g. serving for locating conduits, E04C 2/52) **[4]**
3/14 . . incorporated in a ceiling, wall or floor **[4]**
3/16 . . mounted on, or adjacent to, a ceiling, wall or floor **[4]**
3/18 . using heat pumps **[5]**

5/00 **Hot-air central heating systems** (F24D 10/00, F24D 11/00 take precedence; air conditioning F24F); **Exhaust-gas central heating systems**
5/02 . operating with discharge of hot air into the space or area to be heated

5/04 . . with return of the air to the air heater
5/06 . operating without discharge of hot air into the space or area to be heated
5/08 . . with hot air led through radiators
5/10 . . with hot air led through heat-exchange ducts in the walls, floor, or ceiling
5/12 . using heat pumps **[5]**

7/00 **Central heating systems employing heat-transfer fluids not covered by groups F24D 1/00 to F24D 5/00, e.g. oil, salt, gas** (F24D 10/00, F24D 11/00 take precedence)

9/00 **Central heating systems employing combinations of heat-transfer fluids covered by two or more of groups F24D 1/00 to F24D 7/00** (F24D 10/00, F24D 11/00 take precedence)
9/02 . Hot water and steam systems

10/00 **District heating systems [5]**

11/00 **Central heating systems using heat accumulated in storage masses** (self-contained storage heating units F24D 15/02; storage masses, see the relevant subclasses)
11/02 . using heat pumps

12/00 **Other central heating systems**
12/02 . having more than one heat source (F24D 3/18, F24D 5/12, F24D 11/02 take precedence) **[5]**

Other domestic- or space-heating systems

13/00 **Electric heating systems** (electric water or air heaters F24H)
13/02 . solely using resistance heating, e.g. underfloor heating
13/04 . using electric heating of heat-transfer fluid in separate units of the system

15/00 **Other domestic- or space-heating systems**
15/02 . consisting of self-contained heating units, e.g. storage heaters **[3]**
15/04 . using heat pumps **[5]**

17/00 **Domestic hot-water supply systems** (combined with domestic- or space-heating systems F24D 1/00 to F24D 15/00)
17/02 . using heat pumps **[5]**

19/00 **Details** (of water or air heaters F24H 9/00; of heat-exchange or heat-transfer apparatus, of general application F28F) **[3]**
19/02 . Arrangement of mountings or supports for radiators **[3]**
19/04 . . in skirtings **[3]**
19/06 . Casings, cover lids or ornamental panels, for radiators **[3]**
19/08 . Arrangements for drainage, venting or aerating (valves for drainage F16K, e.g. F16K 21/00, for venting or aerating F16K 24/00) **[3]**
19/10 . Arrangement or mounting of control or safety devices (control valves F16K; only the heater being controlled F24H 9/20) **[3]**

F24F **AIR-CONDITIONING**; **AIR-HUMIDIFICATION**; **VENTILATION**; **USE OF AIR CURRENTS FOR SCREENING** (devices for ventilating greenhouses A01G; animal husbandry A01K, e.g. controlling humidity in incubators A01K 41/04; disinfecting or sterilising of air A61L; devices for reconditioning breathing air in sealed rooms or for ventilating gasproof shelters A62B; filtering, washing or drying of gases B01D; mixing gases with vapours or liquids in general B01F 3/00; spraying B05B, B05D; removing dirt or fumes from areas where they are produced B08B 15/00; ventilation, air-conditioning, or cooling, specially adapted for vehicles, see the relevant vehicle places, e.g. B60H, B61D 27/00; production of ozone C01B 13/10; chimneys or flues E04F 17/02, E04H 12/28, F23J 11/00, F23L 17/02; air ducts or conduits E04F 17/04, F16L; ventilation in doors or windows E06B 7/02; fans, blowers F04; noise-absorbing in pipes or pipe systems F16L; tops for chimneys or ventilating shafts F23L; cooling F25; details of heat-exchange or heat-transfer apparatus, of general application F28F; apparatus for generating ions to be introduced into non-enclosed gases, e.g. the atmosphere, H01T 23/00)

(1) In this subclass:
– air-humidification as auxiliary treatment in air-conditioning, i.e. in units wherein the air is also either cooled or heated, is covered by groups F24F 1/00 or F24F 3/14; **[3]**
– air-humidification per se, e.g. "room humidifiers", is covered by group F24F 6/00. **[3]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
– "air-conditioning" means the supply of air to rooms or spaces by means which provide for the treatment of the air in at least two of the following ways:
heating – cooling – any other kind of treatment, e.g. humidification;
– "ventilation" means the supply of air to, or its extraction from, rooms or spaces, and systems for circulating air within rooms or spaces, but does not cover the mere treatment of air being supplied to, extracted from, or circulated within, rooms or spaces.

(3) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

Air-conditioning

1/00 ***Room units, e.g. separate or self-contained units or units receiving primary air from a central station* [1,2011.01]**

1/01 . *in which secondary air is induced by injector action of the primary air (F24F 1/02 takes precedence)* **[3,2011.01]**

1/02 . *self-contained, i.e. with all apparatus for treatment installed in a common casing* **[1,2011.01]**

1/04 . . *Arrangements for portability* **[1,2011.01]**

1/06 . *Separate outdoor units, e.g. outdoor unit to be linked to a separate room unit comprising a compressor and a heat exchanger* **[2011.01]**

Note

In this group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2011.01]**

1/08 . . *Compressors specially adapted for separate outdoor units* **[2011.01]**

1/10 . . . *Arrangement or mounting thereof* **[2011.01]**

1/12 . . . *Vibration or noise prevention therefor* **[2011.01]**

1/14 . . *Heat exchangers specially adapted for separate outdoor units* **[2011.01]**

1/16 . . . *Arrangement or mounting thereof* **[2011.01]**

1/18 . . . *characterised by their shape* **[2011.01]**

1/20 . . *Electric components for separate outdoor units* **[2011.01]**

1/22 . . . *Arrangement or mounting thereof* **[2011.01]**

1/24 . . . *Cooling of electric components* **[2011.01]**

1/26 . . *Refrigerant piping* **[2011.01]**

1/28 . . . *for connecting several separate outdoor units* **[2011.01]**

1/30 . . . *for use inside the separate outdoor units* **[2011.01]**

1/32 . . . *for connecting the separate outdoor unit to indoor units* **[2011.01]**

1/34 . . . *Protection means therefor, e.g. covers for refrigerant pipes* **[2011.01]**

1/36 . . *Drip trays for outdoor units* **[2011.01]**

1/38 . . *Fan details of outdoor units, e.g. bell-mouth shaped inlets or fan mountings* **[2011.01]**

1/40 . . *Vibration or noise prevention at outdoor units (for outdoor unit compressors F24F 1/12)* **[2011.01]**

1/42 . . *characterised by the use of the condensate, e.g. for enhanced cooling* **[2011.01]**

1/44 . . *characterised by the use of internal combustion engines* **[2011.01]**

1/46 . . *Component arrangements in separate outdoor units* **[2011.01]**

1/48 . . . *characterised by airflow, e.g. inlet or outlet airflow* **[2011.01]**

1/50 . . . . *with outlet air in upward direction* **[2011.01]**

1/52 . . . . *Inlet and outlet arranged on the same side, e.g. for mounting in a wall opening* **[2011.01]**

1/54 . . . . *Inlet and outlet arranged on opposite sides* **[2011.01]**

1/56 . . *Casing or covers of separate outdoor units, e.g. fan guards* **[2011.01]**

1/58 . . . *Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage* **[2011.01]**

1/60 . . *Arrangement or mounting of the outdoor unit* **[2011.01]**

1/62 . . . *Wall-mounted* **[2011.01]**

1/64 . . . *Ceiling-mounted, e.g. below a balcony* **[2011.01]**

1/66 . . . *under the floor level* **[2011.01]**

1/68 . . . *Arrangement of multiple separate outdoor units* **[2011.01]**

3/00 **Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment**; **Apparatus specially designed for such systems** (room units F24F 1/00; construction of heat-exchangers F28)

3/02 . characterised by the pressure or velocity of the primary air (F24F 3/044 takes precedence) **[3]**

3/04 . . operating with high pressure or high velocity

3/044 . Systems in which all treatment is given in the central station, i.e. all-air systems **[3]**

3/048 . . with temperature control at constant rate of air-flow (F24F 3/056 takes precedence) **[3]**

3/052 . . . Multiple duct systems, e.g. systems in which hot and cold air are supplied by separate circuits from the central station to mixing chambers in the spaces to be conditioned **[3]**

3/056 . . the air at least partially flowing over lighting fixtures, the heat of which is dissipated or used **[3]**

3/06 . characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units (F24F 3/02 takes precedence)

3/08 . . with separate supply and return lines for hot and cold heat-exchange fluids

3/10 . . with separate supply lines and common return line for hot and cold heat-exchange fluids

3/12 . characterised by the treatment of the air otherwise than by heating and cooling (F24F 3/02, F24F 3/06 take precedence; apparatus for the individual treatment, see the appropriate subclasses for the treatments)

3/14 . . by humidification; by dehumidification

3/147 . . . with both heat and humidity transfer between supplied and exhausted air **[3]**

3/153 . . . with subsequent heating, i.e. with the air, given the required humidity in the central station, passing a heating element to achieve the required temperature **[3]**

3/16 . . by purification, e.g. by filtering; by sterilisation; by ozonisation

5/00 Air-conditioning systems or apparatus not covered by group F24F 1/00 or F24F 3/00

6/00 Air-humidification [3]

6/02 . by evaporation of water in the air **[3]**

6/04 . . using stationary unheated wet elements **[3]**

6/06 . . using moving unheated wet elements **[3]**

6/08 . . using heated wet elements **[3]**

6/10 . . . heated electrically **[3]**

6/12 . by forming water dispersions in the air **[3]**

6/14 . . using nozzles (nozzles per se, spraying in general B05B) **[3]**

6/16 . . using rotating elements **[3]**

6/18 . by injection of steam into the air **[3]**

7/00 Ventilation

7/007 . with forced flow (using ducting systems F24F 7/06) **[3]**

7/013 . . using wall or window fans, displacing air through the wall or window **[3]**

7/02 . Roof ventilation (F24F 7/007 takes precedence; ventilation of roof coverings E04D) **[3,6]**

7/04 . with ducting systems

7/06 . . with forced air circulation, e.g. by fan

7/08 . . . with separate ducts for supplied and exhausted air **[3]**

7/10 . . . with air supply, or exhaust, through perforated wall, floor or ceiling (outlet members for directing or distributing air F24F 13/06) **[3]**

9/00 Use of air currents for screening, e.g. air curtain (air curtains for vehicles B60J 9/04)

Common features or details

11/00 Control or safety systems or apparatus (control valves per se F16K) **[3]**

11/02 . Arrangement or mounting of control or safety devices

11/04 . . solely for controlling the rate of air-flow (F24F 11/08 takes precedence)

11/047 . . . to constant value **[3]**

11/053 . . . by means responsive to temperature **[3]**

11/06 . . solely for controlling the supply of heating or cooling fluids for secondary treatment (F24F 11/08 takes precedence)

11/08 . . for controlling the primary treatment of air

12/00 Use of energy recovery systems in air conditioning, ventilation or screening (with both heat and humidity transfer between supplied and exhausted air F24F 3/147; heat-exchange in general F28) **[4]**

13/00 Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening

13/02 . Ducting arrangements

13/04 . . Air-mixing units (F24F 13/06 takes precedence; mixing gases in general B01F 3/02)

13/06 . . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser

13/062 . . . having one or more bowls or cones diverging in the flow direction (F24F 13/072 takes precedence) **[3]**

13/065 . . . formed as cylindrical or spherical bodies which are rotatable (F24F 13/072 takes precedence) **[3]**

13/068 . . . formed as perforated walls, ceilings or floors (F24F 13/078 takes precedence) **[3]**

13/072 . . . of elongated shape, e.g. between ceiling panels **[3]**

13/075 . . . having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable (F24F 13/072 takes precedence) **[3]**

13/078 . . . combined with lighting fixtures (air-treatment systems with air-flow over lighting fixtures F24F 3/056) **[3]**

13/08 . Air-flow control members, e.g. louvres, grilles, flaps, guide plates (F24F 7/013, F24F 13/06 take precedence; roof ventilation F24F 7/02) **[3]**

13/10 . . movable, e.g. damper (F24F 13/18 takes precedence; valves in general F16K)

13/12 . . . built-up of sliding members

13/14 . . . built-up of tilting members, e.g. louvre

13/15 . . . . with parallel simultaneously tiltable lamellae **[3]**

13/16 . . . built-up of parallelly-movable plates

13/18 . . specially adapted for insertion in flat panels, e.g. in door or window-pane

13/20 . Casings or covers **[5]**

13/22 . Means for preventing condensation or evacuating condensate **[5]**

13/24 . Means for preventing or suppressing noise **[5]**

13/26 . Arrangements for air-circulation by means of induction, e.g. by fluid coupling or thermal effect **[6]**

13/28 . Arrangement or mounting of filters **[6]**

13/30 . Arrangement or mounting of heat-exchangers **[6]**

13/32 . Supports for air-conditioning, air-humidification or ventilation units **[6]**

F24H **FLUID HEATERS, E.G. WATER OR AIR HEATERS, HAVING HEAT-GENERATING MEANS, IN GENERAL** (heat-transfer, heat-exchange or heat-storage materials C09K 5/00; tube furnaces for thermal non-catalytic cracking C10G 9/20; devices, e.g. valves, for venting and aerating enclosures F16K 24/00; steam traps or like apparatus F16T; steam generation F22; combustion apparatus F23; domestic stoves or ranges F24B, F24C; domestic- or space-heating systems F24D; furnaces, kilns, ovens, retorts F27; heat-exchangers F28; electric heating elements or arrangements H05B)

(1) The distinguishing feature of the air heaters covered by this subclass is that the heat is predominantly released to the air by convection, mostly by forced circulation of the air. The domestic stoves or ranges covered by subclass F24B, F24C may also be fired or electric air heaters but they release their heat to a considerable extent by radiation and only to some extent by natural convention. **[3]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "water" includes other liquids and means always the liquid to be heated; **[3]**
- "air" includes other gases or gas mixtures and means always the gas to be heated; **[3]**
- "furnace tubes" means tubes inside the heater wherein combustion is performed; **[3]**
- "fire tubes" means tubes inside the heater through which flue-gases flow from a combustion chamber located outside the tubes; **[3]**
- "heater" means apparatus including both heat generating means and means for transferring the generated heat to water or air. **[3]**

(3) All storage heaters are classified in group F24H 7/00. **[3]**

Subclass index

1/00 **Water heaters having heat generating means, e.g. boiler, flow-heater, water-storage heater** (F24H 7/00, F24H 8/00 take precedence; details F24H 9/00; steam boilers F22B; domestic stoves or ranges with additional provisions for heating water F24B 9/00, F24C 13/00) **[5]**

1/06 . Portable or mobile, e.g. collapsible

1/08 . Packaged or self-contained boilers, i.e. water heaters with control devices and pump in a single unit

1/10 . Continuous-flow heaters, i.e. heaters in which heat is generated only while the water is flowing, e.g. with direct contact of the water with the heating medium (F24H 1/50 takes precedence) **[5]**

1/12 . . in which the water is kept separate from the heating medium

1/14 . . . by tubes, e.g. bent in serpentine form

1/16 . . . . helically or spirally coiled

1/18 . Water-storage heaters (F24H 1/50 takes precedence; combined with water-heating stoves for central heating F24H 1/22) **[5]**

1/20 . . with immersed heating elements, e.g. electric elements or furnace tubes

1/22 . Water heaters other than continuous-flow or water-storage heaters, e.g. water heaters for central heating (F24H 1/50 takes precedence) **[5]**

1/24 . . with water mantle surrounding the combustion chamber or chambers (F24H 1/40, F24H 1/44 take precedence) **[3]**

1/26 . . . the water mantle forming an integral body

1/28 . . . . including one or more furnace or fire tubes

1/30 . . . the water mantle being built-up from sections

1/32 . . . . with vertical sections arranged side by side

1/34 . . with water chamber arranged adjacent to the combustion chamber or chambers, e.g. above or at side (F24H 1/24, F24H 1/44 take precedence)

1/36 . . . the water chamber including one or more fire tubes

1/38 . . with water contained in separate elements, e.g. radiator-type element (F24H 1/40, F24H 1/44 take precedence)

1/40 . . with water tube or tubes (F24H 1/44 takes precedence)

1/41 . . . in serpentine form **[3]**

1/43 . . . helically or spirally coiled **[3]**

1/44 . . with combinations of two or more of the types covered by groups F24H 1/24 to F24H 1/40

1/46 . Water heaters having plural combustion chambers **[2,5]**

1/48 . Water heaters for central heating incorporating heaters for domestic water **[5]**

1/50 . . incorporating domestic water tanks **[5]**

1/52 . . incorporating heat exchangers for domestic water (F24H 1/50 takes precedence) **[5]**

3/00 **Air heaters having heat generating means** (F24H 7/00, F24H 8/00 take precedence; details F24H 9/00; domestic stoves or ranges with additional provisions for convection heating of air F24B, F24C) **[5]**

3/02 . with forced circulation (F24H 3/12 takes precedence)

3/04 . . the air being in direct contact with the heating medium, e.g. electric heating element

3/06 . . the air being kept separate from the heating medium, e.g. using forced circulation of air over radiators

3/08 . . . by tubes

3/10 . . . by plates

3/12 . with additional heating arrangements

4/00 **Fluid heaters using heat pumps [5]**

4/02 . Liquid heaters **[5]**

4/04 . . Storage heaters **[5]**
4/06 . Gas heaters **[5]**

6/00 **Combined water and air heaters** (F24H 8/00 takes precedence) **[5]**

7/00 **Storage heaters, i.e. heaters in which the energy is stored as heat in masses for subsequent release** (domestic stoves or ranges with additional heat storage masses F24B 1/24, F24C 15/34)
7/02 . the released heat being conveyed to a transfer fluid, e.g. air, water
7/04 . . with forced circulation of the transfer fluid
7/06 . the released heat being radiated

8/00 **Fluid heaters having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation [5]**

9/00 **Details**
9/02 . Casings; Cover lids; Ornamental panels
9/06 . Arrangement of mountings or supports
9/12 . Connecting heaters to circulation pipes (pipe joints in general F16L)
9/14 . Connecting different sections, e.g. in water heaters (in radiators F28F 9/26)
9/16 . Arrangements for water drainage (valves for drainage F16K, e.g. F16K 21/00; in pipes or pipe systems in general F16L 55/00; in domestic-or space-heating systems F24D 19/08)
9/18 . Arrangement or mounting of grates, burners, or heating elements (burners F23D; grates F23H; electric heating elements H05B)
9/20 . Arrangement or mounting of control or safety devices (control valves F16K; safety devices for burners F23D; combustion control devices F23N; of systems comprising a heater, see the relevant subclasses, e.g. of control heating systems F24D 19/10; automatic switching for electric heating apparatus H05B 1/02)

F24J **PRODUCTION OR USE OF HEAT NOT OTHERWISE PROVIDED FOR** (materials therefor C09K 5/00; engines or other mechanisms for producing mechanical power from heat, see the relevant classes, e.g. F03G for using natural heat)

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

1/00 **Apparatus or devices using heat produced by exothermal chemical reactions other than by combustion** (for cooking-vessels A47J 36/28; self-heating compresses A61F 7/03; materials for the production of heat or cold undergoing non-reversible chemical reactions, other than by combustion, when used C09K 5/18)

2/00 **Use of solar heat, e.g. solar heat collectors** (distillation or evaporation of water using solar energy C02F 1/14; roof covering aspects of energy collecting devices E04D 13/18; devices for producing mechanical power from solar energy F03G 6/00; semi-conductor devices specially adapted for converting solar energy into electrical energy H01L 25/00, H01L 31/00; semiconductor devices including arrays of solar cells using heat energy H01L 31/058; generators in which light radiation is directly converted into electrical energy H02N 6/00) **[4,5]**
2/02 . Solar heat collectors with support for article heated, e.g. stoves, ranges, crucibles, furnaces or ovens using solar heat **[4]**
2/04 . Solar heat collectors having working fluid conveyed through collector **[4]**
2/05 . . surrounded by a transparent enclosure, e.g. evacuated solar collectors **[6]**
2/06 . . having concentrating elements (optical elements or systems per se G02B) **[4]**
2/07 . . . Receivers working at high temperature, e.g. for solar power plants **[6]**
2/08 . . . having lenses as concentrating elements **[4]**
2/10 . . . having reflectors as concentrating elements **[4]**
2/12 . . . . parabolic **[4]**
2/13 . . . . hemispherical **[6]**
2/14 . . . . semi-cylindrical or cylindro-parabolic **[4]**
2/15 . . . . conical **[6]**
2/16 . . . . having flat plates **[4]**
2/18 . . . . spaced, opposed interacting reflecting surfaces **[4]**
2/20 . . the working fluid being conveyed between plates **[4]**
2/22 . . . having extended surfaces, e.g. protrusions, corrugations (F24J 2/28 takes precedence) **[4]**
2/23 . . the working fluid trickling freely over collector elements **[6]**
2/24 . . the working fluid being conveyed through tubular heat absorbing conduits **[4]**
2/26 . . . having extended surfaces, e.g. protrusions (F24J 2/28 takes precedence) **[4]**
2/28 . . having permeable mass, foraminous or porous materials **[4]**
2/30 . . with means to exchange heat between plural fluids **[4]**
2/32 . . having evaporator and condenser section, e.g. heat pipe **[4]**
2/34 . . having heat storage mass **[4]**
2/36 . Rollable or foldable collector units **[4]**
2/38 . employing tracking means (F24J 2/02, F24J 2/06 take precedence; rotary supports or mountings therefor F24J 2/54; direction-finders for determining the direction from which electromagnetic waves are being received G01S 3/78; control of position or direction G05D 3/00) **[4]**
2/40 . Control arrangements **[4]**
2/42 . Solar heat systems not otherwise provided for **[4]**
2/44 . . having thermosiphonic circulation **[4]**

2/46 . Component parts, details or accessories of solar heat collectors **[4]**
2/48 . . characterised by the absorber material **[4]**
2/50 . . Transparent coverings **[4]**
2/51 . . Thermal insulation (F24J 2/50 takes precedence) **[6]**
2/52 . . Arrangement of mountings or supports **[4]**
2/54 . . . specially adapted for rotary movement **[6]**

3/00 Other production or use of heat, not derived from combustion (use of solar heat F24J 2/00)
3/06 . using natural heat **[4]**
3/08 . . using geothermal heat (devices for producing mechanical power from geothermal energy F03G 4/00) **[4,5]**

F25 REFRIGERATION OR COOLING; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS; MANUFACTURE OR STORAGE OF ICE; LIQUEFACTION OR SOLIDIFICATION OF GASES

F25B REFRIGERATION MACHINES, PLANTS, OR SYSTEMS; COMBINED HEATING AND REFRIGERATION SYSTEMS; HEAT PUMP SYSTEMS (heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reactions other than by combustion C09K 5/00; pumps, compressors F04; use of heat pumps for domestic or space-heating or for domestic hot-water supply F24D; air-conditioning, air-humidification F24F; fluid heaters using heat pumps F24H)

Note

Attention is drawn to Note (2) following the title of subclass F24F. **[5]**

Subclass index

Compression machines, plant, or systems

1/00 Compression machines, plant or systems with non-reversible cycle (F25B 3/00, F25B 5/00, F25B 6/00, F25B 7/00, F25B 9/00 take precedence) **[5]**

1/02 . with compressor of reciprocating-piston type (F25B 1/10 takes precedence)

1/04 . with compressor of rotary type (F25B 1/10 takes precedence)

1/047 . . of screw type **[5]**

1/053 . . of turbine type **[5]**

1/06 . with compressor of jet type, e.g. using liquid under pressure (F25B 1/10 takes precedence)

1/08 . . using vapour under pressure

1/10 . with multi-stage compression (with cascade operation F25B 7/00)

3/00 Self-contained rotary compression machines, i.e. with compressor, condenser, and evaporator rotating as a single unit

5/00 Compression machines, plant, or systems, with several evaporator circuits, e.g. for varying refrigerating capacity (with cascade operation F25B 7/00)

5/02 . arranged in parallel **[5]**

5/04 . arranged in series **[5]**

6/00 Compression machines, plant, or systems, with several condenser circuits [5]

6/02 . arranged in parallel **[5]**

6/04 . arranged in series **[5]**

7/00 Compression machines, plant, or systems, with cascade operation, i.e. with two or more circuits, the heat from the condenser of one circuit being absorbed by the evaporator of the next circuit (F25B 9/00 takes precedence)

9/00 Compression machines, plant, or systems, in which the refrigerant is air or other gas of low boiling point

9/02 . using Joule-Thompson effect; using vortex effect

9/04 . . using vortex effect **[5]**

9/06 . using expanders (F25B 9/10 takes precedence) **[5]**

9/08 . using ejectors (F25B 9/10 takes precedence) **[5]**

9/10 . with several cooling stages **[5]**

9/12 . using 3He-4He dilution **[5]**
9/14 . characterised by the cycle used, e.g. Stirling cycle **[5]**

11/00 Compression machines, plant, or systems, using turbines, e.g. gas turbines
11/02 . as expanders (F25B 9/06 takes precedence) **[5]**
11/04 . . centrifugal type **[5]**

13/00 Compression machines, plant, or systems, with reversible cycle (defrosting cycles F25B 47/02)

Sorption machines, plant, or systems

15/00 Sorption machines, plant, or systems, operating continuously, e.g. absorption type
15/02 . without inert gas (F25B 15/12, F25B 15/14, F25B 15/16 take precedence)
15/04 . . the refrigerant being ammonia evaporated from aqueous solution
15/06 . . the refrigerant being water vapour evaporated from a salt solution, e.g. lithium bromide
15/08 . . the refrigerant being sulfuric acid
15/09 . . the refrigerant being hydrogen desorbed from a hydride **[5]**
15/10 . with inert gas (F25B 15/12, F25B 15/14, F25B 15/16 take precedence)
15/12 . with resorber (F25B 15/14 takes precedence)
15/14 . using osmosis
15/16 . using desorption cycle

17/00 Sorption machines, plant, or systems, operating intermittently, e.g. absorption or adsorption type
17/02 . the absorbent or adsorbent being a liquid, e.g. brine (F25B 17/10 takes precedence)
17/04 . . with two or more boilers operating alternately
17/06 . . with the boiler and evaporator built-up as a unit in a tiltable or revolving arrangement
17/08 . the absorbent or adsorbent being a solid, e.g. salt (F25B 17/12 takes precedence) **[5]**
17/10 . using the endothermic solution of salt
17/12 . using desorption of hydrogen from a hydride **[5]**

Machines, plant, or systems, with a single mode of operation, not covered by groups F25B 1/00 to F25B 17/00

19/00 Machines, plant, or systems, using evaporation of a refrigerant but without recovery of the vapour
19/02 . using fluid jet, e.g. of steam
19/04 . . using liquid jet, e.g. of water

21/00 Machines, plant, or systems, using electric or magnetic effects
21/02 . using Peltier effect; using Nernst-Ettinghausen effect (thermoelectric elements H01L 35/00, H01L 37/00)
21/04 . . reversible **[5]**

23/00 Machines, plant, or systems, with a single mode of operation not covered by groups F25B 1/00 to F25B 21/00, e.g. using selective radiation effect

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25/00 Machines, plant, or systems, using a combination of modes of operation covered by two or more of the groups F25B 1/00 to F25B 23/00 (combinations of two or more modes of operation covered by a single main group, see the relevant group)
25/02 . Compression-sorption machines, plants, or systems

27/00 Machines, plant, or systems, using particular sources of energy (F25B 30/06 takes precedence)
27/02 . using waste heat, e.g. from internal-combustion engines

29/00 Combined heating and refrigeration systems, e.g. operating alternately or simultaneously [5]

30/00 Heat pumps [5]

Note

When classifying heat pump circuits or systems, groups F25B 1/00 to F25B 25/00 and F25B 29/00 take precedence over group F25B 30/00. **[5]**

30/02 . of the compression type **[5]**
30/04 . of the sorption type **[5]**
30/06 . characterised by the source of low potential heat **[5]**

Component parts or details

31/00 Compressor arrangements (compressors per se F04)
31/02 . of motor-compressor units

33/00 Boilers; **Analysers**; **Rectifiers** (boiler-absorbers F25B 35/00)

35/00 Boiler-absorbers, i.e. boilers usable for absorption or adsorption
35/02 . using a liquid as sorbent, e.g. brine
35/04 . using a solid as sorbent

37/00 Absorbers; **Adsorbers** (boiler-absorbers F25B 35/00; separating processes involving the treatment of liquids with solid sorbents B01D 15/00; separation of gases or vapours by adsorption B01D 53/02; separation of gases or vapours by absorption B01D 53/14; investigating using adsorption or absorption G01N 30/00)

39/00 Evaporators; **Condensers**
39/02 . Evaporators
39/04 . Condensers

40/00 Subcoolers, desuperheaters or superheaters [5]
40/02 . Subcoolers **[5]**
40/04 . Desuperheaters **[5]**
40/06 . Superheaters **[5]**

41/00 Fluid-circulation arrangements, e.g. for transferring liquid from evaporator to boiler (pumps per se, sealings therefor F04)
41/02 . using electro-osmosis
41/04 . Disposition of valves (valves per se F16K)
41/06 . Flow restrictors, e.g. capillary tubes; Disposition thereof

43/00 Arrangements for separating or purifying gases or liquids (in analysers or rectifiers F25B 33/00); **Arrangements for vaporising the residuum of liquid refrigerant, e.g. by heat** (F25B 40/00 takes precedence) **[5]**
43/02 . for separating lubricants from the refrigerant
43/04 . for withdrawing non-condensible gases

45/00 Arrangements for charging or discharging refrigerant

47/00 Arrangements for preventing or removing deposits or corrosion, not provided for in another subclass
47/02 . Defrosting cycles **[5]**

49/00 **Arrangement or mounting of control or safety devices** (testing refrigerators G01M; control in general G05)

49/02 . for compression type machines, plant or systems **[5]**

49/04 . for sorption type machines, plant or systems **[5]**

F25C **PRODUCTION, WORKING, STORING OR DISTRIBUTION OF ICE** (frozen sweets, including ice-cream, their production A23G 9/00; concentrating solutions by removing frozen solvents B01D 9/04; purification of water by freezing C02F 1/22; refrigeration machines, plants, or systems F25B; solidification of gases or gaseous mixtures F25J; freeze-drying F26B) **[2]**

Note

In this subclass, the following term is used with the meaning indicated:
– "ice" means any frozen liquid and also covers frozen semiliquids or pasty substances. **[2]**

1/00 **Production of ice** (F25C 3/00 takes precedence)

1/02 . Production of natural ice, i.e. without refrigeration

1/04 . by using stationary moulds

1/06 . . open or openable at both ends

1/08 . by immersing freezing chambers or plates into water

1/10 . by using rotating or otherwise moving moulds (F25C 1/08 takes precedence)

1/12 . by freezing water on cooled surfaces, e.g. to form slabs

1/14 . . to form thin sheets which are removed by scraping or wedging, e.g. in the form of flakes

1/16 . by partially evaporating water in a vacuum

1/18 . of a particular transparency or translucency, e.g. by injecting air

1/20 . . by agitation

1/22 . Construction of moulds; Filling devices therefor (metering by volume in general G01F)

1/24 . . for refrigerators, e.g. freezing trays

3/00 **Methods or apparatus specially adapted for the production of ice or snow for winter sports or similar recreational purposes, e.g. for sporting installations**; **Production of artificial snow** (foundations or pavings for artificial surfaces for outdoor or indoor practice of snow or ice sports E01C 13/10; working on surfaces of snow or ice in order to make them suitable for traffic or sporting purposes E01H 4/00)

3/02 . for ice rinks

3/04 . for sledging trails or ski trails; Production of artificial snow

5/00 **Working, storing or distribution of ice**

5/02 . Tools or machines for disintegrating, removing, or harvesting ice

5/04 . . without the use of saws

5/06 . . . by deforming bodies with which the ice is in contact, e.g. by inflatable members

5/08 . . . by heating bodies in contact with the ice

5/10 . . . . using hot refrigerant; using fluid heated by refrigerant

5/12 . . . Ice-shaving machines

5/14 . Tools or machines for shaping or finishing ice pieces, e.g. ice presses

5/16 . Tools or devices for ice handling not covered by any other subclass

5/18 . Storing ice

F25D **REFRIGERATORS**; **COLD ROOMS**; **ICE-BOXES**; **COOLING OR FREEZING APPARATUS NOT COVERED BY ANY OTHER SUBCLASS** (refrigerated showcases A47F 3/04; thermally-insulated vessels for domestic use A47J 41/00; refrigerated vehicles, see the appropriate subclasses of classes B60 to B64; containers with thermal insulation in general B65D 81/38; heat-transfer, heat-exchange or heat-storage materials, e.g. refrigerants, or materials for the production of heat or cold by chemical reactions other than by combustion C09K 5/00; thermally-insulated vessels for liquefied or solidified gases F17C; air-conditioning or air-humidification F24F; refrigeration machines, plants, or systems F25B; cooling of instruments or comparable apparatus without refrigeration G12B; cooling of engines or pumps, see the relevant classes)

(1) Devices associated with refrigerating machinery are classified in groups F25D 11/00 to F25D 16/00. **[2009.01]**

(2) In this subclass, the following term is used with the meaning indicated:
– "device" means an enclosed space to be cooled; such devices being associated either with refrigerating machinery, e.g. in a refrigerator, or with other cold sources, e.g. in an ice-box.

(3) Attention is drawn to Note (2) following the title of subclass F24F. **[5]**

Subclass index

Devices not associated with refrigerating machinery

1/00 **Devices using naturally-cold air or water**
1/02 . using naturally-cold water, e.g. household-tap water

3/00 **Devices using other cold materials**; **Devices using cold-storage bodies**
3/02 . using ice, e.g. ice-boxes
3/04 . . Stationary cabinets
3/06 . . Movable containers
3/08 . . . portable, i.e. adapted to be carried personally
3/10 . using liquefied gases, e.g. liquid air
3/11 . . with conveyers carrying articles to be cooled through the cooling space **[4]**
3/12 . using solidified gases, e.g. carbon-dioxide snow
3/14 . . portable, i.e. adapted to be carried personally

5/00 **Devices using endothermic chemical reactions, e.g. using frigorific mixtures**
5/02 . portable, i.e. adapted to be carried personally

7/00 **Devices using evaporation effects without recovery of the vapour** (butter or cheese dishes with cooling devices A47G 19/26)

9/00 **Devices not associated with refrigerating machinery and not covered by groups F25D 1/00 to F25D 7/00**; **Combinations of devices covered by two or more of the groups F25D 1/00 to F25D 7/00**

Devices associated with refrigerating machinery

11/00 **Self-contained movable devices associated with refrigerating machinery, e.g. domestic refrigerators**
11/02 . with cooling compartments at different temperatures
11/04 . specially adapted for storing deep-frozen articles (F25D 11/02 takes precedence)

13/00 **Stationary devices associated with refrigerating machinery, e.g. cold rooms**
13/02 . with several cooling compartments, e.g. refrigerated locker systems
13/04 . . the compartments being at different temperatures
13/06 . with conveyers carrying articles to be cooled through the cooling space

15/00 **Devices associated with refrigerating machinery not covered by group F25D 11/00 or F25D 13/00, e.g. non-self-contained movable devices**

16/00 **Devices using a combination of a cooling mode associated with refrigerating machinery with a cooling mode not associated with refrigerating machinery [5]**

Details or features of the devices covered by groups F25D 1/00 to F25D 16/00 [5]

17/00 **Arrangements for circulating cooling fluids**; **Arrangements for circulating gas, e.g. air, within refrigerated spaces [3]**
17/02 . for circulating liquids, e.g. brine
17/04 . for circulating gas, e.g. by natural convection **[3]**
17/06 . . by forced circulation
17/08 . . . using ducts

19/00 **Arrangement or mounting of refrigeration units with respect to devices**
19/02 . plug-in type
19/04 . with more than one refrigeration unit

21/00 **Defrosting**; **Preventing frosting**; **Removing condensed or defrost water** (removing ice or water from heat-exchange apparatus in general F28F 17/00; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84)
21/02 . Detecting the presence of frost or condensate
21/04 . Preventing the formation of frost or condensate
21/06 . Removing frost (defrosting cycles F25B 47/02)
21/08 . . by electric heating
21/10 . . by spraying with fluid
21/12 . . by hot-fluid circulating system separate from the refrigerant system
21/14 . Collecting or removing condensed and defrost water; Drip trays

23/00 **General constructional features** (F25D 21/00 takes precedence)
23/02 . Doors; Covers (F25D 23/08 takes precedence)
23/04 . . with special compartments, e.g. butter conditioners
23/06 . Walls (F25D 23/08 takes precedence; containers with thermal insulation B65D 81/38) **[4]**
23/08 . Parts formed wholly or mainly of plastics materials
23/10 . Arrangements for mounting in particular locations, e.g. for built-in type, for corner type
23/12 . Arrangements of compartments additional to cooling compartments; Combinations of refrigerators with other equipment, e.g. stove

25/00 **Charging, supporting, or discharging the articles to be cooled**

25/02 . by shelves

25/04 . by conveyers (in general B65G)

27/00 **Lighting arrangements** (in general F21)

29/00 **Arrangement or mounting of control or safety devices**

31/00 **Other cooling or freezing apparatus**

F25J **LIQUEFACTION, SOLIDIFICATION, OR SEPARATION OF GASES OR GASEOUS MIXTURES BY PRESSURE AND COLD TREATMENT** (cryogenic pumps F04B 37/08; gas storage vessels, gas-holders F17; filling vessels with, or discharging from vessels, compressed, liquefied, or solidified gases F17C; refrigeration machines, plants, or systems F25B)

1/00 **Processes or apparatus for liquefying or solidifying gases or gaseous mixtures**

1/02 . requiring the use of refrigeration, e.g. of helium or hydrogen

3/00 **Processes or apparatus for separating the constituents of gaseous mixtures involving the use of liquefaction or solidification**

3/02 . by rectification, i.e. by continuous interchange of heat and material between a vapour stream and a liquid stream (F25J 3/08 takes precedence)

3/04 . . for air

3/06 . by partial condensation (F25J 3/08 takes precedence; by rectification F25J 3/02)

3/08 . Separating gaseous impurities from gases or gaseous mixtures (cold traps B01D 8/00)

5/00 **Arrangements of cold-exchangers or cold-accumulators in separation or liquefaction plants** (heat-exchangers F28C, F28D, F28F)

F26 DRYING

F26B **DRYING SOLID MATERIALS OR OBJECTS BY REMOVING LIQUID THEREFROM** (drying devices for combines A01D 41/133; racks for drying fruit or vegetables A01F 25/12; drying foodstuffs A23; drying hair A45D 20/00; body-drying implements A47K 10/00; drying household articles A47L; drying gases or vapours B01D; chemical or physical processes for dewatering or like separating liquids from solids B01D 43/00; centrifugal apparatus B04; drying ceramics C04B 33/30; drying yarns or fabrics in association with some other form of treatment D06C; drying frames for laundry without heating or positive air circulation, domestic laundry-or spin-driers, wringing or hot pressing laundry D06F; furnaces, kilns, ovens F27)

Note

Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

Processes for drying

1/00 **Preliminary treatment of solid materials or objects to facilitate drying**

3/00 **Drying solid materials or objects by processes involving the application of heat** (in specific machines or apparatus F26B 9/00 to F26B 19/00)

3/02 . by convection, i.e. heat being conveyed from a heat source to the materials or objects to be dried by a gas or vapour, e.g. air

3/04 . . the gas or vapour circulating over, or surrounding, the materials or objects to be dried (F26B 3/14 takes precedence)

3/06 . . the gas or vapour flowing through the materials or objects to be dried (F26B 3/14 takes precedence)

3/08 . . . so as to loosen them, e.g. to form a fluidised bed

3/084 . . . . with heat exchange taking place in the fluidised bed **[5]**

3/088 . . . . using inert thermally-stabilised particles **[5]**

3/092 . . . . agitating the fluidised bed, e.g. by vibrating or pulsating **[5]**

3/097 . . . . using a magnetic field to stabilise the fluidised bed **[5]**

3/10 . . the gas or vapour carrying the materials or objects to be dried with it

3/12 . . . in the form of a spray

3/14 . . the materials or objects to be dried being moved by gravity

3/16 . . . in a counter-flow of the gas or vapour

3/18 . by conduction, i.e. the heat is conveyed from the heat source, e.g. gas flame, to the materials or objects to be dried by direct contact

3/20 . . the heat source being a heated surface (F26B 3/22 takes precedence)

3/22 . . the heat source and the materials or objects to be dried being in relative motion, e.g. of vibration

3/24 . . . the movement being rotation

3/26 . . . the movement being performed by gravity

3/28 . by radiation, e.g. from the sun

3/30 . . from infra-red-emitting elements

3/32 . by development of heat within the materials or objects to be dried

3/34 . . by using electrical effects

3/347 . . . Electromagnetic heating, e.g. induction heating or heating using microwave energy **[4]**

3/353 . . . Resistance heating **[4]**

3/36 . . by using mechanical effects, e.g. by friction (by using ultrasonic vibration F26B 5/02)

5/00 **Drying solid materials or objects by processes not involving the application of heat** (separating liquids from solids by straining B01D; replacing liquids in wet solids by other liquids, e.g. water by spirit, B01D 12/00; drying by electrophoresis B01J)

5/02 . by using ultrasonic vibrations

5/04 . by evaporation or sublimation of moisture under reduced pressure, e.g. in a vacuum

5/06 . . the process involving freezing

5/08 . by centrifugal treatment

5/10 . . the process involving freezing

5/12 . by suction

5/14 . by applying pressure, e.g. wringing; by brushing; by wiping

5/16 . by contact with sorbent bodies, e.g. absorbent mould; by admixture with sorbent materials

7/00 Drying solid materials or objects by processes using a combination of processes not covered by a single one of groups F26B 3/00 or F26B 5/00

Machines or apparatus for drying

9/00 Machines or apparatus for drying solid materials or objects at rest or with only local agitation; Domestic airing cupboards

9/02 . in buildings (special types of buildings E04H)

9/04 . in presses or clamping devices

9/06 . in stationary drums or chambers

9/08 . . including agitating devices

9/10 . in the open air; in pans or tables in rooms; Drying stacks of loose material

11/00 Machines or apparatus for drying solid materials or objects with movement which is non-progressive

11/02 . in moving drums or other mainly-closed receptacles (F26B 11/18 takes precedence)

11/04 . . rotating about a horizontal or slightly-inclined axis

11/06 . . . with stirring devices which are held stationary

11/08 . . rotating about a vertical or steeply-inclined axis

11/10 . . . with stirring devices which are held stationary

11/12 . in stationary drums or other mainly-closed receptacles with moving stirring devices (F26B 11/22 takes precedence)

11/14 . . the stirring device moving in a horizontal or slightly-inclined plane

11/16 . . the stirring device moving in a vertical or steeply-inclined plane

11/18 . on or in moving dishes, trays, pans, or other mainly-open receptacles

11/20 . . with stirring devices which are held stationary

11/22 . on or in stationary dishes, trays, pans, or other mainly-open receptacles, with moving stirring devices

13/00 Machines or apparatus for drying fabrics, fibres, yarns, or other materials in long lengths, with progressive movement

13/02 . with movement in a straight line

13/04 . . using rollers

13/06 . with movement in a sinuous or zig-zag path

13/08 . . using rollers

13/10 . Arrangements for feeding, heating, or supporting materials; Regulating movement, tension, or position of materials (heating processes F26B 3/00)

13/12 . . Regulating movement, tension, or position of material

13/14 . . Rollers (sorbent surfaces F26B 13/26)

13/16 . . . perforated (F26B 13/18 takes precedence; for applying suction F26B 13/30)

13/18 . . . heated; cooled

13/20 . . Supporting materials by fluid jets, e.g. air

13/22 . . Arrangements of gas flames

13/24 . Arrangements of devices using drying processes not involving heating (such processes per se F26B 5/00)

13/26 . . using sorbent surfaces, e.g. bands or coverings on rollers

13/28 . . for applying pressure; for brushing; for wiping

13/30 . . for applying suction, e.g. through perforated rollers

15/00 Machines or apparatus for drying objects with progressive movement; Machines or apparatus with progressive movement for drying batches of material in compact form (F26B 13/00, F26B 17/00 take precedence; conveyers in general B65G)

15/02 . with movement in the whole or part of a circle

15/04 . . in a horizontal plane

15/06 . . . involving several planes, one above the other

15/08 . . in a vertical plane

15/10 . with movement in a path composed of one or more straight lines, e.g. compound

15/12 . . the lines being all horizontal or slightly inclined

15/14 . . . the objects or batches of materials being carried by trays or racks

15/16 . . . the objects or batches of materials being carried by wheeled trucks

15/18 . . . the objects or batches of materials being carried by endless belts

15/20 . . the lines being all vertical or steeply inclined

15/22 . . . the objects or batches of materials being carried by endless belts

15/24 . . . . in a zig-zag path

15/26 . with movement in a helical path

17/00 Machines or apparatus for drying materials in loose, plastic, or fluidised form, e.g. granules, staple fibres, with progressive movement (F26B 13/00 takes precedence)

17/02 . with movement performed by belts carrying the materials; with movement performed by belts propelling the materials over stationary surfaces

17/04 . . the belts being all horizontal or slightly inclined (F26B 17/08 takes precedence)

17/06 . . the belts being all vertical or steeply inclined (F26B 17/08 takes precedence)

17/08 . . the belts being arranged in a sinuous or zig-zag path

17/10 . with movement performed by fluid currents, e.g. issuing from a nozzle (F26B 3/08 takes precedence) **[5]**

17/12 . with movement performed solely by gravity

17/14 . . the materials moving through a counter-current of gas

17/16 . . the materials passing down a heated surface

17/18 . with movement performed by rotating helical blades or other rotary conveyers moving materials in stationary chambers

17/20 . . the axis of rotation being horizontal or slightly inclined

17/22 . . the axis of rotation being vertical or steeply inclined

17/24 . with movement performed by shooting or throwing the materials

17/26 . with movement performed by reciprocating or oscillating conveyers propelling materials over stationary surfaces; with movement performed by reciprocating or oscillating shelves, sieves, or trays

17/28 . with movement performed by rollers or discs with material passing over or between them, e.g. suction drum, sieve

17/30 . with movement performed by rotary or oscillating containers; with movement performed by rotary floors

17/32 . . the movement being in a horizontal or slightly-inclined plane

17/34 . . the movement being in a vertical or steeply-inclined plane

19/00 Machines or apparatus for drying solid materials or objects not covered by groups F26B 9/00 to F26B 17/00

20/00 Combinations of machines or apparatus covered by two or more of groups F26B 9/00 to F26B 19/00

Details of general application

21/00 Arrangements for supplying or controlling air or gases for drying solid materials or objects (air-conditioning or ventilation in general F24F)

21/02 . Circulating air or gases in closed cycles, e.g. wholly within the drying enclosure (F26B 21/14 takes precedence)

21/04 . . partly outside the drying enclosure

21/06 . Controlling, e.g. regulating, parameters of gas supply (F26B 21/14 takes precedence)

21/08 . . Humidity

21/10 . . Temperature; Pressure

21/12 . . Velocity of flow; Quantity of flow

21/14 . using gases or vapours other than air or steam

23/00 Heating arrangements (using heated air or gases F26B 21/00)

23/02 . using combustion heating (F26B 23/10 takes precedence)

23/04 . using electric heating (F26B 23/10 takes precedence)

23/06 . . resistance heating

23/08 . . inductive heating; capacitative heating; microwave heating

23/10 . using tubes or passages containing heated fluids

25/00 Details of general application not covered by group F26B 21/00 or F26B 23/00 (loading, conveying, or unloading in general B65G)

25/02 . Applications of driving mechanisms, not covered by another subclass

25/04 . Agitating, stirring, or scraping devices

25/06 . Chambers, containers, or receptacles

25/08 . . Parts thereof

25/10 . . . Floors, roofs, or bottoms; False bottoms

25/12 . . . Walls or sides; Doors

25/14 . . Chambers, containers, receptacles of simple construction

25/16 . . . mainly closed, e.g. drum

25/18 . . . mainly open, e.g. dish, tray, pan

25/20 . Rollers (F26B 25/06 takes precedence)

25/22 . Controlling the drying process in dependence on liquid content of solid materials or objects

F27 FURNACES; KILNS; OVENS; RETORTS [4]

(1) This class covers:
- furnaces, kilns, ovens, retorts, open sintering apparatus and other similar apparatus for heat treatment of materials or articles, and details or accessories therefor, in general;
- the arrangement of electrical heating elements in or on furnaces.

(2) This class does not cover:
- combustion apparatus per se, i.e. apparatus for direct combination of oxygen gas and a burnable substance; **[7]**
- electrical heating elements per se;
- processes carried on within the furnaces.

(3) In this class, the following term is used with the meaning indicated:
- "furnaces" covers kilns, ovens, or retorts.

F27B FURNACES, KILNS, OVENS, OR RETORTS IN GENERAL; OPEN SINTERING OR LIKE APPARATUS (combustion apparatus F23; electric heating H05B)

Note

Attention is drawn to the references and Notes following the title of class F27 and the Note (3) of section H.

Subclass index

1/00 Shaft or like vertical or substantially vertical furnaces (for preheating, burning, calcining or cooling lime, magnesia or dolomite C04B 2/12)

1/02 . with two or more shafts or chambers, e.g. multi-storey

1/04 . . Combinations or arrangements of shafts

1/06 . of other than up-draught type

1/08 . heated otherwise than by solid fuel mixed with charge

1/09 . . heated electrically **[4]**

1/10 . Details, accessories, or equipment peculiar to furnaces of these types

1/12 . . Shells or casings; Supports therefor

1/14 . . . Arrangements of linings (linings in general F27D 1/00)

1/16 . . Arrangements of tuyères

1/18 . . Arrangements of dust collectors

1/20 . . Arrangement of devices for charging **[4]**

1/21 . . Arrangement of devices for discharging **[4]**

1/22 . . Arrangements of heat-exchange apparatus (heat-exchangers in general F28C, F28D)

1/24 . . Cooling arrangements

1/26 . . Arrangements of controlling devices

1/28 . . Arrangements of monitoring devices, of indicators, of alarm devices

3/00 Hearth-type furnaces, e.g. of reverberatory type (F27B 9/00 to F27B 15/00, F27B 21/00 take precedence); **Electric arc furnaces [4]**

3/02 . of single-chamber fixed-hearth type

3/04 . of multiple-hearth type; of multiple-chamber type; Combinations of hearth-type furnaces

3/06 . with movable working chambers or hearths, e.g. tiltable

3/08 . heated electrically, e.g. electric arc furnaces, with or without any other source of heat

3/10 . Details, accessories, or equipment, e.g. dust-collectors, peculiar to hearth-type furnaces

3/12 . . Working chambers or casings; Supports therefor

3/14 . . . Arrangements of linings

3/16 . . . Walls; Roofs

3/18 . . Arrangement of devices for charging **[4]**

3/19 . . Arrangement of devices for discharging **[4]**

3/20 . . Arrangements of heating devices

3/22 . . Arrangements of air or gas supply devices

3/24 . . Cooling arrangements

3/26 . . Arrangements of heat-exchange apparatus

3/28 . . Arrangement of controlling, monitoring, alarm or like devices **[4]**

5/00 Muffle furnaces; Retort furnaces; Other furnaces in which the charge is held completely isolated (F27B 9/00 takes precedence)

5/02 . of multiple-chamber type

5/04 . adapted for treating the charge in vacuum or special atmosphere

5/05 . . in vacuum **[5]**

5/06 . Details, accessories, or equipment peculiar to furnaces of these types

5/08 . . Arrangements of linings

5/10 . . Muffles

5/12 . . Arrangement of devices for charging **[4]**

5/13 . . Arrangement of devices for discharging **[4]**

5/14 . . Arrangements of heating devices

5/16 . . Arrangements of air or gas supply devices
5/18 . . Arrangement of controlling, monitoring, alarm or like devices **[4]**

7/00 Rotary-drum furnaces, i.e. horizontal or slightly inclined
7/02 . of multiple-chamber or multiple-drum type
7/04 . . with longitudinal divisions
7/06 . adapted for treating the charge in vacuum or special atmosphere
7/08 . externally heated
7/10 . internally heated, e.g. by means of passages in the wall
7/12 . tiltable
7/14 . with means for agitating or moving the charge
7/16 . . the means being fixed relatively to the drum (F27B 7/04 takes precedence)
7/18 . . the means being movable within the drum
7/20 . Details, accessories, or equipment peculiar to rotary-drum furnaces
7/22 . . Rotary drums; Supports therefor
7/24 . . . Seals between rotary and stationary parts
7/26 . . Drives
7/28 . . Arrangements of linings
7/30 . . Arrangements of partitions
7/32 . . Arrangement of devices for charging **[4]**
7/33 . . Arrangement of devices for discharging **[4]**
7/34 . . Arrangements of heating devices
7/36 . . Arrangements of air or gas supply devices
7/38 . . Arrangements of cooling devices
7/40 . . . Planetary coolers **[4]**
7/42 . . Arrangement of controlling, monitoring, alarm or like devices **[4]**

9/00 Furnaces through which the charge is moved mechanically, e.g. of tunnel type (F27B 7/14 takes precedence); **Similar furnaces in which the charge moves by gravity**
9/02 . of multiple-track type; of multiple-chamber type; Combinations of furnaces
9/04 . adapted for treating the charge in vacuum or special atmosphere
9/06 . heated without contact between combustion gases and charge; electrically heated
9/08 . . heated through chamber walls
9/10 . . heated by hot air or gas
9/12 . with special arrangements for preheating or cooling the charge
9/14 . characterised by the path of the charge during treatment; characterised by the means by which the charge is moved during treatment (F27B 9/28 takes precedence; travelling or movable supports or containers for the charge F27D 3/12)
9/16 . . the charge moving in a circular or arcuate path
9/18 . . . under the action of scrapers or pushers
9/20 . . the charge moving in a substantially straight path
9/22 . . . under the action of scrapers or pushers (F27B 9/26 takes precedence)
9/24 . . . being carried by a conveyer
9/26 . . . on or in trucks, sleds, or containers
9/28 . for treating continuous lengths of work
9/30 . Details, accessories, or equipment peculiar to furnaces of these types
9/32 . . Casings
9/34 . . . Arrangements of linings
9/36 . . Arrangements of heating devices
9/38 . . Arrangement of devices for charging **[4]**
9/39 . . Arrangement of devices for discharging **[4]**
9/40 . . Arrangements of controlling or monitoring devices

11/00 Bell-type furnaces (for treating metal strips or wire C21D 9/663)

13/00 Furnaces with both stationary charge and progression of heating, e.g. of ring type, of type in which segmental kiln moves over stationary charge
13/02 . of multiple-chamber type with permanent partitions; Combinations of furnaces
13/04 . of single-chamber type with temporary partitions
13/06 . Details, accessories, or equipment peculiar to furnaces of this type
13/08 . . Casings
13/10 . . . Arrangements of linings
13/12 . . Arrangements of heating devices
13/14 . . Arrangement of controlling, monitoring, alarm or like devices **[4]**

14/00 Crucible or pot furnaces; **Tank furnaces [4]**
14/02 . with tilting or rocking arrangements (F27B 14/04 takes precedence)
14/04 . adapted for treating the charge in vacuum or special atmosphere
14/06 . heated electrically, e.g. induction crucible furnaces, with or without any other source of heat (F27B 14/04 takes precedence)
14/08 . Details peculiar to crucible, pot or tank furnaces **[4]**
14/10 . . Crucibles
14/12 . . . Covers therefor
14/14 . . Arrangements of heating devices
14/16 . . Arrangement of devices for charging **[4]**
14/18 . . Arrangement of devices for discharging **[4]**
14/20 . . Arrangement of controlling, monitoring, alarm or like devices **[4]**

15/00 Fluidised-bed furnaces; **Other furnaces using or treating finely-divided materials in dispersion** (combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles F23C 10/00)
15/02 . Details, accessories, or equipment peculiar to furnaces of these types
15/04 . . Casings; Supports therefor
15/06 . . . Arrangements of linings
15/08 . . Arrangement of devices for charging **[4]**
15/09 . . Arrangement of devices for discharging **[4]**
15/10 . . Arrangements of air or gas supply devices
15/12 . . Arrangements of dust collectors
15/14 . . Arrangements of heating devices
15/16 . . Arrangements of cooling devices
15/18 . . Arrangements of controlling devices
15/20 . . Arrangements of monitoring devices, of indicators, of alarm devices

17/00 Furnaces of a kind not covered by any of groups F27B 1/00 to F27B 15/00 (structural combinations of furnaces F27B 19/02)
17/02 . specially designed for laboratory use

19/00 Combinations of different kinds of furnaces that are not all covered by any single one of main groups F27B 1/00 to F27B 17/00
19/02 . combined in one structure
19/04 . arranged for associated working

21/00 **Open or uncovered sintering apparatus**; **Other heat-treatment apparatus of like construction**
21/02 . Sintering grates or tables
21/04 . Sintering pots or sintering pans
21/06 . Endless-strand sintering machines
21/08 . Details, accessories, or equipment peculiar to sintering or like apparatus **[4]**
21/10 . . Arrangement of devices for charging **[4]**
21/12 . . Arrangement of devices for discharging **[4]**
21/14 . . Arrangement of controlling, monitoring, alarm or like devices **[4]**

F27D **DETAILS OR ACCESSORIES OF FURNACES, KILNS, OVENS, OR RETORTS, IN SO FAR AS THEY ARE OF KINDS OCCURRING IN MORE THAN ONE KIND OF FURNACE** (combustion apparatus F23; electric heating H05B)

Note

Attention is drawn to the references and Notes following the title of class F27 and Note (3) of section H.

Subclass index

1/00 **Casings**; **Linings**; **Walls**; **Roofs** (refractory materials C04B; firebridges for combustion chambers F23M 3/00)
1/02 . Crowns; Roofs
1/04 . characterised by the form of the bricks or blocks used
1/06 . . Composite bricks or blocks
1/08 . . . Bricks or blocks with internal reinforcement or metal backing
1/10 . Monolithic linings; Supports therefor
1/12 . incorporating cooling arrangements (constructions of tube assemblies in general F28)
1/14 . Supports for linings (F27D 1/10 takes precedence)
1/16 . Making or repairing linings
1/18 . Door frames; Doors, lids, removable covers

3/00 **Charging**; **Discharging**; **Manipulation of charge** (conveying systems characterised by their application for specified purposes not otherwise provided for B65G 49/00; moving charge through a furnace F27B 9/14)
3/02 . Skids or tracks for heavy objects
3/04 . Ram or pusher apparatus
3/06 . Charging or discharging machines on travelling carriages
3/08 . Screw feeders; Screw dischargers
3/10 . Charging directly from hoppers or shoots
3/12 . Travelling or movable supports or containers for the charge
3/14 . Charging or discharging liquid or molten material
3/15 . Tapping equipment; Equipment for removing slag
3/16 . Introducing a fluid jet or current into the charge (F27D 3/18 takes precedence) **[3]**
3/18 . Charging particulate material using a fluid carrier **[3]**

5/00 **Supports, screens, or the like for the charge within the furnace** (travelling or movable supports F27D 3/12)

7/00 **Forming, maintaining, or circulating atmospheres in heating chambers**
7/02 . Supplying steam, vapour, gases, or liquids
7/04 . Circulating atmospheres by mechanical means
7/06 . Forming or maintaining special atmospheres or vacuum within heating chambers (F27D 7/02 takes precedence)

9/00 **Cooling of furnaces or of charges therein** (F27D 1/00, F27D 3/00 take precedence)

11/00 **Arrangement of elements for electric heating in or on furnaces** (electric heating per se H05B)
11/02 . Ohmic resistance heating
11/04 . . with direct passage of current through the material being heated
11/06 . Induction heating, i.e. in which the material being heated, or its container or elements embodied therein, form the secondary of a transformer
11/08 . Heating by electric discharge, e.g. arc discharge
11/10 . . Disposition of electrodes (automatic control of temperature G05D 23/00; electric discharge apparatus H01T; arrangements for feeding or guiding electrodes H05B 7/10; automatic control of power by positioning of electrodes H05B 7/144) **[3]**
11/12 . with electromagnetic fields acting directly on the material being heated

13/00 **Apparatus for preheating charges**; **Arrangements for preheating charges**

15/00 **Handling or treating discharged material**; **Supports or receiving chambers therefor**
15/02 . Cooling

17/00 **Arrangement for using waste heat** (heat-exchangers per se F28); **Arrangement for using, or disposing of, waste gases** (removing fumes in general B08B 15/00)

19/00 **Arrangement of controlling devices**

21/00 **Arrangement of monitoring devices**; **Arrangements of safety devices**
21/02 . Observation or illuminating devices
21/04 . Arrangements of indicators or alarms

25/00 **Devices for removing incrustations [2010.01]**

27/00 **Stirring devices for molten material** (F27D 3/14 takes precedence) **[2010.01]**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

F28 HEAT EXCHANGE IN GENERAL

(1) In this class, the following expressions are used with the meanings indicated:
– "heat exchange" means the heating or cooling of a fluid or fluent solid by direct or indirect contact with a heated or cooled fluid or fluent solid;
– "heat transfer" means the heating or cooling of a fluid or fluent solid by direct contact with a heated or cooled surface or body.

(2) Apparatus using heat exchange or heat transfer (as defined in Note (1) above) for specific purposes is classified either in subclass F28B or in the appropriate subclasses of, for example, classes F22, F24, F25, F26, or F27; if no such other subclass is appropriate, such apparatus is classified in subclass F28C or F28D.

F28B STEAM OR VAPOUR CONDENSERS (condensation of vapours B01D 5/00; condensation during pretreatment of gases prior to electrostatic precipitation of dispersed particles B03C 3/014; steam engine plants having condensers F01K; liquefaction of gases F25J; details of heat-exchange or heat-transfer arrangements of general application F28F)

1/00 Condensers in which the steam or vapour is separated from the cooling medium by walls, e.g. surface condenser
1/02 . using water or other liquid as the cooling medium
1/04 . . employing moving walls
1/06 . using air or other gas as the cooling medium
1/08 . . employing moving walls **[3]**

3/00 Condensers in which the steam or vapour comes into direct contact with the cooling medium
3/02 . by providing a flowing coating of cooling liquid on the condensing surface
3/04 . by injecting cooling liquid into the steam or vapour (F28B 3/08 takes precedence)
3/06 . by injecting the steam or vapour into the cooling liquid (F28B 3/08 takes precedence)
3/08 . with rotatable members

5/00 Condensers employing a combination of the methods covered by groups F28B 1/00 and F28B 3/00; Other condensers

7/00 Combinations of two or more condensers, e.g. provision of reserve condenser

9/00 Auxiliary systems, arrangements, or devices
9/02 . for feeding steam or vapour to condensers
9/04 . for feeding, collecting, and storing cooling water or other cooling liquid
9/06 . . with provision for re-cooling the cooling water or other cooling liquid
9/08 . for collecting and removing condensate
9/10 . for extracting, cooling, and removing non-condensable gases

11/00 Controlling arrangements with features specially adapted for condensers

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F28C HEAT-EXCHANGE APPARATUS, NOT PROVIDED FOR IN ANOTHER SUBCLASS, IN WHICH THE HEAT-EXCHANGE MEDIA COME INTO DIRECT CONTACT WITHOUT CHEMICAL INTERACTION (heat-transfer, heat-exchange or heat-storage materials C09K 5/00; fluid heaters having heat generating means F24H; with an intermediate heat-transfer medium coming into direct contact with heat-exchange media F28D 15/00 to F28D 19/00; details of heat-exchange apparatus of general application F28F)

1/00 Direct-contact trickle coolers, e.g. cooling towers (building construction E04H 5/12; enclosed spaces cooled by trickle F25; component parts of trickle coolers F28F 25/00)
1/02 . with counter-current only
1/04 . with cross-current only
1/06 . with both counter-current and cross-current
1/08 . Arrangements for recovering heat from exhaust steam
1/10 . Arrangements for suppressing noise **[5]**
1/12 . Arrangements for preventing clogging by frost **[3]**
1/14 . comprising also a non-direct contact heat exchange **[3]**
1/16 . Arrangements for preventing condensation, precipitation or mist formation, outside the cooler (F28C 1/14 takes precedence) **[3]**

3/00 Other direct-contact heat-exchange apparatus
3/02 . the heat-exchange media both being gases or vapours
3/04 . the heat-exchange media both being liquids
3/06 . the heat-exchange media being a liquid and a gas or vapour (temperators for cooling steam F22)
3/08 . . with change of state, e.g. absorption, evaporation, condensation (generating steam under pressure F22)
3/10 . one heat-exchange medium at least being a fluent solid, e.g. a particulate material
3/12 . . the heat-exchange medium being a particulate material and a gas, vapour, or liquid
3/14 . . . the particulate material moving by gravity, e.g. down a tube
3/16 . . . the particulate material forming a bed, e.g. fluidised, on vibratory sieves
3/18 . . . the particulate material being contained in rotating drums

F28D HEAT-EXCHANGE APPARATUS, NOT PROVIDED FOR IN ANOTHER SUBCLASS, IN WHICH THE HEAT-EXCHANGE MEDIA DO NOT COME INTO DIRECT CONTACT (heat-transfer, heat-exchange or heat-storage materials C09K 5/00; fluid heaters having heat generating means and heat transferring means F24H; furnaces F27; details of heat-exchange apparatus of general application F28F); **HEAT STORAGE PLANTS OR APPARATUS IN GENERAL [4]**

Subclass index

1/00 Heat-exchange apparatus having stationary conduit assemblies for one heat-exchange medium only, the media being in contact with different sides of the conduit wall, in which the other heat-exchange medium is a large body of fluid, e.g. domestic or motor car radiators (F28D 5/00 takes precedence)

1/02 . with the heat-exchange conduits immersed in the body of fluid

1/03 . . with plate-like or laminated conduits **[4]**

1/04 . . with tubular conduits

1/047 . . . the conduits being bent, e.g. in a serpentine or zig-zag **[4]**

1/053 . . . the conduits being straight **[4]**

1/06 . with the heat-exchange conduits forming part of, or being attached to, the tank containing the body of fluid

3/00 Heat-exchange apparatus having stationary conduit assemblies for one heat-exchange medium only, the media being in contact with different sides of the conduit wall, in which the other heat-exchange medium flows in a continuous film, or trickles freely, over the conduits (F28D 5/00 takes precedence)

3/02 . with tubular conduits

3/04 . Distributing arrangements

5/00 Heat-exchange apparatus having stationary conduit assemblies for one heat-exchange medium only, the media being in contact with different sides of the conduit wall, using the cooling effect of natural or forced evaporation

5/02 . in which the evaporating medium flows in a continuous film or trickles freely over the conduits

7/00 Heat-exchange apparatus having stationary tubular conduit assemblies for both heat-exchange media, the media being in contact with different sides of a conduit wall

7/02 . the conduits being helically coiled (F28D 7/10 takes precedence)

7/04 . the conduits being spirally coiled (F28D 7/10 takes precedence)

7/06 . the conduits having a single U-bend (F28D 7/10 takes precedence)

7/08 . the conduits being otherwise bent, e.g. in a serpentine or zig-zag (F28D 7/10 takes precedence)

7/10 . the conduits being arranged one within the other, e.g. concentrically

7/12 . . the surrounding tube being closed at one end, i.e. return type (F28D 7/14 takes precedence)

7/14 . . both tubes being bent

7/16 . the conduits being arranged in parallel spaced relation (F28D 7/02 to F28D 7/10 take precedence) **[4]**

9/00 Heat-exchange apparatus having stationary plate-like or laminated conduit assemblies for both heat-exchange media, the media being in contact with different sides of a conduit wall

9/02 . the heat-exchange media travelling at an angle to one another (F28D 9/04 takes precedence)

9/04 . the conduits being formed by spirally-wound plates or laminae

11/00 Heat-exchange apparatus employing moving conduits

11/02 . the movement being rotary, e.g. performed by a drum or roller (F28D 11/08 takes precedence)

11/04 . . performed by a tube or a bundle of tubes

11/06 . the movement being reciprocating or oscillating (F28D 11/08 takes precedence)

11/08 . more than one conduit assembly performing independent movements, e.g. rotary bundle of tubes in a rotary drum

13/00 Heat-exchange apparatus using a fluidised bed

Heat-exchange apparatus employing intermediate heat-transfer media or bodies [3]

15/00 Heat-exchange apparatus with the intermediate heat-transfer medium in closed tubes passing into or through the conduit walls

15/02 . in which the medium condenses and evaporates, e.g. heat-pipes **[4]**

15/04 . . with tubes having a capillary structure **[6]**

15/06 . . Control arrangements therefor **[6]**

17/00 **Regenerative heat-exchange apparatus in which a stationary intermediate heat-transfer medium or body is contacted successively by each heat-exchange medium, e.g. using granular particles**

17/02 . using rigid bodies, e.g. of porous material

17/04 . Distributing arrangements for the heat-exchange media

19/00 **Regenerative heat-exchange apparatus in which the intermediate heat-transfer medium or body is moved successively into contact with each heat-exchange medium**

19/02 . using granular particles

19/04 . using rigid bodies, e.g. mounted on a movable carrier

20/00 **Heat storage plants or apparatus in general** (specially adapted for particular applications, see the relevant places, e.g. F24D 15/02); **Regenerative heat-exchange apparatus not covered by groups F28D 17/00 or F28D 19/00 [4]**

20/02 . using latent heat **[6]**

21/00 **Heat-exchange apparatus not covered by any of the groups F28D 1/00 to F28D 20/00 [4]**

F28F **DETAILS OF HEAT-EXCHANGE OR HEAT-TRANSFER APPARATUS, OF GENERAL APPLICATION** (heat-transfer, heat-exchange or heat-storage materials C09K 5/00; water or air traps, air venting F16)

Subclass index

1/00 **Tubular elements**; **Assemblies of tubular elements** (specially adapted for movement F28F 5/00)

1/02 . Tubular elements of cross-section which is non-circular (F28F 1/08, F28F 1/10 take precedence)

1/04 . . polygonal, e.g. rectangular

1/06 . . crimped or corrugated in cross-section

1/08 . Tubular elements crimped or corrugated in longitudinal section

1/10 . Tubular elements or assemblies thereof with means for increasing heat-transfer area, e.g. with fins, with projections, with recesses (crimped or corrugated elements F28F 1/06, F28F 1/08)

1/12 . . the means being only outside the tubular element

1/14 . . . and extending longitudinally (F28F 1/38 takes precedence)

1/16 . . . . the means being integral with the element, e.g. formed by extrusion (F28F 1/22 takes precedence)

1/18 . . . . . the element being built-up from finned sections

1/20 . . . . the means being attachable to the element (F28F 1/22 takes precedence)

1/22 . . . . the means having portions engaging further tubular elements

1/24 . . . and extending transversely (F28F 1/38 takes precedence)

1/26 . . . . the means being integral with the element (F28F 1/32 takes precedence)

1/28 . . . . . the element being built-up from finned sections

1/30 . . . . the means being attachable to the element (F28F 1/32 takes precedence)

1/32 . . . . the means having portions engaging further tubular elements

1/34 . . . and extending obliquely (F28F 1/38 takes precedence)

1/36 . . . . the means being helically-wound fins or wire spirals

1/38 . . . and being staggered to form tortuous fluid passages

1/40 . . the means being only inside the tubular element

1/42 . . the means being both outside and inside the tubular element

1/44 . . . and being formed of wire mesh

3/00 **Plate-like or laminated elements**; **Assemblies of plate-like or laminated elements** (specially adapted for movement F28F 5/00)

3/02 . Elements or assemblies thereof with means for increasing heat-transfer area, e.g. with fins, with recesses, with corrugations (F28F 3/08 takes precedence)

3/04 . . the means being integral with the element

3/06 . . the means being attachable to the element

3/08 . Elements constructed for building-up into stacks, e.g. capable of being taken apart for cleaning

3/10 . . Arrangement for sealing the margins

3/12 . Elements constructed in the shape of a hollow panel, e.g. with channels

3/14 . . by separating portions of a pair of joined sheets to form channels, e.g. by inflation (manufacture thereof B23P)

5/00 Elements specially adapted for movement (arrangements for moving the elements, see the appropriate subclass for the apparatus concerned)

5/02 . Rotary drums or rollers

5/04 . Hollow impellers, e.g. stirring vane

5/06 . Hollow screw conveyers

7/00 Elements not covered by group F28F 1/00, F28F 3/00, or F28F 5/00

7/02 . Blocks traversed by passages for heat-exchange media

9/00 Casings; **Header boxes**; **Auxiliary supports for elements**; **Auxiliary members within casings**

9/007 . Auxiliary supports for elements **[6]**

9/013 . . for tubes or tube-assemblies **[6]**

9/02 . Header boxes; End plates

9/04 . . Arrangements for sealing elements into header boxes or end plates (joining pipes to walls in general F16L 41/00)

9/06 . . . by dismountable joints

9/08 . . . . by wedge-type connections, e.g. taper ferrule

9/10 . . . . by screw-type connections, e.g. gland

9/12 . . . . by flange-type connections

9/14 . . . . by force-joining

9/16 . . . by permanent joints, e.g. by rolling (metal-working procedures in general B21, B23, particularly B21D 39/06, B23K)

9/18 . . . . by welding

9/20 . Arrangements of heat reflectors, e.g. separately-insertible reflecting walls

9/22 . Arrangements for directing heat-exchange media into successive compartments, e.g. arrangements of guide plates

9/24 . Arrangements for promoting turbulent flow of heat-exchange media, e.g. by plates (F28F 1/38 takes precedence; in general F15D)

9/26 . Arrangements for connecting different sections of heat-exchange elements, e.g. of radiators (connecting different sections in water heaters F24H 9/14)

11/00 Arrangements for sealing leaky tubes or conduits (stopping flow from or in pipes in general F16L 55/10)

11/02 . using obturating elements, e.g. washers, inserted and operated independently of each other (F28F 11/06 takes precedence)

11/04 . using pairs of obturating elements, e.g. washers, mounted upon central operating rods (F28F 11/06 takes precedence)

11/06 . using automatic tube-obturating appliances

13/00 Arrangements for modifying heat transfer, e.g. increasing, decreasing (F28F 1/00 to F28F 11/00 take precedence)

13/02 . by influencing fluid boundary (boundary-layer control in general F15D)

13/04 . by preventing the formation of continuous films of condensate on heat-exchange surfaces, e.g. by promoting droplet formation

13/06 . by affecting the pattern of flow of the heat-exchange media

13/08 . . by varying the cross-section of the flow channels

13/10 . . by imparting a pulsating motion to the flow, e.g. by sonic vibration

13/12 . . by creating turbulence, e.g. by stirring, by increasing the force of circulation (F28F 13/08 takes precedence)

13/14 . by endowing the walls of conduits with zones of different degrees of conduction of heat

13/16 . by applying an electrostatic field to the body of the heat-exchange medium

13/18 . by applying coatings, e.g. radiation-absorbing, radiation-reflecting; by surface treatment, e.g. polishing

17/00 Removing ice or water from heat-exchange apparatus

19/00 Preventing the formation of deposits or corrosion, e.g. by using filters

19/01 . by using means for separating solid materials from heat-exchange fluids, e.g. filters **[6]**

19/02 . by using coatings, e.g. vitreous or enamel coatings

19/04 . . of rubber; of plastics material; of varnish

19/06 . . of metal

21/00 Constructions of heat-exchange apparatus characterised by the selection of particular materials

21/02 . of carbon, e.g. graphite

21/04 . of ceramic; of concrete; of natural stone

21/06 . of plastics material

21/08 . of metal

23/00 Features relating to the use of intermediate heat-exchange materials, e.g. selection of compositions

23/02 . Arrangements for obtaining or maintaining same in a liquid state

25/00 Component parts of trickle coolers (arrangements for increasing heat transfer F28F 13/00; controlling arrangements F28F 27/00)

25/02 . for distributing, circulating, or accumulating liquid (spraying or atomising in general B05B, B05D)

25/04 . . Distributing or accumulator troughs

25/06 . . Spray nozzles or spray pipes

25/08 . . Splashing boards or grids, e.g. for converting liquid sprays into liquid films; Elements or beds for increasing the area of the contact surface (packing elements in general B01J 19/30, B01J 19/32)

25/10 . for feeding gas or vapour

25/12 . . Ducts; Guide vanes, e.g. for carrying currents to distinct zones

27/00 Control arrangements or safety devices specially adapted for heat-exchange or heat-transfer apparatus

27/02 . for controlling the distribution of heat-exchange media between different channels (arrangements of guide plates or guide vanes F28F 9/22, F28F 25/12)

99/00 Subject matter not provided for in other groups of this subclass [8]

F28G CLEANING OF INTERNAL OR EXTERNAL SURFACES OF HEAT-EXCHANGE OR HEAT-TRANSFER CONDUITS, E.G. WATER TUBES OF BOILERS (cleaning pipes or tubes in general B08B 9/02; devices or arrangements for removing water, minerals, or sludge from boilers while the boiler is in operation, or which remain in position while the boiler is in operation, or are specifically adapted to boilers without any other utility F22B 37/48; removal or treatment of combustion products or combustion residues F23J; removing ice from heat-exchange apparatus F28F 17/00)

Subclass index

1/00 **Non-rotary, e.g. reciprocated, appliances** (F28G 3/00 takes precedence)

1/02 . having brushes (brushes A46B)

1/04 . having articulated tools, e.g. assembled in chain manner

1/06 . having coiled wire tools, i.e. basket type

1/08 . having scrapers, hammers, or cutters, e.g. rigidly mounted

1/10 . . resiliently mounted

1/12 . Fluid-propelled scrapers, bullets, or like solid bodies

1/14 . Pull-through rods

1/16 . using jets of fluid for removing debris (F28G 1/12 takes precedence)

3/00 **Rotary appliances**

3/02 . having abrasive tools

3/04 . having brushes (brushes A46B)

3/06 . having articulated tools, e.g. assembled in chain manner

3/08 . having coiled wire tools, i.e. basket type

3/10 . having scrapers, hammers, or cutters, e.g. rigidly mounted

3/12 . . resiliently mounted

3/14 . . thrown into working position by centrifugal force

3/16 . using jets of fluid for removing debris

5/00 **Cleaning by distortion** (by vibration F28G 7/00)

7/00 **Cleaning by vibration**

9/00 **Cleaning by flushing or washing, e.g. with chemical solvents** (appliances using jets of fluid for removing debris F28G 1/16, F28G 3/16)

11/00 **Cleaning by combustion processes, e.g. using squibs, using travelling burners**

13/00 **Appliances or processes not covered by groups F28G 1/00 to F28G 11/00**; **Combinations of appliances or processes covered by groups F28G 1/00 to F28G 11/00**

15/00 **Details** (measuring thickness of deposit G01B)

15/02 . Supports for cleaning appliances, e.g. frames

15/04 . Feeding or driving arrangements, e.g. power operation

15/06 . . Automatic reversing devices

15/08 . Locating position of cleaning appliances within conduits

15/10 . Masks for delimiting area to be cleaned

WEAPONS; BLASTING

F41 WEAPONS

(1) This class covers also means for practice and training which may have aspects of simulation, e.g. in apparatus for so-called “military games”, although simulators are generally covered by class G09. **[4]**

(2) In this class, the following terms or expressions are used with the meanings indicated:
- “smallarm” means a firearm which is generally held with one or both hands for firing, but this term also includes a light machine-gun which may be supported on a tripod or the like during firing; **[5]**
- “gun” means any weapon having a barrel and a trigger or firing mechanism for projecting a missile; it may be a piece of ordnance or a smallarm. It may use combustible or explosive propellant charges, air pressure, electromagnetism or other propulsive forces; **[5]**
- “revolver-type gun” means a gun having a revolving drum magazine, the chambers of which are used successively as firing chamber; **[5]**
- “revolver” means a revolver-type pistol; **[5]**
- “semi-automatic firearm” means a firearm from which one shot is fired after actuation of the trigger and which then returns to a condition for firing a subsequent shot upon renewed actuation of the trigger;
- “automatic firearm” means a firearm which will continue firing so long as the initial firing pressure is maintained on the trigger;
- “sighting” means bringing into visual coincidence a direction defined by a so-called “sighting” device with the direction of a target;
- “aiming” means bringing a weapon to a direction differing from the sighting direction by corrections in order that the projectile may hit the target;
- “laying” means setting a weapon in the correct position for hitting a target.

(3) Attention is drawn to the definitions of “projectile”, “missile” and “rocket” given in Note (2) following the title of class F42. **[4]**

F41A FUNCTIONAL FEATURES OR DETAILS COMMON TO BOTH SMALLARMS AND ORDNANCE, E.G. CANNONS; MOUNTINGS FOR SMALLARMS OR ORDNANCE [5]

(1) This subclass covers those features or details which are considered to be of a kind generally applicable to, or to be concerned with intrinsic functions common to, both smallarms and ordnance. **[5]**

(2) Such features or details are classified in this subclass, even if they are stated to be applied only to smallarms or only to ordnance. **[5]**

(3) Attention is drawn to the definitions given in Note (2) following the title of class F41. **[5]**

Subclass index

1/00 **Missile propulsion characterised by the use of explosive or combustible propellant charges** (projecting missiles without use of explosive or combustible propellant charge F41B; launching rockets or torpedoes F41F 3/00; missile self-propulsion F42B 15/00) **[5]**

1/02 . Hypervelocity missile propulsion using successive means for increasing the propulsive force, e.g. using successively initiated propellant charges arranged along the barrel length; Multistage missile propulsion **[5]**

1/04 . Missile propulsion using the combustion of a liquid or gaseous fuel, e.g. hypergolic fuel **[5]**

1/06 . Adjusting the range without varying elevation angle or propellant charge data, e.g. by venting a part of the propulsive charge gases, or by adjusting the capacity of the cartridge or combustion chamber **[5]**

1/08 . Recoilless guns, i.e. guns having propulsion means producing no recoil **[5]**

1/10 . . a counter projectile being used to balance recoil **[5]**

3/00 **Breech mechanism, e.g. locks [5]**

3/02 . Block action, i.e. the main breech opening movement being transverse to the barrel axis **[5]**

3/04 . . with pivoting breech-block **[5]**

3/06 . . . about a horizontal axis transverse to the barrel axis at the rear of the block (F41A 3/08 takes precedence) **[5]**

3/08 . . . carrying a rotably mounted obturating plug of the screw-thread or the interrupted-thread type (F41A 3/30 takes precedence) **[5]**

3/10 . . with sliding breech-block, e.g. vertically **[5]**

3/12 . Bolt action, i.e. the main breech opening movement being parallel to the barrel axis **[5]**

3/14 . . Rigid bolt locks, i.e. having locking elements rigidly mounted on the bolt or bolt handle and on the barrel or breech-housing respectively **[5]**

3/16 . . . the locking elements effecting a rotary movement about the barrel axis, e.g. rotating cylinder bolt locks **[5]**

3/18 . . . . hand-operated **[5]**

3/20 . . . . . Straight-pull operated bolt locks, i.e. the operating hand effecting only a straight movement parallel to the barrel axis **[5]**

3/22 . . . . . the locking being effected by rotating the operating handle or lever transversely to the barrel axis **[5]**

3/24 . . . . . the locking elements forming part of the operating handle or lever **[5]**

3/26 . . . . semi-automatically or automatically operated, e.g. having a slidable bolt-carrier and a rotatable bolt **[5]**

3/28 . . . . . having fixed locking elements on the non-rotating bolt and rotating locking elements mounted on the barrel or breech housing, e.g. rotatable rings **[5]**

3/30 . . . . Interlocking means, e.g. locking lugs, screw threads **[5]**

3/32 . . . the bolt being rocked about a notional axis transverse to the barrel axis **[5]**

3/34 . . . the bolt additionally effecting a sliding movement transverse to the barrel axis **[5]**

3/36 . . Semi-rigid bolt locks, i.e. having locking elements movably mounted on the bolt or on the barrrel or breech housing **[5]**

3/38 . . . having rocking locking elements, e.g. pivoting levers or vanes **[5]**

3/40 . . . . mounted on the bolt (F41A 3/42 takes precedence) **[5]**

3/42 . . . . hand-operated **[5]**

3/44 . . . having sliding locking elements, e.g. balls, rollers **[5]**

3/46 . . . . mounted on the bolt (F41A 3/48 takes precedence) **[5]**

3/48 . . . . hand-operated **[5]**

3/50 . . . Toggle-joint locks, e.g. crank-operated **[5]**

3/52 . . . . hand-operated **[5]**

3/54 . . Bolt locks of the unlocked type, i.e. being inertia operated **[5]**

3/56 . . . the bolt being provided with an additional slidable mass **[5]**

3/58 . Breakdown breech mechanisms, e.g. for shotguns **[5]**

3/60 . Breech mechanisms for guns having two or more barrels (F41A 3/58 takes precedence; for revolving-cannon guns F41F 1/10) **[5]**

3/62 . using combustion gas pressure for adding to the mechanical locking action, or for delaying breech opening movement **[5]**

3/64 . Mounting of breech-blocks; Accessories for breech-blocks or breech-block mountings **[5]**

3/66 . . Breech housings or frames; Receivers **[5]**

3/68 . . Bolt stops, i.e. means for limiting bolt opening movement **[5]**

3/70 . . Anti-rebound arrangements, i.e. preventing rebound of the bolt out of the firing position **[5]**

3/72 . . Operating handles or levers; Mounting thereof in breech-blocks or bolts **[5]**

3/74 . . Obturating or packing devices for gas leak prevention in breech mechanisms **[5]**

3/76 . . . specially adapted for sealing the gap between the forward end of the cartridge chamber and the rearward end of the barrel, e.g. sealing devices for revolvers or revolver-type guns **[5]**

3/78 . . Bolt buffer or recuperator means **[5]**

3/80 . . . Adjustable spring buffers **[5]**

3/82 . . . Coil spring buffers (F41A 3/80 takes precedence) **[5]**

3/84 . . . . mounted within the gun stock **[5]**

3/86 . . . . mounted under the barrel **[5]**

3/88 . . . . mounted around the barrel **[5]**

3/90 . . . Fluid buffers **[5]**

3/92 . . . . adjustable **[5]**

3/94 . . . . in combination with spring buffers **[5]**

5/00 **Mechanisms or systems operated by propellant charge energy for automatically opening the lock [5]**

5/02 . recoil-operated **[5]**

5/04 . . the barrel being tilted during recoil **[5]**

5/06 . . the barrel being rotated about its longitudinal axis during recoil **[5]**

5/08 . . having an accelerator lever acting on the breech-block or bolt during the opening movement **[5]**

5/10 . . having a movable inertia weight **[5]**

5/12 . . . mounted in a gun having a fixed barrel **[5]**

5/14 . . Barrel stops, i.e. devices for holding the recoiling barrel in a predetermined position, e.g. the recoil position **[5]**

5/16 . . having a barrel moving forwardly after the firing of a shot **[5]**

5/18 . gas-operated **[5]**

5/20 . . using a gas piston arranged concentrically around the barrel **[5]**

5/22 . . having two or more gas pistons **[5]**

5/24 . . by direct action of gas pressure on bolt or locking elements **[5]**

5/26 . . Arrangements or systems for bleeding the gas from the barrel (F41A 5/20 to F41A 5/24 take precedence) **[5]**

5/28 . . . Adjustable systems **[5]**

5/30 . Gas- or recoil-operation, e.g. selection of gas- or recoil-operated systems **[5]**

5/32 . Energy accumulator systems, i.e. systems for opening the breech-block by energy accumulated during barrel or gas piston recoil **[5]**

5/34 . . with spring accumulators **[5]**

5/36 . . with fluid accumulators **[5]**

7/00 Auxiliary mechanisms for bringing the breech-block or bolt or the barrel to the starting position before automatic firing (operating handles or levers F41A 3/00); **Drives for externally-powered guns** (revolving-cannon guns F41F 1/00); **Remote-controlled gun chargers [5]**

7/02 . Machine-gun rechargers, e.g. manually operated **[5]**

7/04 . . fluid operated **[5]**

7/06 . . electrically operated **[5]**

7/08 . Drives for externally-powered guns, i.e. drives for moving the breech-block or bolt by an external force during automatic firing **[5]**

7/10 . . using a rotating cylindrical drum having a camming groove **[5]**

9/00 Feeding or loading of ammunition (adaptations for feeding or loading missiles from magazines in air guns F41B 11/02); **Magazines**; **Guiding means for the extracting of cartridges** (cartridge extractors or ejectors F41A 15/00) **[5]**

9/01 . Feeding of unbelted ammunition **[5]**

9/02 . . using wheel conveyers, e.g. star-wheel-shaped conveyers **[5]**

9/03 . . using screw or rotary-spiral conveyers **[5]**

9/04 . . using endless-chain belts carrying a plurality of ammunition **[5]**

9/05 . . . in tandem sequence **[5]**

9/06 . . using cyclically moving conveyers, i.e. conveyers having ammunition pusher or carrier elements which are emptied or disengaged from the ammunition during the return stroke **[5]**

9/07 . . . Reciprocating conveyers, i.e. conveyers pushing a plurality of ammunition during the feeding stroke **[5]**

9/09 . . . Movable ammunition carriers or loading trays, e.g. for feeding from magazines **[5]**

9/10 . . . . pivoting or swinging **[5]**

9/11 . . . . . in a horizontal plane **[5]**

9/12 . . . . . mounted within a smallarm **[5]**

9/13 . . . . . in a vertical plane **[5]**

9/14 . . . . . transverse to the barrel axis **[5]**

9/15 . . . . . mounted within a smallarm **[5]**

9/16 . . . . . parallel to the barrel axis **[5]**

9/17 . . . . . mounted within a smallarm **[5]**

9/18 . . . . . feeding from a magazine under the barrel **[5]**

9/19 . . . . . feeding from a magazine mounted in the stock **[5]**

9/20 . . . . sliding, e.g. reciprocating **[5]**

9/21 . . . . . in a vertical direction (F41A 9/23 takes precedence) **[5]**

9/22 . . . . . in a horizontal direction (F41A 9/23 takes precedence) **[5]**

9/23 . . . . . mounted within a smallarm **[5]**

9/24 . . using a movable magazine or clip as feeding element **[5]**

9/25 . . . using a sliding clip **[5]**

9/26 . . . using a revolving drum magazine **[5]**

9/27 . . . . in revolver-type guns **[5]**

9/28 . . . . . of smallarm type (in revolvers F41C 3/14) **[5]**

9/29 . Feeding of belted ammunition **[5]**

9/30 . . Sprocket-type belt transporters **[5]**

9/31 . . . with cartridge stripping means **[5]**

9/32 . . Reciprocating-slide-type belt transporters **[5]**

9/33 . . . with cartridge stripping means **[5]**

9/34 . . from magazines (magazines for belted ammunition per se F41A 9/79) **[5]**

9/35 . Feeding multibarrel guns **[5]**

Note

Feeding elements or concepts of general interest, not specially adapted for feeding multibarrel guns, are classified in groups F41A 9/01 or F41A 9/29. **[5]**

9/36 . . Feed mechanisms for revolving-cannon guns **[5]**

9/37 . Feeding two or more kinds of ammunition to the same gun; Feeding from two sides **[5]**

Note

Feeding elements or concepts of general interest, not specially adapted for feeding two or more kinds of ammunition or from two sides, are classified in groups F41A 9/01 or F41A 9/29. **[5]**

9/38 . Loading arrangements, i.e. for bringing the ammunition into the firing position **[5]**

9/39 . . Ramming arrangements **[5]**

9/40 . . . the breech-block itself being the rammer **[5]**

9/41 . . . . pushing unbelted ammunition from a box magazine on the gun frame into the cartridge chamber **[5]**

9/42 . . . Rammers separate from breech-block **[5]**

9/43 . . . . Chain rammers **[5]**

9/44 . . . . Fluid-operated piston rammers **[5]**

9/45 . . the cartridge chamber or the barrel as a whole being tiltable between a loading and a firing position **[5]**

9/46 . . the cartridge chamber being formed by two complementary elements, movable one relative to the other for loading **[5]**

9/47 . . using forwardly-sliding barrels or barrel parts for loading **[5]**

9/48 . . by gravitational force **[5]**

9/49 . Internally-powered drives, i.e. operated by propellant charge energy, e.g. couplings, clutches, energy accumulators **[5]**

9/50 . External power or control systems **[5]**

9/51 . . Boosters, i.e. externally-powered motors **[5]**

9/52 . Arrangements for changing from automatic or magazine-loading to hand-loading **[5]**

9/53 . Charged-condition indicators, i.e. indicating the presence of a cartridge in the cartridge chamber **[5]**

9/54 . Cartridge guides, stops or positioners, e.g. for cartridge extraction **[5]**

9/55 . . Fixed guiding means, mounted on, or near, the cartridge chamber **[5]**

9/56 . . Movable guiding means **[5]**

9/57 . . . Flexible chutes, e.g. for guiding belted ammunition from the magazine to the gun **[5]**
9/58 . . Cartridge stops; Cartridge positioners **[5]**
9/59 . Ejectors for clips or magazines, e.g. when empty **[5]**
9/60 . Empty-cartridge-case or belt-link collectors or catchers (F41A 9/81 takes precedence) **[5]**
9/61 . Magazines **[5]**
9/62 . . having means for indicating the number of cartridges left in the magazine, e.g. last-round indicators (last-round safeties F41A 17/40) **[5]**
9/63 . . specially adapted for releasable connection with other magazines **[5]**
9/64 . . for unbelted ammunition **[5]**
9/65 . . . Box magazines having a cartridge follower **[5]**
9/66 . . . . Arrangements thereon for charging, i.e. reloading (apparatus or tools for reloading magazines F41A 9/83) **[5]**
9/67 . . . . . having means for depressing the cartridge follower, or for locking it in a depressed position **[5]**
9/68 . . . . Plural magazines, e.g. tandem magazines **[5]**
9/69 . . . . characterised by multiple-row or zigzag arrangement of cartridges **[5]**
9/70 . . . . Arrangements thereon for discharging, e.g. cartridge followers or discharge throats **[5]**
9/71 . . . . Arrangements thereon for varying capacity; Adapters or inserts for changing cartridge size or type **[5]**
9/72 . . . Tubular magazines, i.e. magazines containing the ammunition in lengthwise tandem sequence **[5]**
9/73 . . . Drum magazines **[5]**
9/74 . . . . with radially disposed cartridges **[5]**
9/75 . . . . having a spiral cartridge channel **[5]**
9/76 . . . Magazines having an endless-chain conveyer **[5]**
9/77 . . . Magazines having a screw conveyer **[5]**
9/78 . . . Magazines having a reciprocating conveyer **[5]**
9/79 . . for belted ammunition **[5]**
9/80 . . . having provision for quick-coupling of the belts of adjacent magazines **[5]**
9/81 . . . having provision for collecting belt links or empty cartridge cases **[5]**
9/82 . Reloading of magazines **[5]**
9/83 . . Apparatus or tools for reloading magazines with unbelted ammunition, e.g. cartridge clips **[5]**
9/84 . . . Clips **[5]**
9/85 . . . . for reloading revolver-type magazines **[5]**
9/86 . . Feeding belted ammunition into magazines **[5]**
9/87 . Ammunition handling dollies or transfer carts (F41A 9/86 takes precedence) **[5]**

11/00 **Assembly or disassembly features**; **Modular concepts**; **Articulated or collapsible guns** (F41A 3/64, F41A 19/10 to F41A 19/15, F41A 21/48, F41A 25/26 take precedence) **[5]**
11/02 . Modular concepts, e.g. weapon-family concepts **[5]**
11/04 . Articulated or collapsible guns, i.e. with hinged or telescopic parts for transport or storage (breakdown shotguns or rifles F41C 7/11; folding or telescopic stocks or stock parts F41C 23/04) **[5]**
11/06 . . Telescopic guns **[5]**

13/00 **Cooling or heating systems** (barrels or gun tubes with fins or ribs F41A 21/00); **Blowing-through of gun barrels**; **Ventilating systems** **[5]**
13/02 . Heating systems **[5]**
13/04 . Injecting fluids into barrels or cartridge chambers (F41A 13/08 takes precedence) **[5]**
13/06 . Evacuating combustion gas from barrels (F41A 13/10 takes precedence) **[5]**
13/08 . . Bore evacuators, i.e. chambers disposed around barrels for storing part of the combustion gas and subsequently injecting it into the barrel to provide suction **[5]**
13/10 . Blowers or turbines for evacuating or cooling guns, e.g. driven by combustion gas pressure or recoil **[5]**
13/12 . Systems for cooling the outer surface of the barrel (F41A 13/10 takes precedence) **[5]**

15/00 **Cartridge extractors, i.e. devices for pulling cartridges or cartridge cases at least partially out of the cartridge chamber**; **Cartridge ejectors, i.e. devices for throwing the extracted cartridges or cartridge cases free of the gun** (F41A 9/54 takes precedence) **[5]**
15/02 . for revolver-type guns, e.g. revolvers **[5]**
15/04 . specially adapted for cartridge cases being deformed when fired, e.g. of plastics **[5]**
15/06 . for breakdown guns **[5]**
15/08 . for block-action guns **[5]**
15/10 . . of sliding-block type **[5]**
15/12 . for bolt-action guns **[5]**
15/14 . . the ejector being mounted on, or within, the bolt **[5]**
15/16 . . the ejector being mounted on the breech housing or frame **[5]**
15/18 . for guns with forwardly slidable barrels **[5]**
15/20 . specially adapted for caseless-ammunition duds **[5]**
15/22 . Tools for extracting cartridges **[5]**

17/00 **Safety arrangements, e.g. safeties** **[5]**
17/02 . Key-operated safeties **[5]**
17/04 . Safeties of the combination-lock type (F41A 17/02 takes precedence) **[5]**
17/06 . Electric or electromechanical safeties (F41A 17/04, F41A 17/08 take precedence) **[5]**
17/08 . for inhibiting firing in a specified direction, e.g. at a friendly person or at a protected area (F41A 27/02 takes precedence) **[5]**
17/10 . . Firing mechanisms with elevation stop **[5]**
17/12 . . Firing mechanisms with anti-canting safety **[5]**
17/14 . Double-loading prevention **[5]**
17/16 . Cook-off prevention, i.e. prevention of spontaneous firing of a cartridge by chamber wall heat **[5]**
17/18 . Hang-fire prevention **[5]**
17/20 . Grip or stock safeties, i.e. safeties disengaged by clasping the grip or stock (thumb-operated sliding safeties F41A 17/52, F41A 17/62, F41A 17/70, F41A 17/80) **[5]**
17/22 . . acting on the trigger **[5]**
17/24 . . acting on the firing pin **[5]**
17/26 . . acting on the hammer **[5]**
17/28 . . acting on the sear **[5]**
17/30 . Multiple safeties, i.e. safeties acting on at least one element of the firing mechanism and at least one other element of the gun, e.g. the moving barrel **[5]**
17/32 . . the other element being the breech-block or bolt **[5]**
17/34 . Magazine safeties **[5]**

17/36 . . locking the gun in a safety condition when the magazine is empty or removed **[5]**
17/38 . . locking the magazine in the gun **[5]**
17/40 . Last-round safeties (F41A 17/34 takes precedence) **[5]**
17/42 . Safeties for locking the breech-block or bolt in a safety position (F41A 17/32, F41A 17/36, F41A 17/40 take precedence) **[5]**
17/44 . Safety plugs, e.g. for plugging-up cartridge chambers **[5]**
17/46 . Trigger safeties, i.e. means for preventing trigger movement (F41A 17/02 to F41A 17/40 take precedence) **[5]**
17/48 . . Automatically operated trigger safeties, i.e. operated by breech opening or closing movement **[5]**
17/50 . . . by breakdown action **[5]**
17/52 . . Thumb-operated sliding safeties mounted on the upside of the stock, e.g. for shotguns **[5]**
17/54 . . Protecting-caps for trigger guards; Trigger locking pieces mounted on, or within, the trigger guard **[5]**
17/56 . Sear safeties, i.e. means for rendering ineffective an intermediate lever transmitting trigger movement to firing pin, hammer, bolt or sear (F41A 17/02 to F41A 17/40 take precedence) **[5]**
17/58 . . automatically operated, i.e. operated by breech opening or closing movement **[5]**
17/60 . . . by breakdown action **[5]**
17/62 . . Thumb-operated sliding safeties mounted on the upside of the stock, e.g. for shotguns **[5]**
17/64 . Firing-pin safeties, i.e. means for preventing movement of slidably-mounted strikers (F41A 17/02 to F41A 17/40 take precedence) **[5]**
17/66 . . automatically operated, i.e. operated by breech opening or closing movement **[5]**
17/68 . . . by breakdown action **[5]**
17/70 . . Thumb-operated sliding safeties mounted on the upside of the stock, e.g. for shotguns **[5]**
17/72 . . trigger-operated, i.e. the movement of the trigger bringing a firing-pin safety into inoperative position during the firing **[5]**
17/74 . Hammer safeties, i.e. for preventing the hammer from hitting the cartridge or the firing pin (F41A 17/02 to F41A 17/40 take precedence) **[5]**
17/76 . . automatically operated, i.e. operated by breech opening or closing movement **[5]**
17/78 . . . by breakdown action **[5]**
17/80 . . Thumb-operated sliding safeties mounted on the upside of the stock, e.g. for shotguns **[5]**
17/82 . . trigger-operated, i.e. the movement of the trigger bringing a hammer safety into inoperative position during firing **[5]**

19/00 Firing or trigger mechanisms; Cocking mechanisms [5]

19/01 . Counting means indicating the number of shots fired **[5]**
19/02 . . Burst limiters (F41A 19/67 takes precedence) **[5]**
19/03 . Shot-velocity control (F41A 3/78, F41A 5/28, F41A 19/05, F41A 19/66 take precedence) **[5]**
19/04 . . by regulating the time of release of the firing pin or hammer **[5]**
19/05 . Synchronising for firing through the propeller of an aircraft **[5]**
19/06 . Mechanical firing mechanisms (F41A 19/01 to F41A 19/05, F41A 19/59 take precedence) **[5]**
19/07 . . press-button actuated, e.g. with thumb rest **[5]**
19/08 . . remote actuated; lanyard actuated **[5]**
19/09 . . Auxiliary trigger devices (F41A 19/08 takes precedence) **[5]**
19/10 . . Triggers; Trigger mountings **[5]**
19/11 . . Trigger guards; Trigger-guard mountings (F41A 19/15 takes precedence) **[5]**
19/12 . . Sears; Sear mountings **[5]**
19/13 . . Percussion or firing pins, i.e. fixed or slidably-mounted striker elements; Mountings therefor **[5]**
19/14 . . Hammers, i.e. pivotably-mounted striker elements; Hammer mountings **[5]**
19/15 . . Modular firing mechanism units **[5]**
19/16 . . Adjustable firing mechanisms; Trigger mechanisms with adjustable trigger pull (F41A 19/17 takes precedence) **[5]**
19/17 . . Hair-trigger mechanisms **[5]**
19/18 . . for multibarrel guns (F41A 19/68 takes precedence) **[5]**
19/19 . . . with single-trigger firing possibility **[5]**
19/20 . . . . Double-trigger arrangements having the possibility of single-trigger actuation **[5]**
19/21 . . . . having only one trigger **[5]**
19/22 . . . . . and only one striker element **[5]**
19/23 . . . . . rotatable about an axis parallel to the barrel axis for firing subsequent barrels **[5]**
19/24 . . Release-trigger mechanisms, i.e. the striker element being released during the return movement of the trigger subsequent to trigger pull **[5]**
19/25 . . having only slidably-mounted striker elements, i.e. percussion or firing pins **[5]**
19/26 . . . the percussion or firing pin and the breech-block or bolt forming one piece **[5]**
19/27 . . . the percussion or firing pin being movable relative to the breech-block **[5]**
19/28 . . . . propelled by a cam or lever when the breech-block or bolt arrives at a closing position **[5]**
19/29 . . . . propelled by a spring under tension **[5]**
19/30 . . . . . in bolt-action guns **[5]**
19/31 . . . . . Sear arrangements therefor (F41A 19/33 takes precedence) **[5]**
19/32 . . . . . for catching the percussion or firing pin after each shot, i.e. in single-shot or semi-automatic firing mode **[5]**
19/33 . . . . . Arrangements for the selection of automatic or semi-automatic fire **[5]**
19/34 . . . . . Cocking mechanisms **[5]**
19/35 . . . . . Double-action mechanisms, i.e. the cocking being effected during the first part of the trigger pull movement **[5]**
19/36 . . . . . in block-action guns **[5]**
19/37 . . . . . Cocking mechanisms **[5]**
19/38 . . . . . Double-action mechanisms, i.e. the cocking being effected during the first part of the trigger pull movement **[5]**
19/39 . . . . . Cocking mechanisms for other types of guns, e.g. fixed breech-block types, forwardly-slidable barrel types **[5]**
19/40 . . . . . Double-action mechanisms, i.e. the cocking being effected during the first part of the trigger pull movement **[5]**
19/41 . . . . . for breakdown guns **[5]**

19/42 . . having at least one hammer **[5]**
19/43 . . . in bolt-action guns **[5]**
19/44 . . . . Sear arrangements therefor (F41A 19/46 takes precedence) **[5]**
19/45 . . . . . for catching the hammer after each shot, i.e. in single-shot or semi- automatic firing mode **[5]**
19/46 . . . . Arrangements for the selection of automatic or semi-automatic fire **[5]**
19/47 . . . . Cocking mechanisms **[5]**
19/48 . . . . . Double-action mechanisms, i.e. the cocking being effected during the first part of the trigger pull movement **[5]**
19/49 . . . in block-action guns **[5]**
19/50 . . . . Cocking mechanisms **[5]**
19/51 . . . . . Double-action mechanisms, i.e. the cocking being effected during the first part of the trigger pull movement **[5]**
19/52 . . . Cocking mechanisms for other types of guns, e.g. fixed breech-block types, revolvers **[5]**
19/53 . . . . Double-action mechanisms, i.e. the cocking being effected during the first part of the trigger pull movement **[5]**
19/54 . . . . for breakdown guns **[5]**
19/55 . Fluid-operated firing mechanisms **[5]**
19/56 . . Ignition of the propellant charge by contact with air heated by adiabatic compression **[5]**
19/57 . Firing mechanisms operating with primer cartridge **[5]**
19/58 . Electric firing mechanisms (F41A 17/10, F41A 17/12 take precedence) **[5]**
19/59 . . Electromechanical firing mechanisms, i.e. the mechanical striker element being propelled or released by electric means **[5]**
19/60 . . characterised by the means for generating electric energy **[5]**
19/61 . . . Inductive generators **[5]**
19/62 . . . Piezo-electric generators **[5]**
19/63 . . having means for contactless transmission of electric energy, e.g. by induction, by sparking gap **[5]**
19/64 . . for automatic or burst-firing mode **[5]**
19/65 . . . for giving ripple fire, i.e. using electric sequencer switches for timed multiple-charge launching, e.g. for rocket launchers **[5]**
19/66 . . . Electronic shot-velocity control (F41A 19/65 takes precedence) **[5]**
19/67 . . . Burst limiters **[5]**
19/68 . . for multibarrel guns (F41A 19/65 takes precedence) **[5]**
19/69 . . Electric contacts or switches peculiar thereto (F41A 19/65 takes precedence) **[5]**
19/70 . . . Electric firing pins; Mountings therefor **[5]**

21/00 **Barrels**; **Gun tubes**; **Muzzle attachments**; **Barrel mounting means** (F41A 25/00 takes precedence; barrel attachments for firing grenades or riot-control ammunition from smallarms F41C 27/06; sighting devices F41G 1/00) **[5]**

21/02 . Composite barrels, i.e. barrels having multiple layers, e.g. of different materials **[5]**
21/04 . . Barrel liners **[5]**
21/06 . Plural barrels **[5]**
21/08 . . Barrel junctions **[5]**
21/10 . Insert barrels, i.e. barrels for firing reduced calibre ammunition and being mounted within the normal barrels **[5]**
21/12 . Cartridge chambers; Chamber liners (F41A 3/74, F41A 9/46, F41A 21/04 take precedence) **[5]**
21/14 . . Arrangement of cartridge chambers lateral to the barrel axis **[5]**
21/16 . Barrels or gun tubes characterised by the shape of the bore **[5]**
21/18 . . Grooves; Rifling **[5]**
21/20 . Barrels or gun tubes characterised by the material (F41A 21/02 takes precedence) **[5]**
21/22 . Barrels which have undergone surface treatment, e.g. phosphating **[5]**
21/24 . Barrels or gun tubes with fins or ribs, e.g. for cooling **[5]**
21/26 . specially adapted for recoil reinforcement, e.g. for training purposes **[5]**
21/28 . Gas-expansion chambers; Barrels provided with gas-relieving ports (F41A 1/06, F41A 13/08 take precedence) **[5]**
21/30 . Silencers **[5]**
21/32 . Muzzle attachments or glands (F41A 21/26, F41A 21/30, F41A 21/46 take precedence) **[5]**
21/34 . . Flash dampers **[5]**
21/36 . . for recoil reduction (recoil reduction arrangements in general F41A 25/00) **[5]**
21/38 . . . adjustable **[5]**
21/40 . . Chokes for shotguns **[5]**
21/42 . . . adjustable **[5]**
21/44 . Insulation jackets; Protective jackets **[5]**
21/46 . Barrels having means for separating sabots from projectiles **[5]**
21/48 . Barrel mounting means, e.g. releasable mountings for replaceable barrels **[5]**

23/00 **Gun mountings, e.g. on vehicles**; **Disposition of guns on vehicles** (F41A 25/00, F41A 27/00 take precedence) **[5]**

23/02 . Mountings without wheels **[5]**
23/04 . . Unipods **[5]**
23/06 . . . adjustable **[5]**
23/08 . . Bipods **[5]**
23/10 . . . adjustable **[5]**
23/12 . . Tripods **[5]**
23/14 . . . adjustable **[5]**
23/16 . . Testing mounts **[5]**
23/18 . . Rests for supporting smallarms in non-shooting position (racks for storage A47B 81/00; racks in vehicles B60R 11/00) **[5]**
23/20 . for disappearing guns **[5]**
23/22 . . on board of submarines **[5]**
23/24 . Turret gun mountings (feeding, loading or guiding ammunition F41A 9/00; mechanical elevating or traversing systems for turret guns F41A 27/18) **[5]**
23/26 . Mountings for transport only; Loading or unloading arrangements for guns for use with carrier vehicles (F41A 23/50 takes precedence) **[5]**
23/28 . Wheeled-gun mountings; Endless-track gun mountings **[5]**
23/30 . . the wheels being liftable from the ground for firing **[5]**
23/32 . . with split trails (F41A 23/30, F41A 23/46 take precedence) **[5]**
23/34 . on wheeled or endless-track vehicles **[5]**
23/36 . . on trailers (F41A 23/42 takes precedence) **[5]**
23/38 . . on motorcycles **[5]**
23/40 . . on rail vehicles **[5]**
23/42 . . for rocket throwers **[5]**

23/44 . on sledges **[5]**
23/46 . Trail spades **[5]**
23/48 . . elastic **[5]**
23/50 . Travelling locks; Brakes for holding the gun platform in a fixed position during transport **[5]**
23/52 . Base plates for gun mountings **[5]**
23/54 . . for mortars **[5]**
23/56 . Arrangements for adjusting the gun platform in the vertical or horizontal position (F41A 17/10, F41A 17/12 take precedence) **[5]**
23/58 . . Hydraulic jacks **[5]**
23/60 . . Screw-operated jacks **[5]**

25/00 Gun mountings permitting recoil or return to battery, e.g. gun cradles; **Barrel buffers or brakes** (recoilless guns F41A 1/08) **[5]**
25/02 . Fluid-operated systems **[5]**
25/04 . . adjustable **[5]**
25/06 . Friction-operated systems **[5]**
25/08 . . adjustable **[5]**
25/10 . Spring-operated systems **[5]**
25/12 . . using coil springs **[5]**
25/14 . . . adjustable **[5]**
25/16 . Hybrid systems **[5]**
25/18 . . Hydroelastic systems **[5]**
25/20 . . Hydropneumatic systems **[5]**
25/22 . Bearing arrangements for the reciprocating gun-mount or barrel movement **[5]**
25/24 . . using ball or roller bearings **[5]**
25/26 . Assembling or dismounting recoil elements or systems **[5]**

27/00 Gun mountings permitting traversing or elevating movement, e.g. gun carriages [5]
27/02 . Control systems for preventing interference between the moving gun and the adjacent structure **[5]**
27/04 . Scatter-fire arrangements, i.e. means for oscillating guns automatically during firing **[5]**
27/06 . Mechanical systems (F41A 27/02, F41A 27/04, F41A 27/30 take precedence) **[5]**
27/08 . . Bearings, e.g. trunnions; Brakes or blocking arrangements **[5]**
27/10 . . . Bearings for supporting a pivoting gun in a wall, e.g. a turret wall **[5]**
27/12 . . . Brakes or locks for blocking traversing or elevating gear in a fixed position **[5]**
27/14 . . . Central-pivot bearings **[5]**
27/16 . . . using raceway bearings, e.g. for supporting the turret **[5]**
27/18 . . for gun turrets (F41A 27/08 takes precedence) **[5]**
27/20 . . . Drives for turret movements **[5]**
27/22 . . Traversing gear (F41A 27/18 takes precedence) **[5]**
27/24 . . Elevating gear (F41A 27/18 takes precedence) **[5]**
27/26 . Fluid-operated systems (F41A 27/02, F41A 27/04, F41A 27/30 take precedence) **[5]**
27/28 . Electrically-operated systems (F41A 27/02, F41A 27/04, F41A 27/30 take precedence) **[5]**
27/30 . Stabilisation or compensation systems, e.g. compensating for barrel weight or wind force **[5]**

29/00 Cleaning or lubricating arrangements (injecting fluids into barrels or cartridge chambers F41A 13/04) **[5]**
29/02 . Scrapers or cleaning rods **[5]**
29/04 . Lubricating, oiling or greasing means, e.g. operating during use **[5]**

31/00 Testing arrangements (testing mounts F41A 23/16) **[5]**
31/02 . for checking gun barrels **[5]**

33/00 Adaptations for training (adaptations of barrels for recoil reinforcement F41A 21/26); **Gun simulators** (teaching or practice apparatus for gun-aiming or gun-laying F41G 3/26) **[5]**
33/02 . Light- or radiation-emitting guns **[5]**
33/04 . Acoustical simulation of gun fire, e.g. by pyrotechnic means **[5]**
33/06 . Recoil simulators **[5]**

35/00 Accessories or details not otherwise provided for [5]
35/02 . Dust- or weather-protection caps or covers (protecting-caps for trigger guards F41A 17/54) **[5]**
35/04 . . Muzzle covers **[5]**
35/06 . Adaptation of guns to both right and left hand use **[5]**

99/00 Subject matter not provided for in other groups of this subclass [8]

F41B WEAPONS FOR PROJECTING MISSILES WITHOUT USE OF EXPLOSIVE OR COMBUSTIBLE PROPELLANT CHARGE; **WEAPONS NOT OTHERWISE PROVIDED FOR** (projectiles for fishing, e.g. fish-spears, A01K 81/00; sports implements for throwing A63B 65/00, e.g. boomerangs A63B 65/08; stationary apparatus for projecting sports balls, e.g. tennis balls, A63B 69/40; throwing or slinging toys A63H 33/18, knives, axes B26B; projectiles or missiles other than those incorporating springs as projecting means F42B 6/00)

Subclass index

1/00 Blow guns, i.e. tubes for impelling projectiles, e.g. peas or darts, by the force of the breath (pop guns A63H)

3/00 Sling weapons (throwing-apparatus for clay-pigeon or clay-disc targets F41J 9/18)
3/02 . Catapults, e.g. slingshots **[3]**

3/03 . . Catapults having a pivotable launcher arm **[5]**
3/04 . Centrifugal sling apparatus **[3]**

4/00 **Friction-wheel operated launchers [5]**

5/00 **Bows**; **Crossbows**
5/06 . Quivers **[3]**
5/10 . Compound bows **[5]**
5/12 . Crossbows **[5]**
5/14 . Details of bows; Accessories for arc shooting (sighting devices for bows F41G 1/467) **[5]**
5/16 . . Archer's finger tabs (sporting arm or hand protectors in general A41D 13/08) **[5]**
5/18 . . Bow-string drawing or releasing devices (F41B 5/16 takes precedence) **[5]**
5/20 . . Bow stabilisers or vibration dampers **[5]**
5/22 . . Arrow rests or guides **[5]**

6/00 **Electromagnetic launchers [5]**

7/00 **Spring guns** (catapults F41B 3/02)
7/02 . the spring forming part of the missile or projectile
7/04 . adapted to discharge harpoons
7/08 . Toy guns

9/00 **Liquid ejecting guns, e.g. water pistols**

11/00 **Air guns, e.g. air pistols**; **Steam guns**
11/02 . Adaptations for feeding or loading missiles from magazines
11/04 . for ejecting a powder, e.g. pepper
11/06 . with pressure supplied by gas cartridge (F41B 11/08 takes precedence; valves therefor F41B 11/32)
11/08 . adapted to discharge harpoons
11/12 . having an air piston effecting a compressor stroke during the firing of each shot **[5]**
11/14 . . spring-operated **[5]**
11/16 . . . having an additional slidable mass moving in the opposite direction of the piston, e.g. for recoil reduction **[5]**
11/18 . . . Arrangements for putting the spring under tension **[5]**
11/20 . . . . by a rocking lever **[5]**
11/22 . . . . . in breakdown air guns **[5]**
11/24 . having a deformable bellows or bulb pressed during the firing **[5]**
11/26 . having precompressed air before the firing (F41B 11/06, F41B 11/08, F41B 11/32 take precedence) **[5]**
11/28 . . Pumping or compressor arrangements therefor **[5]**
11/30 . . . operated by a rocking-lever system, e.g. in breakdown air guns **[5]**
11/32 . Arrangement of valves in, or valves specially adapted for, air guns **[5]**
11/34 . Sealing arrangements; Pistons **[5]**

13/00 **Thrusting-weapons** (bayonets F41C 27/18); **Cutting-weapons carried as side-arms** (training appliances for fencing A63B 69/02; sheaths for hand cutting tools B26B 29/00)
13/02 . Sabres; Cutlasses; Swords; Epees
13/04 . . Sheaths or scabbards therefor
13/06 . . . for concealment, e.g. swordsticks
13/08 . Daggers; Stilettoes
13/10 . Lances; Pikes (spears for sporting purposes A63B 65/02)

15/00 **Weapons not otherwise provided for**
15/02 . Batons; Truncheons; Sticks; Shillelaghs
15/04 . . with electric stunning-means
15/06 . . with inserted knives or spikes
15/08 . Knuckledusters
15/10 . Bolas

F41C **SMALLARMS, E.G. PISTOLS, RIFLES** (functional features or details common to both smallarms and ordnance, mountings therefor F41A; projecting missiles without use of explosive or combustible propellant charge F41B); **ACCESSORIES THEREFOR [5]**

Note

Attention is drawn to the definitions in Note (2) following the title of class F41. **[5]**

Subclass index

3/00 **Pistols, e.g. revolvers** (specially adapted for underwater use F41C 9/06; for slaughtering or stunning animals A22B; for shooting bolts into concrete constructions, metal walls or the like B25C) **[3,5]**
3/02 . Signal pistols, e.g. Very pistols
3/04 . Starting pistols; Alarm pistols
3/06 . Cap-firing pistols, e.g. toy pistols
3/08 . . with band supply
3/10 . . with rotatable cap carrier, e.g. drum **[5]**
3/12 . . with slidable cap carrier, e.g. clip (F41C 3/08 takes precedence) **[5]**
3/14 . Revolvers (F41C 3/10 takes precedence; sealing aspects F41A 3/76; using a revolving drum magazine for feeding revolver-type guns, other than revolvers, F41A 9/27; extractors or ejectors therefor F41A 15/02) **[5]**
3/16 . . Hinge-frame revolvers **[5]**

7/00 **Shoulder-fired smallarms, e.g. rifles, carbines, shotguns** (specially adapted for underwater use F41C 9/06) **[3]**

7/02 . Pump-action guns, i.e. guns having a reciprocating handgrip beneath the barrel for loading or cocking

7/04 . with reciprocating handgrip under the buttstock for loading or cocking

7/06 . Lever-action guns, i.e. guns having a rocking lever for loading or cocking

7/11 . Breakdown shotguns or rifles (hinge-frame revolvers F41C 3/16; breech mechanisms therefor F41A 3/58; cocking mechanisms therefor F41A 19/41) **[5]**

9/00 **Other smallarms, e.g. hidden smallarms or smallarms specially adapted for underwater use [3]**

9/02 . Concealed pistols, e.g. in pencils

9/04 . Walking-stick guns

9/06 . Smallarms specially adapted for underwater use

9/08 . Muzzle-loading smallarms; Smallarms with flintlock mechanisms; Accessories therefor **[5]**

Details

23/00 **Butts**; **Butt plates**; **Stocks**

23/02 . Attachment of slings

23/04 . Folding or telescopic stocks or stock parts (articulated or collapsible guns F41A 11/04) **[5]**

23/06 . Stocks specially adapted for recoil reduction **[5]**

23/08 . . Recoil absorbing pads **[5]**

23/10 . Stocks or grips for pistols, e.g. revolvers (F41C 23/12 takes precedence) **[5]**

23/12 . Auxiliary stocks for stabilising, or for transforming pistols, e.g. revolvers, into shoulder-fired guns **[5]**

23/14 . Adjustable stock or stock parts, i.e. adaptable to personal requirements, e.g. length, pitch, cast or drop **[5]**

23/16 . Forestocks; Handgrips; Hand guards (pump-action guns F41C 7/02) **[5]**

23/18 . characterised by the material used (F41C 23/08 takes precedence) **[5]**

23/20 . Butts; Butt plates; Mountings therefor (F41C 23/08, F41C 23/10 take precedence) **[5]**

23/22 . Stocks having space for the storage of objects **[5]**

27/00 **Accessories**; **Details or attachments not otherwise provided for**

27/04 . Arrangements for mounting spades or shields (spades per se A01B 1/02; shields per se F41H 5/06)

27/06 . Adaptations of smallarms for firing grenades, e.g. rifle grenades, or for firing riot-control ammunition; Barrel attachments therefor (signal pistols F41C 3/02)

27/16 . Smallarms combined with thrusting or cutting weapons (thrusting or cutting weapons, other than bayonets F41B 13/00); Bayonets; Bayonet mounts **[5]**

27/18 . . Bayonets; Bayonet mounts **[5]**

27/20 . Attachments for wire cutting **[5]**

27/22 . Balancing or stabilising arrangements **[5]**

33/00 **Means for wearing or carrying smallarms**

33/02 . Holsters, i.e. cases for pistols having means for being carried or worn, e.g. at the belt or under the arm

33/04 . . Special attachments therefor

33/06 . Containers for carrying smallarms, e.g. safety boxes, gun cases (F41C 33/02 takes precedence) **[5]**

33/08 . Handles for carrying smallarms **[5]**

F41F **APPARATUS FOR LAUNCHING PROJECTILES OR MISSILES FROM BARRELS, E.G. CANNONS** (smallarms F41C); **LAUNCHERS FOR ROCKETS OR TORPEDOES**; **HARPOON GUNS** (functional features or details common to both smallarms and ordnance, mountings therefor F41A; projecting missiles without use of explosive or combustible propellant charge F41B) **[5]**

Subclass index

1/00 **Launching apparatus for projecting projectiles or missiles from barrels, e.g. cannons** (F41F 3/00 takes precedence); **Harpoon guns**

1/06 . Mortars (base plates therefor F41A 23/54)

1/08 . Multibarrel guns, e.g. twin guns **[5]**

1/10 . . Revolving-cannon guns, i.e. multibarrel guns with the barrels and their respective breeches mounted on a rotor; Breech mechanisms therefor **[5]**

3/00 **Rocket or torpedo launchers**

3/04 . for rockets

3/042 . . the launching apparatus being used also as transport container for the rocket **[4]**

3/045 . . adapted to be carried and used by a person, e.g. bazookas (F41F 3/042 takes precedence) **[4]**

3/048 . . Means for imparting spin to the rocket before launching **[4]**

3/052 . . Means for securing the rocket in the launching apparatus **[4]**

3/055 . . Umbilical connecting means **[4]**

3/058 . . Means for removing duds or misfires **[4]**

3/06 . . from aircraft

3/065 . . . Rocket pods, i.e. detachable containers for launching a plurality of rockets **[5]**

3/07 . . Underwater launching-apparatus **[4]**

3/073 . . Silos for rockets, e.g. mounting or sealing rockets therein (F41F 3/077 takes precedence) **[5]**

3/077 . . Doors or covers for launching tubes **[5]**

3/08 . for marine torpedoes

3/10 . . from below the surface of the water

5/00 **Launching-apparatus for gravity-propelled missiles or projectiles** (from aircraft B64D 1/04)
5/04 . from ships, e.g. for mines, for depth charges

7/00 **Launching-apparatus for projecting missiles or projectiles otherwise than from barrels** (F41F 3/04 takes precedence) **[3]**

F41G **WEAPON SIGHTS**; **AIMING** (optical aspects thereof G02B)

1/00 **Sighting devices** (for indirect laying of fire F41G 3/16; bombsights F41G 3/24)
1/01 . characterised by the visual combination effect of the respective geometrical forms of fore and rear sight (F41G 1/42 takes precedence) **[5]**
1/02 . Foresights
1/027 . . with lens **[5]**
1/033 . . adjustable **[5]**
1/04 . . Protection means therefor
1/06 . Rearsights
1/08 . . with aperture
1/10 . . with notch
1/12 . . with line or mark other than notch
1/14 . . with lens
1/16 . . Adjusting mechanisms therefor; Mountings therefor
1/17 . . . Convertible sights, i.e. sets of two or more sights brought into the sight line optionally **[5]**
1/18 . . . Clicking indicators with spring detents
1/20 . . . coarse and fine
1/22 . . . Friction clamps
1/24 . . . rack-and-pinion; lever; linkwork
1/26 . . . screw
1/28 . . . wedge; cam; eccentric
1/30 . Reflecting sights specially adapted for smallarms or ordnance (reflecting-sights in general G02B)
1/32 . Night sights, e.g. luminescent
1/34 . . combined with light source, e.g. spot light
1/35 . . . for illuminating the target **[5]**
1/36 . . . with infra-red light source
1/38 . Telescopic sights specially adapted for smallarms or ordnance (telescopic sights in general G02B); Supports or mountings therefor
1/387 . . Mounting telescopic sights on smallarms **[5]**
1/393 . . Mounting telescopic sights on ordnance; Transmission of sight movements to the associated gun **[5]**
1/40 . Periscopic sights specially adapted for smallarms or ordnance (periscopic sights in general G02B); Supports or mountings therefor
1/41 . . Mounting periscopic sights on smallarms **[5]**
1/42 . Tube sights; Bar sights
1/44 . Spirit-level adjusting-means, e.g. for correcting tilt
1/46 . for particular applications
1/467 . . for bows **[5]**
1/473 . . for lead-indicating or range-finding, e.g. for use with rifles or shotguns **[5]**
1/48 . . for firing grenades from rifles
1/50 . . for trench mortars
1/52 . . for rifles or shotguns having two or more barrels, or adapted to fire different kinds of ammunition, e.g. ball or shot
1/54 . Devices for testing or checking

3/00 **Aiming means**; **Laying means** (sighting devices F41G 1/00; determining direction, distance or velocity by use of radio or other waves G01S; computers G06; aerials H01Q)
3/02 . using an independent line of sight
3/04 . for dispersing fire from a battery
3/06 . with rangefinder (rangefinders per se G01C)
3/08 . with means for compensating for speed, direction, temperature, pressure, or humidity of the atmosphere (measuring G01)
3/10 . with means for compensating for canting of the trunnions
3/12 . with means for compensating for muzzle velocity or powder temperature
3/14 . Indirect aiming means
3/16 . . Sighting devices adapted for indirect laying of fire
3/18 . . Auxiliary target devices adapted for indirect laying of fire
3/20 . . specially adapted for mountain artillery
3/22 . for vehicle-borne armament, e.g. on aircraft
3/24 . . Bombsights
3/26 . Teaching or practice apparatus for gun-aiming or gun-laying
3/28 . . Small-scale apparatus (relief models or maps G09B)
3/30 . . Gun-laying apparatus
3/32 . Devices for testing or checking

5/00 **Elevating or traversing control systems for guns** (gun mountings permitting traversing or elevating movement, e.g. gun carriages, F41A 27/00; computers G06)
5/02 . using only mechanical means for remote control
5/04 . using hydraulic means for remote control
5/06 . using electric means for remote control
5/08 . Ground-based tracking-systems for aerial targets
5/12 . acoustically influenced
5/14 . for vehicle-borne guns
5/16 . . gyroscopically influenced
5/18 . . Tracking systems for guns on aircraft
5/20 . . for guns on ships
5/22 . . . to compensate for rolling or pitching
5/24 . . for guns on tanks
5/26 . Apparatus for testing or checking

7/00 **Direction control systems for self-propelled missiles** (flight control B64C, G05D 1/00; self-propelled or guided missiles having direction control systems only installed aboard F42B 15/01; rocket torpedoes F42B 17/00; marine torpedoes or sea-mines having self-propulsion means F42B 19/00; locating by use of radio or other waves G01S; computing aspects G06)
7/20 . based on continuous observation of target position **[3]**
7/22 . . Homing guidance systems **[3]**
7/24 . . Beam riding guidance systems (conical-scan beam beacons therefor G01S 1/42) **[3]**
7/26 . . . Optical guidance systems **[3]**
7/28 . . . Radio guidance systems **[3]**

7/30 . . Command link guidance systems **[3]**
7/32 . . . for wire-guided missiles **[3]**
7/34 . based on predetermined target position data **[3]**
7/36 . . using inertial references **[3]**

9/00 Systems for controlling missiles or projectiles, not provided for elsewhere
9/02 . for bombing control (bombsights F41G 3/24)

11/00 Details of sighting or aiming apparatus; **Accessories**

F41H ARMOUR; ARMOURED TURRETS; ARMOURED OR ARMED VEHICLES; MEANS OF ATTACK OR DEFENCE, E.G. CAMOUFLAGE, IN GENERAL

Subclass index

1/00 Personal protection-gear (shields for personal use F41H 5/08; for protection against chemical warfare A62B)
1/02 . Armoured or projectile- or missile-resistant garments; Composite protection fabrics
1/04 . Protection helmets (crash helmets A42B 3/00)
1/06 . . of steel; Steel head-shields
1/08 . . of plastics; Plastic head-shields

3/00 Camouflage, i.e. means or methods for concealment or disguise (for vessels B63G 8/34, B63G 13/02)
3/02 . Covers, e.g. screens, nets (making thereof, see the relevant classes, e.g. D04)

5/00 Armour; **Armour plates** (processes for manufacturing or treating B21, C21)
5/007 . Reactive armour; Dynamic armour **[5]**
5/013 . Mounting or securing armour plates **[5]**
5/02 . Plate construction
5/04 . . composed of more than one layer
5/06 . Shields (in ships B63G 9/00; in aircraft B64D 7/00)
5/08 . . for personal use
5/10 . . . Spade bayonets, i.e. usable as a spade, bayonet, or cover against rifle fire
5/12 . . for smallarms; for light-rocket launchers
5/14 . . . Wheeled armoured shields
5/16 . . for ordnance
5/18 . . Rotating shields
5/20 . Turrets
5/22 . Manhole covers, e.g. on tanks (in general F16J)
5/24 . for stationary use, e.g. fortifications
5/26 . Peepholes; Windows (manufacture or composition of glass C03); Covers therefor

7/00 Armoured or armed vehicles (general vehicle aspects B60; armoured or armed ships B63G; armoured or armed aircraft B64D; mounting guns, e.g. machine-guns, on vehicles F41A 23/00)
7/02 . Land vehicles with enclosing armour, e.g. tanks (endless-track vehicles, steering thereof B62D)
7/03 . . Air-pressurised compartments for crew; Means for preventing admission of noxious substances, e.g. combustion gas from gun barrels, in crew compartments; Sealing arrangements **[5]**
7/04 . . Armour construction (in general F41H 5/00)
7/10 . Mine-laying land vehicles

9/00 Equipment for attack or defence by spreading flame, gas, or smoke; **Chemical warfare equipment** (protection against chemicals A62B)
9/02 . Flame-throwing apparatus (for destroying vegetation A01M 15/00)
9/04 . Gas blowing apparatus, e.g. for tear gas (F41H 9/10 takes precedence)
9/06 . Apparatus for generating artificial fog or smoke screens (smoke-pot projectors, e.g. arranged on vehicles, F42B 5/155)
9/08 . . Smoke-pots without propulsive charge, i.e. stationary **[5]**
9/10 . Hand-held or body-worn self-defence devices using repellant gases or chemicals **[5]**

11/00 Defence installations; **Defence devices** (constructional aspects, see section E, e.g. E04H 9/04); **Means for clearing or detecting landmines**
11/02 . Anti-aircraft or anti-guided missile defence installations or systems (cartridges or missiles for producing smoke or for dispensing radar chaff or infra-red material F42B 5/15, F42B 12/48, F42B 12/70)
11/04 . . Aerial barrages
11/05 . Net barriers for harbour defence
11/06 . Gun-traps
11/08 . Barbed-wire obstacles; Barricades; Stanchions; Tank traps; Vehicle-impeding devices; Caltrops
11/10 . . Dispensing-apparatus therefor, e.g. devices for dispensing and reeling barbed wire
11/11 . . Clearing or neutralising barbed-wire obstacles (smallarm attachments for wire cutting F41C 27/20) **[5]**
11/12 . *Means for clearing land minefields; Systems specially adapted for detection of landmines* **[1,2011.01]**
11/13 . . *Systems specially adapted for detection of landmines* **[2011.01]**
11/132 . . . *Biological systems, e.g. with detection by animals or plants* **[2011.01]**
11/134 . . . *Chemical systems, e.g. with detection by vapour analysis* **[2011.01]**
11/136 . . . *Magnetic, electromagnetic, acoustic or radiation systems, e.g. ground penetrating radars or metal-detectors* **[2011.01]**
11/138 . . . *Mechanical systems, e.g. prodding sticks for manual detection* **[2011.01]**
11/14 . . Explosive line charges, e.g. snakes

11/16 . . *Self-propelled mine-clearing vehicles; Mine-clearing devices attachable to vehicles* **[1,2011.01]**

11/18 . . . *with ground-impacting means for activating mines by the use of mechanical impulses, e.g. flails or stamping elements* **[2011.01]**

11/20 . . . *with ground-penetrating elements, e.g. with means for removing buried landmines from the soil (F41H 11/18 takes precedence)* **[2011.01]**

11/22 . . . . *the elements being excavation buckets* **[2011.01]**

11/24 . . . . *the elements being ploughs* **[2011.01]**

11/26 . . . . *the elements being rotary ground-penetrating elements* **[2011.01]**

11/28 . . . *using brushing or sweeping means or dozers to push mines lying on a surface aside; using means for removing mines intact from a surface* **[2011.01]**

11/30 . . . *with rollers creating a surface load on the ground, e.g. steadily increasing surface load, for triggering purposes* **[2011.01]**

11/32 . . . *Decoy or sacrificial vehicles; Decoy or sacrificial devices attachable to vehicles* **[2011.01]**

13/00 Means of attack or defence not otherwise provided for

F41J TARGETS; TARGET RANGES; BULLET CATCHERS

Subclass index

1/00 Targets; **Target stands**; **Target holders** (F41J 2/00 to F41J 11/00 take precedence; targets combined with bullet catchers F41J 13/02) **[5]**

1/01 . Target discs characterised by their material, structure or surface (F41J 5/044 takes precedence) **[5]**

1/08 . for ordnance, e.g. cannons; for attacking by aircraft; Full-scale models imitating target objects, e.g. tanks, aircraft **[5]**

1/10 . Target stands; Target holders

2/00 Reflecting targets, e.g. radar-reflector targets; **Active targets transmitting electromagnetic waves [5]**

2/02 . Active targets transmitting infra-red radiation **[5]**

3/00 Targets for arrows or darts, e.g. for sporting or amusement purposes

3/02 . Indicators or score boards for arrow or dart games

5/00 Target indicating systems; **Target-hit or score detecting systems [5]**

5/02 . Photo-electric hit-detector systems

5/04 . Electric hit-indicating systems; Detecting hits by actuation of electric contacts or switches **[5]**

5/044 . . Targets having two or more electrically-conductive layers for short-circuiting by penetrating projectiles **[5]**

5/048 . . . one of the layers being in the form of discrete target sections **[5]**

5/052 . . Targets comprising a plurality of electric contacts, each corresponding to a discrete target section and being actuated by the movement thereof (F41J 5/056 takes precedence) **[5]**

5/056 . . Switch actuation by hit-generated mechanical vibration of the target body, e.g. using shock or vibration transducers **[5]**

5/06 . Acoustic hit-indicating systems, i.e. detecting of shock waves (F41J 5/056 takes precedence)

5/08 . Infra-red hit-indicating systems

5/10 . Cinematographic hit-indicating systems (cinematographic targets F41J 9/14)

5/12 . for indicating the distance by which a bullet misses the target (F41J 5/02 to F41J 5/10 take precedence)

5/14 . Apparatus for signalling hits or scores to the shooter, e.g. manually operated, or for communication between target and shooter; Apparatus for recording hits or scores **[5]**

5/16 . . Manually evaluating scores, e.g. using scoring plugs or gauges; Apparatus for evaluating scores on targets after removal from the target holder **[5]**

5/18 . Targets having hit-indicating means actuated or moved mechanically when the target has been hit, e.g. discs or flags (the target as a whole disappearing or moving when hit F41J 7/04) **[5]**

5/20 . . indicating which part of the target has been hit, i.e. the score **[5]**

5/22 . . the indicating means being a dispensing device **[5]**

5/24 . Targets producing a particular effect when hit, e.g. detonation of pyrotechnic charge, bell ring, photograph **[5]**

5/26 . . exploding or disintegrating when hit (F41J 9/16 takes precedence) **[5]**

7/00 Movable targets which are stationary when fired at

7/02 . movable for checking

7/04 . disappearing when hit

7/06 . Bobbing targets, i.e. targets intermittently or unexpectedly appearing **[5]**

9/00 Moving targets, i.e. moving when fired at (F41J 2/00 takes precedence) **[5]**

9/02 . Land-based targets

9/04 . Sea-going targets

9/06 . . towed

9/08 . Airborne targets, e.g. drones, kites, balloons

9/10 . . towed

9/14 . Cinematographic targets, e.g. moving-picture targets

9/16 . Clay-pigeon targets; Clay-disc targets

9/18 . . Traps or throwing-apparatus therefor

9/20 . . . with spring-operated throwing arm **[3]**

9/22 . . . . cocked by manual action **[3]**
9/24 . . . . cocked by electromechanical means **[3]**
9/26 . . . operated by fluid means **[3]**
9/28 . . . operated by manual action **[3]**
9/30 . . . characterised by using a magazine of targets **[3]**
9/32 . . . characterised by means for obviating the anticipation of the flight path **[3]**

11/00 Target ranges [2009.01]
11/02 . Safety means therefor **[2009.01]**

13/00 Bullet catchers [2009.01]
13/02 . combined with targets **[2009.01]**

F42 AMMUNITION; BLASTING

(1) This class covers also means for practice or training which may have aspects of simulation, although simulators are generally covered by class G09.

(2) In this class, the following terms or expressions are used with the meanings indicated:
- "primer" effects the first explosive step in the sequence of explosion; **[2]**
- "percussion cap" means a primer which is struck to explode; **[2]**
- "igniter" effects the first spark-producing or heat-producing step but may not be explosive; **[2]**
- "firing-means" or "initiator" (used respectively in the arts of weaponry and blasting) means a device acting directly on the primer, which device may or may not form part of the fuze; **[2]**
- "detonator" or "detonator charge" means a charge used to amplify the explosion of the primer; **[2]**
- "fuze" means an assembly or mechanism which incorporates safety and arming means in order that the explosion can only take place under certain conditions; this assembly or mechanism determines also the moment (instantaneous or delayed) or the manner, e.g. impact, proximity, hydrostatic pressure, of the firing; **[2]**
- "ammunition" covers propulsive charge and projectile whether or not forming a single body, unless otherwise made clear; **[2]**
- "projectile", "missile" or "projectile or missile" means any body which is projected or propelled; **[4]**
- "guided missile" means projectile or missile which is guided during at least part of its trajectory; **[4]**
- "rocket" means projectile or missile which is self-propelled, during at least part of its trajectory, by a rocket engine, i.e. by a jet-propulsion engine carrying both fuel and oxidant therefor; **[4]**
- "fuse" or "fuse cord" means a continuous train of explosive enclosed in a usually flexible cord or cable for setting-off an explosive charge in the art of blasting. **[5]**

F42B EXPLOSIVE CHARGES, E.G. FOR BLASTING; **FIREWORKS**; **AMMUNITION** (explosive compositions C06B; fuzes F42C; blasting F42D) **[2,5]**

Subclass index

1/00 Explosive charges characterised by form or shape but not dependent on shape of container

1/02 . Shaped or hollow charges (blasting cartridges with cavities in the charge F42B 3/08; oil-winning using shaped-charge perforators E21B 43/116)

1/024 . . provided with embedded bodies of inert material **[5]**

1/028 . . characterised by the form of the liner **[5]**

1/032 . . characterised by the material of the liner **[5]**

1/036 . . Manufacturing processes therefor **[5]**

1/04 . Detonator charges not forming part of the fuze

3/00 Blasting cartridges, i.e. case and explosive (fuse cords, e.g. detonating fuse cords, C06C 5/00; chemical aspects of detonators, blasting caps or primers C06C 7/00)

3/02 . adapted to be united into assemblies

3/04 . for producing gas under pressure

3/06 . . with re-utilisable case

3/08 . with cavities in the charge, e.g. hollow-charge blasting cartridges

3/087 . Flexible or deformable blasting cartridges, e.g. bags or hoses (loaded cartridge bags F42B 5/38) **[5]**

3/093 . . in mat or tape form **[5]**

3/10 . Initiators therefor (percussion fuzes F42C 7/00; percussion caps F42C 19/10; electric primers F42C 19/12)

Note

Group F42B 3/18 takes precedence over groups F42B 3/103 to F42B 3/16.

3/103 . . Mounting initiator heads in initiators; Sealing-plugs **[5]**
3/107 . . . Sealing-plugs characterised by the material used **[5]**
3/11 . . characterised by the material used, e.g. for initiator case or electric leads (F42B 3/107 takes precedence) **[5]**
3/113 . . activated by optical means, e.g. laser, flashlight **[5]**
3/117 . . activated by friction **[5]**
3/12 . . Bridge initiators
3/13 . . . with semiconductive bridge **[5]**
3/14 . . Spark initiators
3/16 . . Delay initiators
3/18 . . Safety initiators resistant to premature firing by static electricity or stray currents
3/182 . . . having shunting means **[5]**
3/185 . . . having semiconductive sealing plugs **[5]**
3/188 . . . having radio-frequency filters **[5]**
3/192 . . designed for neutralisation on contact with water **[5]**
3/195 . . Manufacture **[5]**
3/198 . . . of electric initiator heads **[5]**
3/22 . Elements for controlling or guiding the detonation wave, e.g. tubes (using inert bodies embedded in shaped or hollow charges F42B 1/024) **[5]**
3/24 . Cartridge closures or seals (top closures for shotgun ammunition cartridges F42B 7/12) **[5]**
3/26 . Arrangements for mounting initiators; Accessories therefor, e.g. tools **[5]**
3/28 . Cartridge cases characterised by the material used, e.g. coatings (for initiator cases F42B 3/11) **[5]**

4/00 Fireworks, i.e. pyrotechnic devices for amusement, display, illumination, or signal purposes (signalling by explosives G08B; advertising by firework G09F 13/46) **[2]**

4/02 . in cartridge form, i.e. shell, propellant, and primer **[2]**
4/04 . Firecrackers **[2]**
4/06 . Aerial display rockets (rockets in general F42B 15/00) **[2]**
4/08 . . characterised by having vanes, wings, parachutes, or balloons **[2]**
4/10 . . characterised by having means to separate article or charge from casing without destroying casing **[2]**
4/12 . . . Parachute or flare separation **[2]**
4/14 . . characterised by having plural successively-ignited charges **[2]**
4/16 . Hand-thrown impact-exploded noise makers (cap pistols F41C 3/06) **[4]**
4/18 . Simulations, e.g. pine cone, house that is destroyed, warship, volcano **[2]**
4/20 . characterised by having holder or support other than casing, e.g. whirler or spike support **[2]**
4/22 . characterised by having means to separate an article or charge from casing without destroying casing (in aerial display rockets F42B 4/10) **[2]**
4/24 . characterised by having plural successively-ignited charges (in aerial display rockets F42B 4/14) **[2]**
4/26 . Flares; Torches **[2]**
4/28 . . Parachute flares (F42B 4/12 takes precedence) **[2]**
4/30 . Manufacture **[2]**

5/00 Cartridge ammunition, e.g. separately-loaded propellant charges (shotgun ammunition F42B 7/00; practice or training ammunition F42B 8/00; missiles therefor F42B 12/00, F42B 14/00, F42B 15/00)

5/02 . Cartridges, i.e. cases with propellant charge and missile
5/03 . . containing more than one missile **[4]**
5/045 . . of telescopic type (F42B 5/184 takes precedence) **[5]**
5/05 . . for recoilless guns (recoilless guns using a counter-projectile to balance recoil F41A 1/10) **[4]**
5/067 . . Mounting or locking missiles in cartridge cases (F42B 5/18 takes precedence) **[5]**
5/073 . . . using an auxiliary locking element **[5]**
5/08 . . modified for electric ignition
5/10 . . with self-propelled bullet
5/14 . . for marking cattle
5/145 . . for dispensing gases, vapours, powders, particles or chemically-reactive substances (from projectiles F42B 12/46, F42B 12/70) **[5]**
5/15 . . . for creating a screening or decoy effect, e.g. using radar chaff or infra-red material (infra-red flares F42B 4/26) **[5]**
5/155 . . . . Smoke-pot projectors, e.g. arranged on vehicles **[5]**
5/16 . . characterised by composition or physical dimensions or form of propellant charge or powder (chemical composition C06B)
5/18 . . Caseless ammunition; Cartridges having combustible cases **[5]**
5/184 . . . telescopic **[5]**
5/188 . . . Manufacturing processes therefor **[5]**
5/192 . . . Cartridge cases characterised by the material used **[5]**
5/196 . . . . Coatings **[5]**
5/24 . . for cleaning; for cooling; for lubricating **[5]**
5/26 . Cartridge cases (F42B 5/18 takes precedence)
5/28 . . of metal
5/285 . . . formed by assembling several elements **[4]**
5/29 . . . . wound from sheets or strips **[4]**
5/295 . . . coated **[4]**
5/297 . . . . with plastics **[5]**
5/30 . . of plastics
5/307 . . . formed by assembling several elements **[4]**
5/313 . . . . all elements made of plastics **[4]**
5/32 . . for rim fire
5/34 . . with provision for varying the length
5/36 . . modified for housing an integral firing-cap
5/38 . Separately-loaded propellant charges, e.g. cartridge bags **[4]**

6/00 Projectiles or missiles specially adapted for projection without use of explosive or combustible propellant charge, e.g. for blow guns, bows or crossbows, hand-held spring or air guns (for delivering hypodermic charges F42B 12/54; throwing-darts A63B 65/02; projectiles or missiles incorporating springs as the projecting means F41B 7/02) **[5]**

6/02 . Arrows; Crossbow bolts; Harpoons for hand-held spring or air guns **[5]**

6/04 . . Archery arrows (F42B 6/08, F41B 5/06 take precedence) **[5]**
6/06 . . . Tail ends, e.g. nocks, fletching **[5]**
6/08 . . Arrow heads; Harpoon heads **[5]**
6/10 . Air gun pellets **[5]**

7/00 Shotgun ammunition
7/02 . Cartridges, i.e. cases with propellant charge and missile
7/04 . . of pellet type
7/06 . . with cartridge case of plastics
7/08 . . Wads therefor
7/10 . . Ball or slug shotgun cartridges
7/12 . . Cartridge top closures, i.e. for the missile side (closures for blasting cartridges F42B 3/24) **[5]**

8/00 Practice or training ammunition (range-reducing, destabilising or braking arrangements F42B 10/00; with signalling effect F42B 12/02; F42B 19/00 takes precedence) **[4]**
8/02 . Cartridges **[5]**
8/04 . . Blank cartridges, i.e. primed cartridges without projectile but containing an explosive or combustible powder charge **[5]**
8/06 . . . for cap-firing pistols **[5]**
8/08 . . Dummy cartridges, i.e. inert cartridges containing neither primer nor explosive or combustible powder charge **[5]**
8/10 . . with sub-calibre adaptor **[5]**
8/12 . Projectiles or missiles (F42B 19/36 takes precedence) **[5]**
8/14 . . disintegrating in flight or upon impact **[5]**
8/16 . . . containing an inert filler in powder or granular form **[5]**

Note

Group F42B 8/14 takes precedence over groups F42B 8/18 to F42B 8/26. **[5]**

8/18 . . Rifle grenades **[5]**
8/20 . . Mortar grenades **[5]**
8/22 . . Fall bombs **[5]**
8/24 . . Rockets **[5]**
8/26 . . Hand grenades **[5]**
8/28 . Land or marine mines; Depth charges **[5]**

10/00 Means for influencing, e.g. improving, the aerodynamic properties of projectiles or missiles; **Arrangements on projectiles or missiles for stabilising, steering, range-reducing, range-increasing or fall-retarding** (F42B 6/00 takes precedence; sub-calibre projectiles having sabots F42B 14/00) **[5]**
10/02 . Stabilising arrangements **[5]**
10/04 . . using fixed fins (F42B 10/22 takes precedence) **[5]**
10/06 . . . Tail fins **[5]**
10/08 . . . . Flechette-type projectiles **[5]**
10/10 . . . . the fins being formed in the barrel by deformation of the projectile body **[5]**
10/12 . . using fins longitudinally-slidable with respect to the projectile or missile **[5]**
10/14 . . using fins spread or deployed after launch, e.g. after leaving the barrel **[5]**
10/16 . . . Wrap-around fins **[5]**
10/18 . . . using a longitudinally slidable support member **[5]**
10/20 . . . deployed by combustion gas pressure, or by pneumatic or hydraulic forces **[5]**
10/22 . . Projectiles of cannelured type **[5]**
10/24 . . . with inclined grooves **[5]**
10/26 . . using spin (F42B 10/04, F42B 10/12, F42B 10/14, F42B 10/24, F42B 14/02 take precedence) **[5]**
10/28 . . . induced by gas action **[5]**
10/30 . . . . using rocket motor nozzles **[5]**
10/32 . Range-reducing or range-increasing arrangements; Fall-retarding means **[5]**
10/34 . . Tubular projectiles **[5]**
10/36 . . . Ring-foil projectiles **[5]**
10/38 . . Range-increasing arrangements (F42B 10/34 takes precedence) **[5]**
10/40 . . . with combustion of a slow-burning charge, e.g. fumers, base-bleed projectiles **[5]**
10/42 . . . Streamlined projectiles **[5]**
10/44 . . . . Boat-tails specially adapted for drag reduction **[5]**
10/46 . . . . Streamlined nose cones; Windshields; Radomes **[5]**
10/48 . . Range-reducing, destabilising or braking arrangements; Fall-retarding means (F42B 10/34 takes precedence) **[5]**
10/50 . . . Brake flaps **[5]**
10/52 . . . Nose cones **[5]**
10/54 . . . Spin braking means **[5]**
10/56 . . . of parachute type **[5]**
10/58 . . . of rotochute type **[5]**
10/60 . Steering arrangements (F42B 19/01 takes precedence) **[5]**
10/62 . . Steering by movement of flight surfaces **[5]**
10/64 . . . of fins **[5]**
10/66 . . Steering by varying intensity or direction of thrust (thrust vector control of rocket engine plants F02K 9/80) **[5]**

12/00 Projectiles, missiles or mines characterised by the warhead, the intended effect, or the material (F42B 6/00, F42B 10/00, F42B 14/00 take precedence; for practice or training F42B 8/12, F42B 8/28; self-propulsion or guidance aspects F42B 15/00) **[5]**
12/02 . characterised by the warhead or the intended effect **[5]**
12/04 . . of armour-piercing type **[5]**
12/06 . . . with hard or heavy core; Kinetic energy penetrators (F42B 12/16, F42B 12/74 take precedence) **[5]**
12/08 . . . with armour-piercing caps; with armoured cupola **[5]**
12/10 . . . with shaped or hollow charge (shaped or hollow charges per se F42B 1/02) **[5]**
12/12 . . . . rotatably mounted with respect to missile housing **[5]**
12/14 . . . . the symmetry axis of the hollow charge forming an angle with the longitudinal axis of the projectile **[5]**
12/16 . . . . in combination with an additional projectile or charge, acting successively on the target **[5]**
12/18 . . . . . Hollow charges in tandem arrangement **[5]**
12/20 . . of high-explosive type (F42B 12/44 takes precedence) **[5]**
12/22 . . . with fragmentation-hull construction **[5]**
12/24 . . . . with grooves, recesses or other wall weakenings **[5]**

12/26 . . . . the projectile wall being formed by a spirally-wound element **[5]**
12/28 . . . . the projectile wall being built from annular elements **[5]**
12/30 . . . . Continuous-rod warheads **[5]**
12/32 . . . . the hull or case comprising a plurality of discrete bodies, e.g. steel balls, embedded therein **[5]**
12/34 . . expanding before or on impact, i.e. of dumdum or mushroom type **[5]**
12/36 . . for dispensing materials; for producing chemical or physical reaction; for signalling **[5]**
12/38 . . . of tracer type **[5]**
12/40 . . . of target-marking, i.e. impact-indicating, type (F42B 12/48 takes precedence) **[5]**
12/42 . . . of illuminating type, e.g. carrying flares **[5]**
12/44 . . . of incendiary type (F42B 12/46 takes precedence) **[5]**
12/46 . . . for dispensing gases, vapours, powders or chemically-reactive substances (F42B 12/70 takes precedence) **[5]**
12/48 . . . . smoke-producing **[5]**
12/50 . . . . by dispersion **[5]**
12/52 . . . . . Fuel-air explosive devices **[5]**
12/54 . . . . by implantation, e.g. hypodermic projectiles **[5]**
12/56 . . . for dispensing discrete solid bodies (F42B 12/70 takes precedence) **[5]**
12/58 . . . . Cluster or cargo ammunition, i.e. projectiles containing one or more submissiles (F42B 12/32 takes precedence) **[5]**
12/60 . . . . . the submissiles being ejected radially **[5]**
12/62 . . . . . the submissiles being ejected parallel to the longitudinal axis of the projectile **[5]**
12/64 . . . . . the submissiles being of shot- or flechette-type **[5]**
12/66 . . . . . Chain-shot, i.e. the submissiles being interconnected by chains or the like **[5]**
12/68 . . . . Line-carrying missiles, e.g. for life-saving (harpoons F42B 30/14) **[5]**
12/70 . . . . for dispensing radar chaff or infra-red material (radar-reflector targets, active targets transmitting infra-red radiation F41J 2/00; radar-reflecting surfaces H01Q 15/14) **[5]**
12/72 . characterised by the material (heat treatment for explosive shells C21D 9/16) **[5]**
12/74 . . of the core or solid body **[5]**
12/76 . . of the casing **[5]**
12/78 . . . of jackets for smallarm bullets **[5]**
12/80 . . . Coatings **[5]**
12/82 . . . . reduction friction **[5]**

14/00 Projectiles or missiles characterised by arrangements for guiding or sealing them inside barrels, or for lubricating or cleaning barrels [5]

14/02 . Driving bands; Rotating bands (F42B 14/04 takes precedence) **[5]**
14/04 . Lubrication means in missiles (coatings for reducing friction F42B 12/82) **[5]**
14/06 . Sub-calibre projectiles having sabots; Sabots therefor **[5]**
14/08 . . Sabots filled with propulsive charges; Removing sabots by combustion of pyrotechnic elements or by propulsive-gas pressure (arrangements on barrels for removing sabots from projectiles F41A 21/46) **[5]**

15/00 Self-propelled projectiles or missiles, e.g. rockets; **Guided missiles** (F42B 10/00, F42B 12/00, F42B 14/00 take precedence; for practice or training F42B 8/12; rocket torpedoes F42B 17/00; marine torpedoes F42B 19/00; cosmonautic vehicles B64G; jet-propulsion plants F02K) **[4]**

15/01 . Arrangements thereon for guidance or control (aircraft flight control B64C; guidance systems other than those only installed aboard F41G 7/00, F41G 9/00; locating by use of radio or other waves G01S; flight control in general G05D 1/00; computing aspects G06) **[5]**
15/04 . . using wire, e.g. for guiding ground-to-ground rockets
15/08 . for carrying measuring instruments (adaptations for meteorology G01W 1/08)
15/10 . Missiles having a trajectory only in the air
15/12 . . Intercontinental ballistic missiles (F42B 15/01 takes precedence) **[4]**
15/20 . Missiles having a trajectory beginning below water surface (having additional propulsion means for movement through water F42B 17/00)
15/22 . Missiles having a trajectory finishing below water surface (having additional propulsion means for movement through water F42B 17/00)
15/34 . Protection against overheating or radiation, e.g. heat shields; Additional cooling arrangements **[5]**
15/36 . Means for interconnecting rocket-motor and body section; Multi-stage connectors; Disconnecting means **[5]**
15/38 . . Ring-shaped explosive elements for the separation of rocket parts **[5]**

17/00 Rocket torpedoes, i.e. missiles provided with separate propulsion means for movement through air and through water (F42B 12/00 takes precedence)

19/00 Marine torpedoes, e.g. launched by surface vessels or submarines (having additional propulsion means for movement through air F42B 17/00); **Sea mines having self-propulsion means** (F42B 12/00 takes precedence; launching means F41F; locating by use of radio or other waves G01S; automatic control of course G05D 1/00; firing directors or calculators G06G)

19/01 . Steering control
19/04 . . Depth control
19/06 . . Directional control
19/08 . . with means for preventing rolling or pitching
19/10 . . remotely controlled, e.g. by sonic or radio control (control systems using wire F41G 7/32)
19/12 . Propulsion specially adapted for torpedoes (marine propulsion in general B63H)
19/14 . . by compressed-gas motors
19/16 . . . of cylinder type
19/18 . . . of turbine type
19/20 . . . characterised by the composition of propulsive gas; Manufacture or heating thereof in torpedoes
19/22 . . by internal-combustion engines
19/24 . . by electric motors
19/26 . . by jet propulsion
19/28 . . with means for avoiding visible wake
19/30 . . with timing control of propulsion
19/36 . adapted to be used for exercise purposes, e.g. indicating position or course
19/38 . . with means for causing torpedoes to surface at end of run
19/40 . . . by expelling liquid ballast

19/42 . . . by releasing solid ballast
19/44 . . . by enlarging displacement
19/46 . adapted to be launched from aircraft

21/00 **Depth charges** (F42B 12/00 takes precedence; for practice or training F42B 8/28; laying aspects B63G)

22/00 **Marine mines, e.g. launched by surface vessels or submarines** (F42B 12/00 takes precedence; for practice or training F42B 8/28; mine laying or sweeping B63G)
22/02 . Contact mines (contact fuzes F42C 7/02)
22/04 . Influenced mines, e.g. by magnetic or acoustic effect
22/06 . Ground mines
22/08 . Drifting mines (with propulsion means F42B 19/00)
22/10 . Moored mines
22/12 . . at a fixed depth setting
22/14 . . at a variable depth setting
22/16 . . . using mechanical means, e.g. plummet and float
22/18 . . . using hydrostatic means
22/20 . . . using magnetic or acoustic depth-control means
22/22 . having self-contained sinking means
22/24 . Arrangement of mines in fields or barriers (net barriers for harbour defence F41H 11/05)
22/42 . with anti-sweeping means, e.g. electrical
22/44 . adapted to be launched from aircraft

23/00 **Land mines** (F42B 12/00 takes precedence; for practice or training F42B 8/28)
23/04 . anti-vehicle **[5]**
23/08 . . non-metallic **[5]**
23/10 . anti-personnel **[5]**
23/14 . . non-metallic **[5]**
23/16 . . of missile type, i.e. for detonation after ejection from ground (fuzes for initiating mine ejection F42C 1/09) **[5]**
23/24 . Details

25/00 **Fall bombs** (F42B 10/00, F42B 12/00 take precedence; for practice or training F42B 8/12) **[5]**

27/00 **Hand grenades** (F42B 12/00 takes precedence; for practice or training F42B 8/12)
27/08 . with handle

29/00 **Noiseless, smokeless, or flashless missiles launched by their own explosive propellant**

30/00 **Projectiles or missiles, not otherwise provided for, characterised by the ammunition class or type, e.g. by the launching apparatus or weapon used** (F42B 10/00, F42B 12/00, F42B 14/00 take precedence) **[5]**
30/02 . Bullets **[5]**
30/04 . Rifle grenades **[5]**
30/06 . . Bullet traps or bullet decelerators therefor **[5]**
30/08 . Ordnance projectiles or missiles, e.g. shells **[5]**
30/10 . . Mortar projectiles **[5]**
30/12 . . . with provision for additional propulsive charges, or for varying the length **[5]**
30/14 . Harpoons (for hand-held spring or air guns F42B 6/02) **[5]**

33/00 **Manufacture of ammunition**; **Dismantling of ammunition**; **Apparatus therefor** (F42B 5/188 takes precedence; manufacturing processes for hollow charges F42B 1/036; manufacturing of blasting cartridge initiators F42B 3/195)
33/02 . Filling cartridges, missiles, or fuzes; Inserting propellant or explosive charges
33/04 . Fitting or extracting primers in or from fuzes or charges
33/06 . Dismantling fuzes, cartridges, projectiles, missiles, rockets, or bombs (F42B 33/04 takes precedence)
33/10 . Reconditioning used cartridge cases
33/12 . Crimping shotgun cartridges
33/14 . Surface treatment of cartridges or cartridge cases

35/00 **Testing or checking of ammunition**
35/02 . Gauging, sorting, trimming or shortening cartridges or missiles

39/00 **Packaging or storage of ammunition or explosive charges**; **Safety features thereof**; **Cartridge belts or bags**
39/02 . Cartridge bags; Bandoleers
39/08 . Cartridge belts
39/10 . . Machines for charging or for extracting cartridges from feed belts
39/14 . Explosion or fire protection arrangements on packages or ammunition (F42B 39/20 takes precedence) **[5]**
39/16 . . Fire-extinguishing **[5]**
39/18 . . Heat shields; Thermal insulation **[5]**
39/20 . Packages or ammunition having valves for pressure-equalising; Packages or ammunition having plugs for pressure release, e.g. meltable **[5]**
39/22 . Locking of ammunition in transport containers **[5]**
39/24 . Shock-absorbing arrangements in packages **[5]**
39/26 . Packages or containers for a plurality of ammunition, e.g. cartridges (F42B 39/14 to F42B 39/24, F42B 39/28 take precedence) **[5]**
39/28 . Ammunition racks, e.g. in vehicles **[5]**
39/30 . Containers for detonators or fuzes (F42B 39/14, F42B 39/20 take precedence) **[5]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

F42C **AMMUNITION FUZES** (blasting cartridge initiators F42B 3/10; chemical aspects C06C); **ARMING OR SAFETY MEANS THEREFOR** (filling fuzes F42B 33/02; fitting or extracting primers in or from fuzes F42B 33/04; containers for fuzes F42B 39/30) **[5]**

Subclass index

1/00 **Impact fuzes, i.e. fuzes actuated only by ammunition impact**

1/02 . with firing pin structurally combined with fuze

1/04 . . operating by inertia of members on impact

1/06 . . . for any direction of impact

1/08 . . with delayed action after ignition of fuze (time fuzes F42C 9/00)

1/09 . . the fuze activating a propulsive charge for propelling the ammunition or the warhead into the air, e.g. in rebounding projectiles **[5]**

1/10 . without firing pin

1/12 . . with delayed action after ignition of fuze (time fuzes F42C 9/00)

1/14 . operating at a predetermined distance from ground or target by means of a protruding member

3/00 **Fuzes actuated by exposure to a liquid, e.g. sea-water** (F42C 5/00 takes precedence; time fuzes F42C 9/00)

5/00 **Fuzes actuated by exposure to a predetermined ambient fluid pressure**

5/02 . barometric pressure

7/00 **Fuzes actuated by application of a predetermined mechanical force, e.g. tension, torsion, pressure** (by ammunition impact F42C 1/00; by exposure to a predetermined ambient fluid pressure F42C 5/00)

7/02 . Contact fuzes, i.e. fuzes actuated by mechanical contact between a stationary ammunition, e.g. a land mine, and a moving target, e.g. a person (F42C 7/12 takes precedence)

7/04 . . actuated by applying pressure on the ammunition head **[5]**

7/06 . . . and comprising pneumatic or hydraulic retarding means **[5]**

7/08 . . of release type, i.e. actuated by releasing pressure from the ammunition head **[5]**

7/10 . . of antenna type **[5]**

7/12 . Percussion fuzes of the double-action type, i.e. fuzes cocked and fired in a single movement, e.g. by pulling an incorporated percussion pin or hammer (percussion caps F42C 19/10) **[5]**

9/00 **Time fuzes**; **Combined time- and percussion- or pressure-actuated fuzes**; **Fuzes for timed self-destruction of ammunition**

9/02 . the timing being caused by mechanical means

9/04 . . by spring motor

9/06 . . by flow of fluent material, e.g. shot, fluids

9/08 . the timing being caused by chemical action, e.g. of acids

9/10 . the timing being caused by combustion

9/12 . . with ring combustion elements

9/14 . Double fuzes; Multiple fuzes

9/16 . . for self-destruction of ammunition

9/18 . . . when the spin rate falls below a predetermined limit, e.g. a spring force being stronger than the locking action of a centrifugally-operated lock **[5]**

11/00 **Electric fuzes** (proximity fuzes F42C 13/00; electric igniters F42C 19/12)

11/02 . with piezo-crystal

11/04 . with current induction

11/06 . with time delay by electric circuitry

13/00 **Proximity fuzes**; **Fuzes for remote detonation**

13/02 . operated by intensity of light or similar radiation

13/04 . operated by radio waves

13/06 . operated by sound waves

13/08 . operated by variations in magnetic field

14/00 **Fuzes characterised by the ammunition class or type** (F42C 1/00, F42C 13/00, F42C 15/00 take precedence) **[5]**

14/02 . for hand grenades **[5]**

14/04 . for torpedoes, marine mines or depth charges (influenced marine mines F42B 22/04) **[5]**

14/06 . for fall bombs **[5]**

14/08 . for land mines **[5]**

15/00 **Arming-means in fuzes**; **Safety means for preventing premature detonation of fuzes or charges**

15/16 . wherein the firing pin is displaced out of the action line for safety (F42C 15/40 takes precedence)

15/18 . wherein a carrier for an element of the pyrotechnic or explosive train is moved (F42C 15/40 takes precedence) **[5]**

15/184 . . using a slidable carrier **[5]**

15/188 . . using a rotatable carrier **[5]**

15/192 . . . rotatable in a plane which is parallel to the longitudinal axis of the projectile **[5]**

15/196 . . . . by the action of centrifugal or inertia forces on the carrier body, e.g. the carrier having eccentrically mounted weights or eccentric centre of gravity **[5]**

15/20 . wherein a securing-pin or latch is removed to arm the fuze, e.g. removed from the firing pin (F42C 15/40 takes precedence)

15/21 . . using spring action (F42C 15/23 takes precedence) **[5]**

15/22 . . using centrifugal force (F42C 15/23 takes precedence)

15/23 . . by unwinding a flexible ribbon or tape **[5]**

15/24 . wherein the safety or arming action is effected by inertia means (F42C 15/196, F42C 15/20 take precedence)

15/26 . . using centrifugal force

15/28 . operated by flow of fluent material, e.g. shot, fluids (F42C 15/26 takes precedence)

15/285 . . stored within the fuze housing **[5]**

15/29 . . operated by fluidic oscillators; operated by dynamic fluid pressure, e.g. ram-air operated **[5]**

15/295 . . operated by a turbine or a propeller; Mounting means therefor **[5]**

15/30 . . of propellant gases, i.e. derived from propulsive charge or rocket motor

15/31 . . generated by the combustion of a pyrotechnic or explosive charge within the fuze **[5]**

15/32 . operated by change of fluid pressure (F42C 5/00, F42C 15/29 take precedence)

15/33 . . by breaking a vacuum or pressure container **[5]**
15/34 . wherein the safety or arming action is effected by a blocking-member in the pyrotechnic or explosive train between primer and main charge (F42C 15/18, F42C 15/40 take precedence)
15/36 . wherein arming is effected by combustion or fusion of an element (F42C 15/31 takes precedence)
15/38 . wherein arming is effected by chemical action (F42C 3/00 takes precedence)
15/40 . wherein the safety or arming action is effected electrically
15/42 . . from a remote location, e.g. for controlled mines or mine fields **[5]**
15/44 . Arrangements for disarming, or for rendering harmless, fuzes after arming, e.g. after launch **[5]**

17/00 Fuze-setting apparatus
17/02 . Fuze-setting keys
17/04 . for electric fuzes **[5]**

19/00 Details of fuzes (other parts F42C 15/00)
19/02 . Fuze bodies; Fuze housings
19/04 . Protective caps
19/06 . Electric contact parts specially adapted for use with electric fuzes
19/07 . . Nose-contacts for projectiles or missiles **[5]**
19/08 . Primers (initiators for blasting cartridges F42B 3/10); Detonators
19/085 . . Primers for caseless ammunition **[5]**
19/09 . . Primers or detonators containing a hollow charge **[5]**
19/095 . . Arrangement of a multiplicity of primers or detonators, dispersed around a warhead, one of the primers or detonators being selected for directional detonation effects **[5]**
19/10 . . Percussion caps
19/12 . . electric
19/14 . . . operable also in the percussion mode **[5]**

21/00 Checking fuzes; **Testing fuzes**

99/00 Subject matter not provided for in other groups of this subclass [8]

F42D BLASTING (fuses, e.g. fuse cords, C06C 5/00; blasting cartridges F42B 3/00)

1/00 Blasting methods or apparatus, e.g. for loading or tamping
1/02 . Arranging blasting cartridges to form an assembly (adaptation of blasting cartridges therefor F42B 3/02)
1/04 . Arrangements for ignition
1/045 . . Arrangements for electric ignition (dynamo-electric generators H02K) **[5]**
1/05 . . . Electric circuits for blasting **[5]**
1/055 . . . . specially adapted for firing multiple charges with a time delay **[5]**
1/06 . . Relative timing of multiple charges (F42D 1/055 takes precedence)
1/08 . Tamping methods; Methods for loading boreholes with explosives; Apparatus therefor **[5]**
1/10 . . Feeding explosives in granular or slurry form; Feeding explosives by pneumatic or hydraulic pressure **[5]**
1/12 . . Feeding tamping material by pneumatic or hydraulic pressure **[5]**
1/14 . . Hand-operated tamping or loading **[5]**
1/16 . . . Tamping tools **[5]**
1/18 . . Plugs for boreholes **[5]**
1/20 . . Tamping cartridges, i.e. cartridges containing tamping material (flexible or deformable blasting cartridges F42B 3/087) **[5]**
1/22 . . Means for holding or positioning blasting cartridges or tamping cartridges in boreholes **[5]**
1/24 . . characterised by the tamping material **[5]**
1/26 . . . Tamping with foaming agents **[5]**
1/28 . . . Tamping with gelling agents **[5]**

3/00 Particular applications of blasting techniques
3/02 . for demolition of tall structures, e.g. chimney stacks
3/04 . for rock blasting
3/06 . for seismic purposes

5/00 Safety arrangements
5/02 . Locating undetonated charges
5/04 . Rendering explosive charges harmless, e.g. destroying ammunition (extracting primers, dismantling ammunition F42B 33/04, F42B 33/06); Rendering detonation of explosive charges harmless **[5]**
5/045 . . Detonation-wave absorbing or damping means **[5]**
5/05 . . . Blasting mats **[5]**
5/055 . . Silencing means for blasting operations (F42D 5/045 takes precedence) **[5]**
5/06 . Unloading boreholes

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

F99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

F99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION G – PHYSICS

(1) In this section, the following term is used with the meaning indicated:

– "variable" (as a noun) means a feature or property (e.g., a dimension, a physical condition such as temperature, a quality such as density or colour) which, in respect of a particular entity (e.g., an object, a quantity of a substance, a beam of light) and at a particular instant, is capable of being measured; the variable may change, so that its numerical expression may assume different values at different times, in different conditions or in individual cases, but may be constant in respect of a particular entity in certain conditions or for practical purposes (e.g., the length of a bar may be regarded as constant for many purposes).

(2) Attention is drawn to the definitions of terms or expressions used, appearing in the notes of several of the classes in this section, in particular those of "measuring" in class G01 and "control" and "regulation" in class G05.

(3) Classification in this section may present more difficulty than in other sections, because the distinction between different fields of use rests to a considerable extent on differences in the intention of the user rather than on any constructional differences or differences in the manner of use, and because the subjects dealt with are often in effect systems or combinations, which have features or parts in common, rather than "things", which are readily distinguishable as a whole. For example, information (e.g., a set of figures) may be displayed for the purpose of education or advertising (G09), for enabling the result of a measurement to be known (G01), for signalling the information to a distant point or for giving information which has been signalled from a distant point (G08). The words used to describe the purpose depend on features that may be irrelevant to the form of the apparatus concerned, for example, such features as the desired effect on the person who sees the display, or whether the display is controlled from a remote point. Again, a device which responds to some change in a condition, e.g., in the pressure of a fluid, may be used, without modification of the device itself, to give information about the pressure (G01L) or about some other condition linked to the pressure (another subclass of class G01, e.g., G01K for temperature), to make a record of the pressure or of its occurrence (G07C), to give an alarm (G08B), or to control another apparatus (G05).

The classification scheme is intended to enable things of a similar nature (as indicated above) to be classified together. It is therefore particularly necessary for the real nature of any technical subject to be decided before it can be properly classified.

INSTRUMENTS

G01 MEASURING; TESTING

(1) This class covers, in addition to "true" measuring instruments, other indicating or recording devices of analogous construction, and also signalling or control devices insofar as they are concerned with measurement (as defined in Note 2 below) and are not specially adapted to the particular purpose of signalling or control.

(2) In this class, the following term is used with the meaning indicated:

– "measuring" is used to cover considerably more than its primary or basic meaning. In this primary sense, it means finding a numerical expression of the value of a variable in relation to a unit or datum or to another variable of the same nature, e.g. expressing a length in terms of another length as in measuring a length with a scale; the value may be obtained directly (as just suggested) or by measuring some other variable of which the value can be related to the value of the required variable, as in measuring a change in temperature by measuring a resultant change in the length of a column of mercury. However, since the same device or instrument may, instead of giving an immediate indication, be used to produce a record or to initiate a signal to produce an indication or control effect, or may be used in combination with other devices or instruments to give a conjoint result from measurement of two or more variables of the same or different kinds, it is necessary to interpret "measuring" as including also any operation that would make it possible to obtain such a numerical expression by the additional use of some way of converting a value into figures. Thus the expression in figures may be actually made by a digital presentation or by reading a scale, or an indication of it may be given without the use of figures, e.g. by some perceptible feature (variable) of the entity (e.g. object, substance, beam of light) of which the variable being measured is a property or condition or by an analogue of such a feature (e.g. the corresponding position of a member without any scale, a corresponding voltage generated in some way). In many cases there is no such value indication but only an indication of difference or equality in relation to a standard or datum (of which the value may or may not be known in figures); the standard or datum may be the value of another variable of the same nature but of a different entity (e.g. a standard measure) or of the same entity at a different time.

In its simplest form, measurement may give merely an indication of presence or absence of a certain condition or quality, e.g. movement (in any direction or in a particular direction), or whether a variable exceeds a predetermined value.

(3) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems" and the Notes following the title of subclass B82B relating to "nano-structures". **[7]**

(4) Attention is drawn to the Notes following the title of section G, especially as regards the definition of the term "variable".

(5) In many measuring arrangements, a first variable to be measured is transformed into a second, or further, variables. The second, or further, variables may be (a) a condition related to the first variable and produced in a member, or (b) a displacement of a member. Further transformation may be needed. **[6]**

When classifying such an arrangement, (i) the transformation step, or each transformation step, that is of interest is classified, or (ii) if interest lies only in the system as a whole, the first variable is classified in the appropriate place. **[6]**

This is particularly important where two or more conversions take place, for instance where a first variable, for example pressure, is transformed into a second variable, for example an optical property of a sensing body, and that second variable is expressed by means of a third variable, for example an electric effect. In such a case, the following classification places should be considered: the place for the transformation of the first variable, that for sensing the condition caused by that variable, subclass G01D for expression of the measurement, and finally the place for the overall system, if any. **[6]**

(6) The measurement of change in the value of a physical property is classified in the same subclass as the measurement of that physical property, e.g. measurement of expansion of length is classified in subclass G01B.

G01B MEASURING LENGTH, THICKNESS OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS

(1) This subclass covers measuring of position or displacement in terms of linear or angular dimensions. **[4]**

(2) In this subclass, the groups are distinguished by the means of measurement which is of major importance. Thus the mere application of other means for giving a final indication does not affect the classification.

(3) Attention is drawn to the Notes following the title of class G01.

(4) Machines operated on similar principles to the hand-held devices specified in this subclass are classified with these devices.

(5) Measuring arrangements or details thereof covered by two or more of groups G01B 3/00 to G01B 17/00 are classified in group G01B 21/00 if no single other group can be selected as being predominantly applicable.

Subclass index

1/00 Measuring instruments characterised by the selection of material therefor

3/00 Instruments as specified in the subgroups and characterised by the use of mechanical measuring means (arrangements for measuring particular parameters G01B 5/00; devices of general interest specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34) **[2]**

3/02 . Rulers or tapes with scales or marks for direct reading
3/04 . . rigid
3/06 . . . folding
3/08 . . . extensible
3/10 . . flexible
3/11 . Chains for measuring length
3/12 . Measuring wheels
3/14 . Templates for checking contours
3/16 . Compasses, i.e. with a pair of pivoted arms
3/18 . Micrometers
3/20 . Slide gauges
3/22 . Feeler-pin gauges, e.g. dial gauges (for measuring contours or curvatures G01B 5/20)
3/24 . . with open yoke, i.e. calipers
3/26 . . Plug gauges
3/28 . . Depth gauges
3/30 . Bars, blocks, or strips in which the distance between a pair of faces is fixed, although it may be preadjustable, e.g. end measure, feeler strip
3/32 . . Holders therefor
3/34 . Ring or other apertured gauges, e.g. "go/no-go" gauge
3/36 . . for external screw threads
3/38 . Gauges with an open yoke and opposed faces, i.e. calipers, in which the internal distance between the faces is fixed, although it may be preadjustable
3/40 . . for external screw threads
3/42 . . of limit-gauge type, i.e. "go/no-go" (G01B 3/40 takes precedence)
3/44 . . . preadjustable for wear or tolerance
3/46 . Plug gauges for internal dimensions with engaging surfaces which are at a fixed distance, although they may be preadjustable
3/48 . . for internal screw threads
3/50 . . of limit-gauge type, i.e. "go/no-go" (G01B 3/48 takes precedence)
3/52 . . . preadjustable for wear or tolerance
3/56 . Gauges for measuring angles or tapers, e.g. conical calipers

5/00 Measuring arrangements characterised by the use of mechanical means (instruments of the types covered by group G01B 3/00 per se G01B 3/00) **[2]**

5/004 . for measuring coordinates of points **[6]**
5/008 . . using coordinate measuring machines **[6]**
5/012 . . . Contact-making feeler heads therefor **[6]**
5/016 . . . . Constructional details of contacts **[6]**
5/02 . for measuring length, width, or thickness (G01B 5/004, G01B 5/08 take precedence) **[6]**
5/04 . . specially adapted for measuring length or width of objects while moving
5/06 . . for measuring thickness
5/08 . for measuring diameters
5/10 . . of objects while moving
5/12 . . internal diameters
5/14 . for measuring distance or clearance between spaced objects or spaced apertures (G01B 5/24 takes precedence)
5/16 . . between a succession of regularly spaced objects or regularly spaced apertures
5/18 . for measuring depth
5/20 . for measuring contours or curvatures
5/207 . . using a plurality of fixed, simultaneously operating transducers (G01B 5/213 to G01B 5/22 take precedence) **[6]**
5/213 . . for measuring radius of curvature **[6]**
5/22 . . Spherometers
5/24 . for measuring angles or tapers; for testing the alignment of axes
5/245 . . for testing perpendicularity **[6]**
5/25 . . for testing the alignment of axes
5/252 . . . for measuring eccentricity, i.e. lateral shift between two parallel axes **[6]**
5/255 . . for testing wheel alignment
5/26 . for measuring areas, e.g. planimeter (integrators in general G06G)
5/28 . for measuring roughness or irregularity of surfaces
5/30 . for measuring the deformation in a solid, e.g. mechanical strain gauge

7/00 Measuring arrangements characterised by the use of electric or magnetic means

7/004 . for measuring coordinates of points **[6]**
7/008 . . using coordinate measuring machines **[6]**
7/012 . . . Contact-making feeler heads therefor **[6]**
7/016 . . . . Constructional details of contacts **[6]**
7/02 . for measuring length, width, or thickness (G01B 7/004, G01B 7/12 takes precedence) **[6]**
7/04 . . specially adapted for measuring length or width of objects while moving
7/06 . . for measuring thickness
7/12 . for measuring diameters
7/13 . . Internal diameters **[6]**
7/14 . for measuring distance or clearance between spaced objects or spaced apertures (G01B 7/30 takes precedence)
7/15 . . being regularly spaced **[6]**
7/16 . for measuring the deformation in a solid, e.g. by resistance strain gauge
7/24 . . using change in magnetic properties
7/26 . for measuring depth
7/28 . for measuring contours or curvatures
7/287 . . using a plurality of fixed, simultaneously operating transducers (G01B 7/293 takes precedence) **[6]**
7/293 . . for measuring radius of curvature **[6]**
7/30 . for measuring angles or tapers; for testing the alignment of axes
7/305 . . for testing perpendicularity **[6]**
7/31 . . for testing the alignment of axes
7/312 . . . for measuring eccentricity, i.e. lateral shift between two parallel axes **[6]**
7/315 . . for testing wheel alignment
7/32 . for measuring areas (integrators in general G06G)
7/34 . for measuring roughness or irregularity of surfaces

9/00 Instruments as specified in the subgroups and characterised by the use of optical measuring means (arrangements for measuring particular parameters G01B 11/00) **[2]**

9/02 . Interferometers

9/021 . . using holographic techniques **[2]**
9/023 . . . for contour producing (G01B 9/025 to G01B 9/029 take precedence) **[2]**
9/025 . . . Double-exposure technique **[2]**
9/027 . . . in real time **[2]**
9/029 . . . by time averaging **[2]**
9/04 . Measuring microscopes
9/06 . Measuring telescopes
9/08 . Optical projection comparators
9/10 . Goniometers for measuring angles between surfaces

11/00 Measuring arrangements characterised by the use of optical means (instruments of the types covered by group G01B 9/00 per se G01B 9/00) **[2]**
11/02 . for measuring length, width, or thickness (G01B 11/08 takes precedence)
11/03 . . by measuring coordinates of points **[3]**
11/04 . . specially adapted for measuring length or width of objects while moving
11/06 . . for measuring thickness
11/08 . for measuring diameters
11/10 . . of objects while moving
11/12 . . internal diameters
11/14 . for measuring distance or clearance between spaced objects or spaced apertures (G01B 11/26 takes precedence; rangefinders G01C 3/00)
11/16 . for measuring the deformation in a solid, e.g. optical strain gauge
11/22 . for measuring depth
11/24 . for measuring contours or curvatures
11/245 . . using a plurality of fixed, simultaneously operating transducers (G01B 11/255 takes precedence) **[7]**
11/25 . . by projecting a pattern, e.g. moiré fringes, on the object (G01B 11/255 takes precedence) **[7]**
11/255 . . for measuring radius of curvature **[7]**
11/26 . for measuring angles or tapers; for testing the alignment of axes
11/27 . . for testing the alignment of axes
11/275 . . for testing wheel alignment
11/28 . for measuring areas (integrators in general G06G)
11/30 . for measuring roughness or irregularity of surfaces

13/00 Measuring arrangements characterised by the use of fluids
13/02 . for measuring length, width, or thickness (G01B 13/08 takes precedence)
13/03 . . by measuring coordinates of points **[3]**
13/04 . . specially adapted for measuring length or width of objects while moving
13/06 . . for measuring thickness
13/08 . for measuring diameters
13/10 . . internal diameters
13/12 . for measuring distance or clearance between spaced objects or spaced apertures (G01B 13/18 takes precedence)
13/14 . for measuring depth
13/16 . for measuring contours or curvatures
13/18 . for measuring angles or tapers; for testing the alignment of axes
13/19 . . for testing the alignment of axes
13/195 . . for testing wheel alignment
13/20 . for measuring areas, e.g. pneumatic planimeter (integrators in general G06G)
13/22 . for measuring roughness or irregularity of surfaces
13/24 . for measuring the deformation in a solid **[3]**

15/00 Measuring arrangements characterised by the use of wave or particle radiation (G01B 9/00, G01B 11/00 take precedence) **[4]**
15/02 . for measuring thickness
15/04 . for measuring contours or curvatures
15/06 . for measuring the deformation in a solid
15/08 . for measuring roughness or irregularity of surfaces **[6]**

17/00 Measuring arrangements characterised by the use of infrasonic, sonic, or ultrasonic vibrations [4]
17/02 . for measuring thickness
17/04 . for measuring the deformation in a solid, e.g. by vibrating string
17/06 . for measuring contours or curvatures **[6]**
17/08 . for measuring roughness or irregularity of surfaces **[6]**

21/00 Measuring arrangements or details thereof in so far as they are not adapted to particular types of measuring means of the other groups of this subclass [3]
21/02 . for measuring length, width, or thickness (G01B 21/10 takes precedence) **[3]**
21/04 . . by measuring coordinates of points **[3]**
21/06 . . specially adapted for measuring length or width of objects while moving **[3]**
21/08 . . for measuring thickness **[3]**
21/10 . for measuring diameters **[3]**
21/12 . . of objects while moving **[3]**
21/14 . . internal diameters **[3]**
21/16 . for measuring distance or clearance between spaced objects **[3]**
21/18 . for measuring depth **[3]**
21/20 . for measuring contours or curvatures, e.g. determining profile **[3]**
21/22 . for measuring angles or tapers; for testing the alignment of axes **[3]**
21/24 . . for testing the alignment of axes **[3]**
21/26 . . for testing wheel alignment **[3]**
21/28 . for measuring areas (integrators in general G06G) **[3]**
21/30 . for measuring roughness or irregularity of surfaces **[3]**
21/32 . for measuring the deformation in a solid **[3]**

G01C MEASURING DISTANCES, LEVELS OR BEARINGS; **SURVEYING**; **NAVIGATION**; **GYROSCOPIC INSTRUMENTS**; **PHOTOGRAMMETRY OR VIDEOGRAMMETRY** (measuring liquid level G01F; radio navigation, determining distance or velocity by use of propagation effects, e.g. Doppler effect, propagation time, of radio waves, analogous arrangements using other waves G01S)

(1) In this subclass, the following term is used with the meaning indicated:
– "navigation" means determining the position and course of land vehicles, ships, aircraft, and space vehicles.

(2) Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Measuring angles
1/02 . Theodolites
1/04 . . combined with cameras
1/06 . . Arrangements for reading scales
1/08 . Sextants
1/10 . . including an artificial horizon (G01C 1/14 takes precedence)
1/12 . . . with a stabilised mirror
1/14 . . Periscopic sextants

3/00 Measuring distances in line of sight; **Optical rangefinders** (tapes, chains, or wheels for measuring length G01B 3/00; active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48) **[1,8]**
3/02 . Details
3/04 . . Adaptation of rangefinders for combination with telescopes or binoculars
3/06 . . Use of electric means to obtain final indication
3/08 . . . Use of electric radiation detectors
3/10 . using a parallactic triangle with variable angles and a base of fixed length in the observation station, e.g. in the instrument **[1,8]**
3/12 . . with monocular observation at a single point, e.g. coincidence type (G01C 3/20 takes precedence)
3/14 . . with binocular observation at a single point, e.g. stereoscopic type (G01C 3/20 takes precedence)
3/16 . . . Measuring marks
3/18 . . with one observation point at each end of the base (G01C 3/20 takes precedence)
3/20 . . with adaptation to the measurement of the height of an object
3/22 . using a parallactic triangle with variable angles and a base of fixed length at, near, or formed by, the object **[1,8]**
3/24 . using a parallactic triangle with fixed angles and a base of variable length in the observation station, e.g. in the instrument **[1,8]**
3/26 . using a parallactic triangle with fixed angles and a base of variable length at, near, or formed by, the object **[1,8]**
3/28 . . with provision for reduction of the distance into the horizontal plane
3/30 . . . with adaptation to the measurement of the height of an object, e.g. tacheometers
3/32 . by focusing the object, e.g. on a ground glass screen

5/00 Measuring height; **Measuring distances transverse to line of sight**; **Levelling between separated points**; **Surveyors' levels** (G01C 3/20, G01C 3/30 take precedence)
5/02 . involving automatic stabilisation of the line of sight
5/04 . Hydrostatic levelling, i.e. by flexibly interconnected liquid containers at separated points
5/06 . by using barometric means

7/00 Tracing profiles (by photogrammetry or videogrammetry G01C 11/00)
7/02 . of land surfaces
7/04 . . involving a vehicle which moves along the profile to be traced
7/06 . of cavities, e.g. tunnels

9/00 Measuring inclination, e.g. by clinometers, by levels
9/02 . Details
9/04 . . Transmission means between sensing element and final indicator for giving an enlarged reading
9/06 . . Electric or photoelectric indication or reading means
9/08 . . Means for compensating acceleration forces due to movement of instrument
9/10 . by using rolling bodies
9/12 . by using a single pendulum (plumb lines G01C 15/10)
9/14 . . movable in more than one direction
9/16 . by using more than one pendulum
9/18 . by using liquids
9/20 . . the indication being based on the inclination of the surface of a liquid relative to its container
9/22 . . . with interconnected containers in fixed relation to each other
9/24 . . in closed containers partially filled with liquid so as to leave a gas bubble
9/26 . . . Details

9/28 . . . . Mountings
9/30 . . . . Means for adjusting dimensions of bubble
9/32 . . . . Means for facilitating the observation of the position of the bubble, e.g. illuminating means
9/34 . . . of the tubular type, i.e. for indicating the level in one direction only
9/36 . . . of the spherical type, i.e. for indicating the level in all directions

11/00 Photogrammetry or videogrammetry, e.g. stereogrammetry; Photographic surveying [1,8]

11/02 . Picture-taking arrangements specially adapted for photogrammetry or photographic surveying, e.g. controlling overlapping of pictures
11/04 . Interpretation of pictures
11/06 . . by comparison of two or more pictures of the same area
11/08 . . . the pictures not being supported in the same relative position as when they were taken
11/10 . . . . using computers to control the position of the pictures
11/12 . . . the pictures being supported in the same relative position as when they were taken
11/14 . . . . with optical projection (G01C 11/26 takes precedence)
11/16 . . . . . in a common plane
11/18 . . . . . involving scanning means
11/20 . . . . . in separate planes
11/22 . . . . with mechanical projection (G01C 11/26 takes precedence)
11/24 . . . . with optical-mechanical projection (G01C 11/26 takes precedence)
11/26 . . . . using computers to control the position of the pictures
11/28 . . . Special adaptation for recording picture point data, e.g. for profiles
11/30 . . by triangulation
11/32 . . . Radial triangulation
11/34 . . . Aerial triangulation
11/36 . Videogrammetry, i.e. electronic processing of video signals from different sources to give parallax or range information **[8]**

13/00 Surveying specially adapted to open water, e.g. sea, lake, river or canal (liquid level metering G01F)

15/00 Surveying instruments or accessories not provided for in groups G01C 1/00 to G01C 13/00

15/02 . Means for marking measuring points
15/04 . . Permanent marks; Boundary markers
15/06 . . Surveyors' staffs; Movable markers
15/08 . . . Plumbing or registering staffs or markers over ground marks
15/10 . Plumb lines
15/12 . Instruments for setting out fixed angles, e.g. right angles
15/14 . Artificial horizons

17/00 Compasses; Devices for ascertaining true or magnetic north for navigation or surveying purposes (using gyroscopic effect G01C 19/00)

17/02 . Magnetic compasses
17/04 . . with north-seeking magnetic elements, e.g. needles
17/06 . . . Suspending magnetic elements
17/08 . . . . by flotation
17/10 . . . Comparing observed direction with north indication
17/12 . . . . by sighting means, e.g. for surveyors' compasses
17/14 . . . . by reference marks, e.g. for ships' compasses
17/16 . . . . by clinometers, e.g. for determining dip or strike of geological strata
17/18 . . . Supporting or suspending compasses, e.g. by gimbal, by flotation
17/20 . . . Observing the compass card or needle
17/22 . . . . by projection
17/24 . . . . Illumination
17/26 . . . . using electric pick-offs for transmission to final indicator, e.g. photocell
17/28 . . Electromagnetic compasses (with north-seeking magnetic elements and having electric pick-offs G01C 17/26)
17/30 . . . Earth-inductor compasses
17/32 . . . Electron compasses
17/34 . Sun- or astro-compasses
17/36 . Repeaters for remote indication of readings of a master compass
17/38 . Testing, calibrating, or compensating of compasses

19/00 Gyroscopes; Turn-sensitive devices with vibrating masses; Turn-sensitive devices without moving masses

19/02 . Rotary gyroscopes
19/04 . . Details
19/06 . . . Rotors
19/08 . . . . electrically driven (G01C 19/14 takes precedence)
19/10 . . . . . Power supply
19/12 . . . . fluid driven (G01C 19/14 takes precedence)
19/14 . . . . Fluid rotors
19/16 . . . Suspensions; Bearings
19/18 . . . . providing movement of rotor with respect to its rotational axes (G01C 19/20, G01C 19/24 take precedence)
19/20 . . . . in fluid
19/22 . . . . torsional
19/24 . . . . using magnetic or electrostatic fields
19/26 . . . Caging, i.e. immobilising moving parts, e.g. for transport
19/28 . . . Pick-offs, i.e. devices for taking off an indication of the displacement of the rotor axis
19/30 . . . Erection devices, i.e. devices for restoring rotor axis to a desired position (for instrument indicating the vertical G01C 19/46)
19/32 . . . Indicating or recording means specially adapted for rotary gyroscopes
19/34 . . for indicating a direction in the horizontal plane, e.g. directional gyroscopes
19/36 . . . with north-seeking action by magnetic means, e.g. gyromagnetic compasses
19/38 . . . with north-seeking action by other than magnetic means, e.g. gyrocompasses using earth's rotation
19/40 . . for control by signals from a master compass, i.e. repeater compasses
19/42 . . for indicating rate of turn; for integrating rate of turn
19/44 . . for indicating the vertical
19/46 . . . Erection devices for restoring rotor axis to a desired position

19/48 . . . . operating by electrical means (G01C 19/54 takes precedence)
19/50 . . . . operating by mechanical means (G01C 19/54 takes precedence)
19/52 . . . . operating by fluid means (G01C 19/54 takes precedence)
19/54 . . . . with correction for acceleration forces due to movement of instrument
19/56 . Turn-sensitive devices with vibrating masses, e.g. tuning fork
19/58 . Turn-sensitive devices without moving masses **[3]**
19/60 . . Electronic or nuclear magnetic resonance gyrometers **[3,4]**
19/62 . . . with optical pumping **[3]**
19/64 . . Gyrometers using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams **[3]**
19/66 . . . Ring laser gyrometers **[5]**
19/68 . . . . Lock-in prevention **[5]**
19/70 . . . . . by mechanical means **[5]**
19/72 . . . with counter-rotating light beams in a passive ring, e.g. fibre laser gyrometers **[5]**

21/00 Navigation; **Navigational instruments not provided for in groups G01C 1/00 to G01C 19/00** (measuring distance traversed on the ground by a vehicle G01C 22/00; control of position, course, altitude or attitude of vehicles G05D 1/00; traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle G08G 1/0968)

21/02 . by astronomical means (G01C 21/24, G01C 21/26 take precedence) **[1,7]**
21/04 . by terrestrial means (G01C 21/24, G01C 21/26 take precedence) **[1,7]**
21/06 . . involving measuring of drift angle; involving correction for drift
21/08 . . involving use of the magnetic field of the earth
21/10 . by using measurement of speed or acceleration (G01C 21/24, G01C 21/26 take precedence) **[1,7]**
21/12 . . executed aboard the object being navigated; Dead reckoning
21/14 . . . by recording the course traversed by the object (G01C 21/16 takes precedence)
21/16 . . . by integrating acceleration or speed, i.e. inertial navigation
21/18 . . . . Stabilised platforms, e.g. by gyroscope
21/20 . Instruments for performing navigational calculations (G01C 21/24, G01C 21/26 take precedence) **[1,7]**
21/22 . . Plotting boards
21/24 . specially adapted for cosmonautical navigation
21/26 . specially adapted for navigation in a road network **[7]**
21/28 . . with correlation of data from several navigational instruments **[7]**
21/30 . . . Map- or contour-matching **[7]**
21/32 . . . . Structuring or formatting of map data **[7]**
21/34 . . Route searching; Route guidance **[7]**
21/36 . . . Input/output arrangements for on-board computers **[7]**

22/00 Measuring distance traversed on the ground by vehicles, persons, animals or other moving solid bodies, e.g. using odometers or using pedometers

22/02 . by conversion into electric waveforms and subsequent integration, e.g. using tachometer generator

23/00 Combined instruments indicating more than one navigational value, e.g. for aircraft; **Combined measuring devices for measuring two or more variables of movement, e.g. distance, speed, acceleration**

25/00 Manufacturing, calibrating, cleaning, or repairing instruments or devices referred to in the other groups of this subclass (testing, calibrating, or compensating compasses G01C 17/38)

G01D MEASURING NOT SPECIALLY ADAPTED FOR A SPECIFIC VARIABLE; ARRANGEMENTS FOR MEASURING TWO OR MORE VARIABLES NOT COVERED BY A SINGLE OTHER SUBCLASS; TARIFF METERING APPARATUS; MEASURING OR TESTING NOT OTHERWISE PROVIDED FOR

(1) This subclass covers:
- devices for indicating or recording the results of measurements, not peculiar to variables covered by a single other subclass;
- analogous arrangements but in which the input is not a variable to be measured, e.g. a hand operation;
- details of measuring instruments, which are of general interest;
- measurement transducers not adapted solely for the measurement of a single specified variable and not provided for elsewhere, i.e. means for converting the output of a sensing member to another variable where the form or nature of the sensing member does not constrain the means for converting;
- measuring or testing not otherwise provided for.

(2) Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 **Measuring arrangements giving results other than momentary value of variable, of general application** (G01D 3/00 takes precedence; in tariff metering apparatus G01D 4/00; transducers not specially adapted for a specific variable G01D 5/00)

1/02 . giving mean values, e.g. root mean square values (measuring root mean square values of currents or voltages G01R 19/02)

1/04 . giving integrated values (giving mean values G01D 1/02)

1/06 . . by intermittent summation

1/08 . . . over fixed periods of time

1/10 . giving differentiated values

1/12 . giving a maximum or minimum of a value

1/14 . giving a distribution function of a value, i.e. number of times the value comes within specified ranges of amplitude

1/16 . giving a value which is a function of two or more values, e.g. product, ratio

1/18 . with arrangements for signalling that a predetermined value of an unspecified parameter has been exceeded (G01D 1/14 takes precedence) **[3]**

3/00 **Measuring arrangements with provision for the special purposes referred to in the subgroups of this group**

3/02 . with provision for altering or correcting the transfer function

3/024 . . for range change; Arrangements for substituting one sensing member by another **[6]**

3/028 . mitigating undesired influences, e.g. temperature, pressure **[6]**

3/032 . . affecting incoming signal, e.g. by averaging; gating undesired signals **[6]**

3/036 . . on measuring arrangements themselves **[6]**

3/06 . with provision for operation by a null method

3/08 . with provision for safeguarding the apparatus, e.g. against abnormal operation, against breakdown

3/10 . with provision for switching-in of additional or auxiliary indicators or recorders

4/00 **Tariff metering apparatus** (in taximeters G07B 13/00; apparatus actuated by coins, cards or the like with meter-controlled dispensing of liquid, gas, or electricity G07F 15/00)

4/02 . Details

4/04 . . Resetting-mechanisms, e.g. for indicating members

4/06 . . Arrangement of clutches between driving and indicating member, e.g. of hysteresis clutch (G01D 4/04 takes precedence)

4/08 . . Transfer of indication from a counter into a summing counter

4/10 . Maximum indicating or recording apparatus, i.e. where the tariff for a period is based on a maximum demand within that period

4/12 . . Apparatus for indicating or recording progressive maximum

4/14 . . Fixed-demand indicating or recording apparatus, i.e. where indication is made when a predetermined quantity has been consumed during a time interval greater or less than a predetermined time interval

4/16 . Apparatus for indicating or recording maximum or minimum load hours

4/18 . Apparatus for indicating or recording overconsumption with opposing torque which comes into effect when a predetermined level is exceeded, e.g. subtraction meters

5/00 **Mechanical means for transferring the output of a sensing member**; **Means for converting the output of a sensing member to another variable where the form or nature of the sensing member does not constrain the means for converting**; **Transducers not specially adapted for a specific variable** (G01D 3/00 takes precedence; specially adapted for apparatus giving results other than momentary value of variable G01D 1/00) **[6]**

Note

Groups G01D 5/02 to G01D 5/54 are distinguished by the means which is of major importance. Thus the mere application of other means for giving a final indication does not affect the classification.

5/02 . using mechanical means

5/04 . . using levers; using cams; using gearing

5/06 . . acting through a wall or enclosure, e.g. by bellows, by magnetic coupling

5/08 . . Reducing the effects of friction, e.g. by applying vibrations

5/10 . . Applying external forces to increase force available for operation of indicating or recording part

5/12 . using electric or magnetic means (G01D 5/06 takes precedence) **[3]**

5/14 . . influencing the magnitude of a current or voltage

5/16 . . . by varying resistance

5/165 . . . . by relative movement of a point of contact and a resistive track **[6]**

5/18 . . . by varying effective impedance of discharge tubes or semiconductor devices

5/20 . . . by varying inductance, e.g. by a movable armature

5/22 . . . . differentially influencing two coils

5/24 . . . by varying capacitance

5/241 . . . . by relative movement of capacitor electrodes **[6]**

5/242 . . . by varying output of an electrodynamic device, e.g. of a tachodynamo

5/243 . . influencing the phase or frequency of ac

5/244 . . influencing characteristics of pulses or pulse trains; generating pulses or pulse trains **[6]**

5/245 . . . using a variable number of pulses in a train

5/246 . . . by varying the duration of individual pulses

5/247 . . . using time shifts of pulses

5/248 . . . by varying pulse repetition frequency

5/249 . . . using pulse code

5/25 . . Selecting one or more conductors or channels from a plurality of conductors or channels, e.g. by closing contacts

5/251 . . . one conductor or channel

5/252 . . . a combination of conductors or channels

5/26 . using optical means, i.e. using infra-red, visible or ultra-violet light

5/28 . . with deflection of beams of light, e.g. for direct optical indication (G01D 5/40 takes precedence)

5/30 . . . the beams of light being detected by photocells

5/32 . . with attenuation or whole or partial obturation of beams of light (G01D 5/40 takes precedence)
5/34 . . . the beams of light being detected by photocells
5/347 . . . . using displacement encoding scales **[6]**
5/353 . . . . influencing the transmission properties of an optical fibre **[6]**
5/36 . . . . Forming the light into pulses
5/38 . . . . . by diffraction gratings
5/39 . . Scanning a visible indication of the measured value and reproducing this indication at a remote place, e.g. on the screen of a cathode-ray tube
5/40 . . specially adapted for use with infra-red light
5/42 . using fluid means
5/44 . . using jets of fluid
5/46 . . . by deflecting or throttling the flow
5/48 . using wave or particle radiation means (G01D 5/26 takes precedence)
5/50 . . derived from a radioactive source
5/52 . . . detected by a counter tube
5/54 . using means specified in two or more of groups G01D 5/02, G01D 5/12, G01D 5/26, G01D 5/42, and G01D 5/48

Note

Classification is made in this group only if no other group can be selected as being predominantly applicable.

Note

For a combination of two or more of the means specified, the first applicable one of subgroups G01D 5/56 to G01D 5/62 takes precedence over any others of these groups.

5/56 . . using electric or magnetic means
5/58 . . using optical means, i.e. using infra-red, visible or ultra-violet light
5/60 . . using fluid means
5/62 . . using wave or particle radiation means not covered by group G01D 5/58

7/00 Indicating measured values
7/02 . Indicating value of two or more variables simultaneously
7/04 . . using a separate indicating element for each variable
7/06 . . . Luminous indications projected on a common screen
7/08 . . using a common indicating element for two or more variables
7/10 . . . giving indication in co-ordinate form
7/12 . Audible indication of meter readings, e.g. for the blind **[2]**

9/00 Recording measured values
9/02 . Producing one or more recordings of the values of a single variable
9/04 . . with provision for multiple or alternative recording
9/06 . . . Multiple recording, e.g. duplicating
9/08 . . . . giving both graphical and numerical recording
9/10 . . the recording element, e.g. stylus, being controlled in accordance with the variable, and the recording medium, e.g. paper roll, being controlled in accordance with time
9/12 . . . recording occurring continuously
9/14 . . . . with provision for altering speed of recording medium in accordance with the magnitude of the variable to be recorded
9/16 . . . recording occurring at separated intervals, e.g. by chopper bar
9/18 . . . . recording element actuated only upon change in value of variable
9/20 . . the recording element, e.g. stylus, being controlled in accordance with time and the recording medium, e.g. paper roll, being controlled in accordance with the variable
9/22 . . . recording occurring continuously
9/24 . . . recording occurring at separated intervals, e.g. by chopper bar
9/26 . . either the recording element, e.g. stylus, or the recording medium, e.g. paper roll, being controlled in accordance with both time and the variable
9/28 . Producing one or more recordings, each recording being of the values of two or more different variables (G01D 9/38, G01D 9/40 take precedence)
9/30 . . there being a separate recording element for each variable, e.g. multiple-pen recorder
9/32 . . there being a common recording element for two or more variables
9/34 . . . the variables being recorded in predetermined sequence
9/36 . . . . in separate columns
9/38 . Producing one or more recordings, each recording being produced by controlling the recording element, e.g. stylus, in accordance with one variable and controlling the recording medium, e.g. paper roll, in accordance with another variable
9/40 . Producing one or more recordings, each recording being produced by controlling either the recording element, e.g. stylus, or the recording medium, e.g. paper roll, in accordance with two or more variables
9/42 . Recording indications of measuring instruments by photographic means, e.g. of counters

11/00 Component parts of measuring arrangements not specially adapted for a specific variable (G01D 13/00, G01D 15/00 take precedence)
11/02 . Bearings or suspensions for moving parts
11/04 . . Knive-edge bearings
11/06 . . Strip or thread suspensions, e.g. in tension
11/08 . Elements for balancing moving parts
11/10 . Elements for damping the movement of parts
11/12 . . using fluid damping
11/14 . . using magnetic induction damping
11/16 . Elements for restraining or preventing the movement of parts, e.g. for zeroising (caging of moving parts when not in use G01D 11/20)
11/18 . . Springs (G01D 11/06 takes precedence)
11/20 . Caging devices for moving parts when not in use
11/22 . . automatically actuated
11/24 . Housings
11/26 . . Windows; Cover glasses; Sealings therefor
11/28 . Structurally-combined illuminating devices
11/30 . Supports specially adapted for an instrument; Supports specially adapted for a set of instruments

13/00 **Component parts of indicators for measuring arrangements not specially adapted for a specific variable**

13/02 . Scales; Dials
13/04 . . Construction
13/06 . . . Moving bands (G01D 13/10 takes precedence)
13/08 . . . Rotating drums (G01D 13/10 takes precedence)
13/10 . . . with adjustable scales; with auxiliary scales, e.g. vernier
13/12 . . Graduation
13/14 . . . for rotations of more than 360°
13/16 . . . with staggered markings
13/18 . . . with raised or recessed markings
13/20 . . . with luminescent markings
13/22 . Pointers, e.g. settable pointer
13/24 . . for indicating a maximum or minimum
13/26 . . adapted to perform a further operation, e.g. making electrical contact
13/28 . . with luminescent markings

15/00 **Component parts of recorders for measuring arrangements not specially adapted for a specific variable**

15/02 . Styli or other recording elements acting to mechanically deform or perforate the recording surface (printing recording elements G01D 15/20)
15/04 . . acting to punch holes in the recording surface
15/06 . Electric recording elements, e.g. electrolytic
15/08 . . for spark erosion
15/10 . Heated recording elements acting on heat-sensitive layers
15/12 . Magnetic recording elements
15/14 . Optical recording elements; Recording elements using X- or nuclear radiation
15/16 . Recording elements transferring recording material, e.g. ink, to the recording surface (printing recording elements G01D 15/20)
15/18 . . Nozzles emitting recording material
15/20 . Recording elements for printing with ink or for printing by deformation or perforation of the recording surface, e.g. embossing
15/22 . Chopper bars for bringing recording element into contact with recording surface
15/24 . Drives for recording elements or surfaces, not covered by group G01D 5/00
15/26 . . operating by clockwork
15/28 . Holding means for recording surfaces; Guiding means for recording surfaces; Exchanging means for recording surfaces
15/30 . . for foldable strip charts
15/32 . . for circular charts
15/34 . Recording surfaces

18/00 **Testing or calibrating of apparatus or arrangements provided for in groups G01D 1/00 to G01D 15/00**

21/00 **Measuring or testing not otherwise provided for**

21/02 . Measuring two or more variables by means not covered by a single other subclass

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G01F **MEASURING VOLUME, VOLUME FLOW, MASS FLOW, OR LIQUID LEVEL**; **METERING BY VOLUME** (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; burettes or pipettes B01L 3/02; arrangements of liquid volume meters or volume-flow meters in liquid-delivering apparatus, e.g. for retail sale purposes, B67D 7/16; pumps, fluid motors, details common to measuring or metering devices and pumps or fluid motors F01 to F04; locating, determining distance or velocity using reflection or reradiation of radio waves, analogous arrangements using other waves G01S; systems for ratio control G05D 11/00) **[2,5]**

Note

Attention is drawn to the Notes following the title of class G01.

Subclass index

Measuring volume flow

1/00 **Measuring the volume flow or mass flow of fluid or fluent solid material wherein the fluid passes through the meter in a continuous flow** (measuring a proportion of the volume flow G01F 5/00; measuring speed of flow G01P 5/00; indicating presence or absence of flow G01P 13/00; regulating quantity or ratio G05D) **[2]**

Note

Groups G01F 1/704 to G01F 1/76 take precedence over groups G01F 1/05 to G01F 1/68. **[2]**

1/05 . by using mechanical effects **[2]**
1/06 . . using rotating vanes with tangential admission **[2]**
1/07 . . . with mechanical coupling to the indicating device **[2]**
1/075 . . . with magnetic or electromagnetic coupling to the indicating device **[2]**
1/08 . . . Adjusting, correcting, or compensating means therefor **[2]**

1/10 . . using rotating vanes with axial admission **[2]**
1/11 . . . with mechanical coupling to the indicating device **[2]**
1/115 . . . with magnetic or electromagnetic coupling to the indicating device **[2]**
1/12 . . . Adjusting, correcting, or compensating means therefor
1/20 . . by detection of dynamic effects of the fluid flow **[2]**
1/22 . . . by variable-area meters **[2]**
1/24 . . . . with magnetic or electric coupling to the indicating device **[2]**
1/26 . . . . of the valve type **[2]**
1/28 . . . by drag-force, e.g. vane type or impact flowmeter **[2]**
1/30 . . . . for fluent solid material **[2]**
1/32 . . . by swirl flowmeter, e.g. using Karman vortices **[2]**
1/34 . . by measuring pressure or differential pressure **[2]**
1/36 . . . the pressure or differential pressure being created by the use of flow constriction **[2]**
1/37 . . . . the pressure or differential pressure being measured by means of communicating tubes or reservoirs with movable fluid levels, e.g. by U-tubes **[2]**
1/38 . . . . the pressure or differential pressure being measured by means of a movable element, e.g. diaphragm, piston, Bourdon tube or flexible capsule **[2]**
1/40 . . . . Details of construction of the flow constriction devices **[2]**
1/42 . . . . . Orifices or nozzles **[2]**
1/44 . . . . . Venturi tubes **[2]**
1/46 . . . . . Pitot tubes (specially adapted for measuring speed of fluids G01P 5/165) **[2]**
1/48 . . . the pressure or differential pressure being created by a capillary element **[2]**
1/50 . . . Correcting or compensating means **[2]**
1/52 . . by measuring the height of the fluid level due to the lifting power of the fluid flow **[2]**
1/54 . . by means of chains, flexible bands, or wires introduced into, and moved by, the flow **[2]**
1/56 . by using electric or magnetic effects (G01F 1/66 takes precedence) **[2]**
1/58 . . by electromagnetic flowmeters **[2]**
1/60 . . . Circuits therefor **[2]**
1/64 . . by measuring electrical currents passing through the fluid flow; by measuring electrical potential generated by the fluid flow, e.g. by electrochemical, contact, or friction effects (G01F 1/58 takes precedence) **[2]**
1/66 . by measuring frequency, phase shift, or propagation time of electromagnetic or other waves, e.g. ultrasonic flowmeters **[2]**
1/68 . by using thermal effects **[2]**
1/684 . . Structural arrangements; Mounting of elements, e.g. in relation to fluid flow **[6]**
1/688 . . . using a particular type of heating, cooling or sensing element **[6]**
1/69 . . . . of resistive type **[6]**
1/692 . . . . . Thin-film arrangements **[6]**
1/696 . . Circuits therefor, e.g. constant-current flow meters **[6]**
1/698 . . . Feedback or rebalancing circuits, e.g. self heated constant temperature flowmeters **[6]**
1/699 . . . . by control of a separate heating or cooling element **[6]**
1/704 . using marked regions or existing inhomogeneities within the fluid stream, e.g. statistically occurring variations in a fluid parameter (G01F 1/76, G01F 25/00 take precedence) **[4]**
1/708 . . Measuring the time taken to traverse a fixed distance **[4]**
1/712 . . . using auto-correlation or cross-correlation detection means (measuring speed by using correlation detection means in general G01P 3/80, G01P 5/22) **[4]**
1/716 . . . using electron paramagnetic resonance (EPR) or nuclear magnetic resonance (NMR) **[4]**
1/72 . Devices for measuring pulsing fluid flows **[2]**
1/74 . Devices for measuring flow of a fluid or flow of a fluent solid material in suspension in another fluid **[2]**
1/76 . Devices for measuring mass flow of a fluid or a fluent solid material (weighing a continuous stream of material during flow G01G 11/00) **[2]**
1/78 . . Direct mass flowmeters **[2]**
1/80 . . . operating by measuring pressure, force, momentum, or frequency of a fluid flow to which a rotational movement has been imparted **[2]**
1/82 . . . . using a driven wheel as impeller and one or more other wheels or moving elements which are angularly restrained by a resilient member, e.g. spring member, as the measuring device **[2]**
1/84 . . . . Gyroscopic mass flowmeters **[2]**
1/86 . . Indirect mass flowmeters, e.g. measuring volume flow and density, temperature, or pressure **[2]**
1/88 . . . with differential-pressure measurement to determine the volume flow **[2]**
1/90 . . . with positive-displacement meter or turbine meter to determine the volume flow **[2]**

3/00 Measuring the volume flow of fluids or fluent solid material wherein the fluid passes through the meter in successive and more or less isolated quantities, the meter being driven by the flow (measuring a proportion of the volume flow G01F 5/00)

3/02 . with measuring chambers which expand or contract during measurement
3/04 . . having rigid movable walls
3/06 . . . comprising members rotating in a fluid-tight or substantially fluid-tight manner in a housing
3/08 . . . . Rotary-piston or ring-piston meters
3/10 . . . . Geared or lobed impeller meters
3/12 . . . . Meters with nutating members, e.g. discs
3/14 . . . comprising reciprocating pistons, e.g. reciprocating in a rotating body
3/16 . . . . in stationary cylinders
3/18 . . . . . involving two or more cylinders
3/20 . . having flexible movable walls, e.g. diaphragms, bellows (diaphragms or bellows therefor G01F 15/16)
3/22 . . . for gases
3/24 . with measuring chambers moved during operation (wet gas-meters G01F 3/30)
3/26 . . Tilting-trap meters
3/28 . . on carriers rotated by the weight of the liquid in the measuring chambers
3/30 . Wet gas-meters
3/32 . . comprising partitioned drums rotating or nutating in a liquid

3/34 . . comprising bells reciprocating in a liquid
3/36 . with stationary measuring chambers having constant volume during measurement (with measuring chambers which expand or contract during measurement G01F 3/02)
3/38 . . having only one measuring chamber

5/00 Measuring a proportion of the volume flow

7/00 Volume-flow measuring devices with two or more measuring ranges; **Compound meters**

9/00 Measuring volume flow relative to another variable, e.g. of liquid fuel for an engine
9/02 . wherein the other variable is the speed of a vehicle

Metering by volume

11/00 Apparatus requiring external operation adapted at each repeated and identical operation to measure and separate a predetermined volume of fluid or fluent solid material from a supply or container, without regard to weight, and to deliver it
11/02 . with measuring chambers which expand or contract during measurement
11/04 . . of the free-piston type
11/06 . . . with provision for varying the stroke of the piston
11/08 . . of the diaphragm or bellows type (diaphragms or bellows therefor G01F 15/16)
11/10 . with measuring chambers moved during operation
11/12 . . of the valve type, i.e. the separating being effected by fluid-tight or powder-tight movements (involving the tilting or inverting of the supply vessel G01F 11/26)
11/14 . . . wherein the measuring chamber reciprocates
11/16 . . . . for liquid or semiliquid
11/18 . . . . for fluent solid material
11/20 . . . wherein the measuring chamber rotates or oscillates
11/22 . . . . for liquid or semiliquid
11/24 . . . . for fluent solid material
11/26 . . wherein the measuring chamber is filled and emptied by tilting or inverting the supply vessel, e.g. bottle-emptying apparatus
11/28 . with stationary measuring chambers having constant volume during measurement (with measuring chambers which expand or contract during measurement G01F 11/02)
11/30 . . with supply and discharge valves of the lift or plug-lift type
11/32 . . . for liquid or semiliquid
11/34 . . . for fluent solid material
11/36 . . with supply or discharge valves of the rectilinearly-moved slide type
11/38 . . . for liquid or semiliquid
11/40 . . . for fluent or solid material
11/42 . . with supply or discharge valves of the rotary or oscillatory type
11/44 . . . for liquid or semiliquid
11/46 . . . for fluent solid material

13/00 Apparatus for measuring by volume and delivering fluids or fluent solid materials, not provided for in the preceding groups

15/00 Details of, or accessories for, apparatus of groups G01F 1/00 to G01F 13/00 insofar as such details or appliances are not adapted to particular types of such apparatus
15/02 . Compensating or correcting for variations in pressure, density, or temperature
15/04 . . of gases to be measured
15/06 . Indicating or recording devices, e.g. for remote indication
15/07 . Integration to give total flow, e.g. using mechanically-operated integrating mechanism **[2]**
15/075 . . using electrically-operated integrating means **[2]**
15/08 . Air or gas separators in combination with liquid meters; Liquid separators in combination with gas-meters
15/10 . Preventing damage by freezing or excess pressure or insufficient pressure
15/12 . Cleaning arrangements; Filters (filters in general B01D)
15/14 . Casings, e.g. of special material
15/16 . Diaphragms; Bellows; Mountings therefor
15/18 . Supports or connecting means for meters

Measuring volume

17/00 Methods or apparatus for determining the capacity of containers or cavities, or the volume of solid bodies (measuring linear dimensions to determine volume G01B)

19/00 Calibrated capacity measures for fluids or fluent solid material, e.g. measuring cups

22/00 Methods or apparatus for measuring volume of fluids or fluent solid material, not otherwise provided for [5]
22/02 . involving measurement of pressure **[5]**

Level indicators

23/00 Indicating or measuring liquid level, or level of fluent solid material, e.g. indicating in terms of volume, indicating by means of an alarm (in wells E21B 47/04; adaptation to, or mounting on, steam boilers F22B 37/78; level regulation G05D; alarm devices G08B)
23/02 . by gauge glasses or other apparatus involving a window or transparent tube for directly observing the level to be measured or the level of a liquid column in free communication with the main body of the liquid
23/04 . by dip members, e.g. dip-sticks
23/14 . by measurement of pressure (measuring pressure in general G01L)
23/16 . . Indicating, recording, or alarm devices being actuated by mechanical or fluid means, e.g. using gas, mercury, or a diaphragm as transmitting element, or by a column of liquid
23/18 . . Indicating, recording, or alarm devices actuated electrically
23/20 . by measurement of weight, e.g. to determine the level of stored liquefied gas (weighing in general G01G)
23/22 . by measurement of physical variables, other than linear dimensions, pressure, or weight, dependent on the level to be measured, e.g. by difference of heat transfer of steam or water (involving the use of floats G01F 23/30)
23/24 . . by measuring variations of resistance of resistors due to contact with conductor fluid

23/26 . . by measuring variations of capacity or inductance of capacitors or inductors arising from the presence of liquid or fluent solid material in the electric or electromagnetic fields
23/28 . . by measuring the variations of parameters of electromagnetic or acoustic waves applied directly to the liquid or fluent solid material **[6]**
23/284 . . . Electromagnetic waves **[6]**
23/288 . . . . X-rays; Gamma rays **[6]**
23/292 . . . . Light **[6]**
23/296 . . . Acoustic waves **[6]**
23/30 . by floats (switches operated by floats H01H 35/18) **[4]**
23/32 . . using rotatable arms or other pivotable transmission elements **[4]**
23/34 . . . using mechanically actuated indicating means **[4]**
23/36 . . . using electrically actuated indicating means **[4]**
23/38 . . . using magnetically actuated indicating means **[4]**
23/40 . . using bands or wires as transmission elements **[4]**
23/42 . . . using mechanically actuated indicating means **[4]**
23/44 . . . using electrically actuated indicating means **[4]**
23/46 . . . using magnetically actuated indicating means **[4]**
23/48 . . using twisted spindles as transmission elements **[4]**
23/50 . . . using mechanically actuated indicating means **[4]**
23/52 . . . using electrically actuated indicating means **[4]**
23/54 . . . using magnetically actuated indicating means **[4]**
23/56 . . using elements rigidly fixed to, and rectilinearly moving with, the floats as transmission elements **[4]**
23/58 . . . using mechanically actuated indicating means **[4]**
23/60 . . . using electrically actuated indicating means **[4]**
23/62 . . . using magnetically actuated indicating means **[4]**
23/64 . . of the free float type **[4]**
23/66 . . . using mechanically actuated indicating means **[4]**
23/68 . . . using electrically actuated indicating means **[4]**
23/70 . . . . for sensing changes in level only at discrete points **[4]**
23/72 . . . using magnetically actuated indicating means **[4]**
23/74 . . . . for sensing changes in level only at discrete points **[4]**
23/76 . . characterised by the construction of the float **[4]**

25/00 Testing or calibrating of apparatus for measuring volume, volume flow, or liquid level, or for metering by volume

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G01G WEIGHING

Note

Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Weighing apparatus involving the use of a counterweight or other counterbalancing mass

1/02 . Pendulum-weight apparatus
1/04 . . the pendulum having a fixed pivot axis
1/06 . . . with a plurality of pendulums
1/08 . . the pendulum having a moving pivot axis, e.g. a floating pendulum
1/10 . . . with a plurality of pendulums
1/12 . . Constructional arrangements for obtaining equal indicative divisions
1/14 . . Temperature-compensating arrangements
1/16 . . Means for correcting for obliquity of mounting
1/18 . Balances involving the use of a pivoted beam, i.e. beam balances
1/20 . . Beam balances having the pans carried below the beam, and for use with separate counterweights
1/22 . . . for precision weighing
1/24 . . Platform-type scales, i.e. having the pans carried above the beam
1/26 . . with associated counterweight or set of counterweights
1/28 . . . involving means for automatically lifting counterweights corresponding to the load
1/29 . . . . with electrical or electromechanical control means **[3]**
1/30 . . . wherein the counterweight is in the form of a chain
1/32 . . . wherein the counterweights are in the form of rider-weights
1/34 . . . involving a fixed counterweight, with poise-weights selectively added to the load side
1/36 . . . wherein the counterweights are slidable along the beam, e.g. steelyards
1/38 . . . . with automatically-driven counterweight
1/40 . . specially adapted for weighing by substitution
1/42 . . Temperature-compensating arrangements

3/00 Weighing apparatus characterised by the use of elastically-deformable members, e.g. spring balances

3/02 . wherein the weighing element is in the form of a helical spring
3/04 . . using a plurality of springs
3/06 . wherein the weighing element is in the form of a spiral spring
3/08 . wherein the weighing element is in the form of a leaf spring
3/10 . wherein the torsional deformation of a weighing element is measured
3/12 . wherein the weighing element is in the form of a solid body stressed by pressure or tension during weighing
3/13 . . having piezo-electric or piezo-resistive properties **[3]**
3/14 . . measuring variations of electrical resistance (G01G 3/13 takes precedence) **[3]**
3/142 . . . Circuits specially adapted therefor **[3]**
3/145 . . . . involving comparison with a reference value (G01G 3/147 takes precedence) **[3]**
3/147 . . . . involving digital counting **[3]**
3/15 . . measuring variations of magnetic properties
3/16 . . measuring variations of frequency of oscillations of the body
3/18 . Temperature-compensating arrangements

5/00 Weighing apparatus wherein the balancing is effected by fluid action

5/02 . with a float or other member variably immersed in liquid
5/04 . with means for measuring the pressure imposed by the load on a liquid
5/06 . . using electrical indicating means **[3]**

7/00 Weighing apparatus wherein the balancing is effected by magnetic, electromagnetic, or electrostatic action, or by means not provided for in groups G01G 1/00 to G01G 5/00

7/02 . by electromagnetic action
7/04 . . with means for regulating the current to solenoids
7/06 . by electrostatic action

9/00 Methods of, or apparatus for, the determination of weight, not provided for in groups G01G 1/00 to G01G 7/00

11/00 Apparatus for weighing a continuous stream of material during flow; **Conveyer-belt weighers**

11/02 . having mechanical weight-sensitive devices
11/04 . having electrical weight-sensitive devices
11/06 . having fluid weight-sensitive devices
11/08 . having means for controlling the rate of feed or discharge
11/10 . . by controlling the height of the material on the belt
11/12 . . by controlling the speed of the belt
11/14 . using totalising or integrating devices
11/16 . . being electric or electronic devices **[3]**
11/18 . . . using digital counting **[3]**
11/20 . . being mechanical devices **[3]**

13/00 Weighing apparatus with automatic feed or discharge for weighing-out batches of material (for weighing a continuous stream G01G 11/00; check-weighing G01G 15/00; for fluids G01G 17/04; apportioning by weight materials to be mixed G01G 19/22; combinatorial weighing G01G 19/387) **[5]**

13/02 . Means for automatically loading weigh-pans or other receptacles, e.g. disposable containers, under control of the weighing mechanism
13/04 . . involving dribble-feed means controlled by the weighing mechanism to top up the receptacle to the target weight
13/06 . . . wherein the main feed is effected by gravity from a hopper or chute
13/08 . . . wherein the main feed is effected by mechanical conveying means, e.g. by belt conveyers, by vibratory conveyers
13/10 . . . wherein the main feed is effected by pneumatic conveying means, e.g. by fluidised feed of granular material
13/12 . . Arrangements for compensating for material suspended at cut-off, i.e. for material which is still falling from the feeder when the weigher stops the feeder
13/14 . . Arrangements for determination of, or compensation for, the tare weight of an unloaded container, e.g. of a disposable container
13/16 . Means for automatically discharging weigh receptacles under control of the weighing mechanism
13/18 . . by valves or flaps in the container bottom
13/20 . . by screw conveyers in the weigh receptacle
13/22 . . by tilting or rotating the receptacle
13/24 . Weighing mechanism control arrangements for automatic feed or discharge
13/26 . . involving fluid-pressure systems
13/28 . . involving variation of an electrical variable which is used to control loading or discharge of the receptacle
13/285 . . . involving comparison with a reference value (G01G 13/29 takes precedence) **[3]**
13/29 . . . involving digital counting **[3]**
13/295 . . . for controlling automatic loading of the receptacle **[3]**
13/30 . . involving limit switches or position-sensing switches
13/32 . . . involving photoelectric devices
13/34 . . involving mechanical linkage motivated by the weighing mechanism

15/00 Arrangements for check-weighing of materials dispensed into removable containers

15/02 . with provision for adding or removing a make-up quantity of material to obtain the desired net weight (dribble-feed means for automatic batch-weighers G01G 13/04)
15/04 . with provision for adding or removing a make-up quantity of material to obtain the desired gross weight (dribble-feed means for automatic batch-weighers G01G 13/04)

17/00 Apparatus for, or methods of, weighing material of special form or property (determining weight by measuring volume G01F)

17/02 . for weighing material of filamentary or sheet form
17/04 . for weighing fluids, e.g. gases, pastes
17/06 . . having means for controlling the supply or discharge
17/08 . for weighing livestock

19/00 Weighing apparatus or methods adapted for special purposes not provided for in groups G01G 11/00 to G01G 17/00

19/02 . for weighing wheeled or rolling bodies, e.g. vehicles
19/03 . . for weighing during motion (G01G 19/04, G01G 19/07 take precedence) **[3]**
19/04 . . for weighing railway vehicles
19/06 . . . on overhead rails
19/07 . . for weighing aircraft
19/08 . for incorporation in vehicles
19/10 . . having fluid weight-sensitive devices
19/12 . . having electrical weight-sensitive devices
19/14 . for weighing suspended loads (G01G 3/00 takes precedence)
19/16 . . having fluid weight-sensitive devices
19/18 . . having electrical weight-sensitive devices
19/20 . . for weighing unbalanced loads
19/22 . for apportioning materials by weighing prior to mixing them
19/24 . . using a single weighing apparatus
19/26 . . . associated with two or more counterweighted beams
19/28 . . . having fluid weight-sensitive devices
19/30 . . . having electrical weight-sensitive devices
19/32 . . using two or more weighing apparatus
19/34 . . with electrical control means
19/36 . . with mechanical control means
19/38 . . programme controlled, e.g. by perforated tape
19/387 . for combinatorial weighing, i.e. selecting a combination of articles whose total weight or number is closest to a desired value **[5]**
19/393 . . using two or more weighing units **[5]**
19/40 . with provisions for indicating, recording, or computing price or other quantities dependent on the weight (indicating means for weighing apparatus G01G 23/18; recording means for weighing apparatus G01G 23/18)
19/41 . . using mechanical computing means
19/413 . . using electromechanical or electronic computing means
19/414 . . . using electronic computing means only **[5]**
19/415 . . . . combined with recording means **[5]**
19/417 . . with provision for checking computing part of balance
19/42 . . for counting by weighing (G01G 19/387 takes precedence) **[5]**
19/44 . for weighing persons
19/46 . . Spring balances specially adapted for this purpose
19/48 . . Pendulum balances specially adapted for this purpose
19/50 . . having additional measuring devices, e.g. for height
19/52 . Weighing apparatus combined with other objects, e.g. with furniture (with walking-sticks A45B 3/08)
19/54 . . combined with writing implements or paper-knives
19/56 . . combined with handles of tools or of household implements
19/58 . . combined with handles of suit-cases or trunks
19/60 . . combined with fishing equipment, e.g. with fishing rods
19/62 . Over or under weighing apparatus **[3]**
19/64 . Percentage-indicating weighing apparatus, i.e. for expressing the weight as a percentage of a predetermined or initial weight **[3]**

21/00 Details of weighing apparatus

21/02 . Arrangements of bearings
21/04 . . of knife-edge bearings
21/06 . . of ball or roller bearings
21/07 . . of flexure-plate bearings **[3]**
21/08 . . Bearing mountings or adjusting means therefor
21/10 . . Floating suspensions; Arrangements of shock-absorbers
21/12 . . Devices for preventing derangement
21/14 . Beams
21/16 . . of composite construction; Connections between different beams
21/18 . Link connections between the beam and the weigh pan
21/20 . . for precision weighing apparatus
21/22 . Weigh-pans or other weighing receptacles; Weighing platforms
21/23 . Support or suspension of weighing platforms (G01G 21/24 takes precedence) **[3]**
21/24 . Guides or linkages for ensuring parallel motion of the weigh-pans
21/26 . Counterweights; Poise-weights; Sets of weights; Holders for the reception of weights
21/28 . Frames; Housings
21/30 . Means for preventing contamination by dust

23/00 Auxiliary devices for weighing apparatus

23/01 . Testing or calibrating of weighing apparatus **[3]**
23/02 . Relieving mechanisms; Arrestment mechanisms
23/04 . . for precision weighing apparatus
23/06 . Means for damping oscillations, e.g. of weigh-beams
23/08 . . by fluid means
23/10 . . by electric or magnetic means
23/12 . . specially adapted for preventing oscillations due to movement of the load
23/14 . Devices for determining tare weight or for cancelling out the tare by zeroising, e.g. mechanically operated (in connection with automatic loading G01G 13/14)
23/16 . . electrically or magnetically operated
23/18 . Indicating devices, e.g. for remote indication; Recording devices; Scales, e.g. graduated
23/20 . . Indicating the weight by mechanical means
23/22 . . . combined with price indicators
23/24 . . . involving logarithmic scales
23/26 . . . Drive for the indicating member, e.g. mechanical amplifiers
23/28 . . . involving auxiliary or memory marks
23/30 . . . with means for illuminating the scale
23/32 . . Indicating the weight by optical projection means
23/34 . . . combined with price indicators
23/35 . . Indicating the weight by photographic recording
23/36 . . Indicating the weight by electrical means, e.g. using photoelectric cells
23/365 . . . involving comparison with a reference value (G01G 23/37 takes precedence) **[3]**
23/37 . . . involving digital counting
23/375 . . . . during the movement of a coded element **[3]**
23/38 . . Recording or coding devices specially adapted for weighing apparatus
23/40 . . . mechanically operated
23/42 . . . electrically operated

23/44 . . . . Coding devices therefor **[3]**
23/46 . . . Devices preventing recording until the weighing mechanism has come to rest **[3]**
23/48 . Temperature-compensating arrangements (G01G 1/14, G01G 1/42, G01G 3/18 take precedence) **[3]**

G01H MEASUREMENT OF MECHANICAL VIBRATIONS OR ULTRASONIC, SONIC OR INFRASONIC WAVES [4]

(1) This subclass covers the combination of generation and measurement of mechanical vibrations.
(2) Attention is drawn to the Notes following the title of class G01.

Subclass index

PRINCIPLE OF THE MEASURING

By direct conduction; by detection in a fluid; by sensitivity to radiation; by detection of changes in electric or magnetic properties 1/00; 3/00; 9/00; 11/00

SPECIAL CHARACTERISTICS MEASURED

Propagation velocity; reverberation time; resonant frequency; mechanical or acoustic impedance 5/00; 7/00; 13/00; 15/00

1/00 Measuring vibrations in solids by using direct conduction to the detector (G01H 9/00, G01H 11/00 take precedence)
1/04 . of vibrations which are transverse to direction of propagation
1/06 . . Frequency
1/08 . . Amplitude
1/10 . of torsional vibrations
1/12 . of longitudinal or not specified vibrations **[4]**
1/14 . . Frequency **[4]**
1/16 . . Amplitude **[4]**

3/00 Measuring vibrations by using a detector in a fluid (G01H 7/00, G01H 9/00, G01H 11/00 take precedence)
3/04 . Frequency
3/06 . . by electric means
3/08 . . Analysing frequencies present in complex vibrations, e.g. comparing harmonics present
3/10 . Amplitude; Power
3/12 . . by electric means (G01H 3/14 takes precedence) **[2]**
3/14 . . Measuring mean amplitude; Measuring mean power; Measuring time integral of power **[2]**

5/00 Measuring propagation velocity of ultrasonic, sonic or infrasonic waves

7/00 Measuring reverberation time

9/00 Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves by using radiation-sensitive means, e.g. optical means

11/00 Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves by detecting changes in electric or magnetic properties
11/02 . by magnetic means, e.g. reluctance **[4]**
11/04 . . using magnetostrictive devices **[4]**
11/06 . by electric means **[4]**
11/08 . . using piezo-electric devices **[4]**

13/00 Measuring resonant frequency

15/00 Measuring mechanical or acoustic impedance [3]

17/00 Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves, not provided for in the other groups of this subclass [4]

G01J MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY [2]

(1) This subclass covers the detection of the presence or absence of infra-red, visible, or ultra-violet light, not otherwise provided for.
(2) Attention is drawn to the Notes following the title of class G01.

Subclass index

PHOTOMETRY; PYROMETRY 1/00; 5/00
SPECTROMETRY; MEASURING: POLARISATION; VELOCITY; PHASE; PULSES 3/00; 4/00; 7/00; 9/00; 11/00

1/00 **Photometry, e.g. photographic exposure meter** (spectrophotometry G01J 3/00; specially adapted for radiation pyrometry G01J 5/00)

1/02 . Details
1/04 . . Optical or mechanical part
1/06 . . . Restricting the angle of incident light
1/08 . . Arrangements of light sources specially adapted for photometry
1/10 . by comparison with reference light or electric value
1/12 . . using wholly visual means (G01J 1/20 takes precedence)
1/14 . . . using comparison with a surface of graded brightness
1/16 . . using electric radiation detectors (G01J 1/20 takes precedence)
1/18 . . . using comparison with a reference electric value
1/20 . . intensity of the measured or reference value being varied to equalise their effects at the detector, e.g. by varying incidence angle
1/22 . . . using a variable element in the light-path, e.g. filter, polarising means (G01J 1/34 takes precedence)
1/24 . . . . using electric radiation detectors
1/26 . . . . . adapted for automatic variation of the measured or reference value
1/28 . . . using variation of intensity or distance of source (G01J 1/34 takes precedence)
1/30 . . . . using electric radiation detectors
1/32 . . . . . adapted for automatic variation of the measured or reference value
1/34 . . . using separate light-paths used alternately or sequentially, e.g. flicker
1/36 . . . . using electric radiation detectors
1/38 . using wholly visual means (G01J 1/10 takes precedence)
1/40 . . using limit of visibility or extinction effect
1/42 . using electric radiation detectors (optical or mechanical part G01J 1/04; by comparison with a reference light or electric value G01J 1/10)
1/44 . . Electric circuits
1/46 . . . using a capacitor
1/48 . using chemical effects
1/50 . . using change in colour of an indicator, e.g. actinometer
1/52 . . using photographic effects
1/54 . . by observing photo-reactions between gases
1/56 . using radiation pressure or radiometer effect
1/58 . using luminescence generated by light
1/60 . by measuring the pupil of the eye

3/00 **Spectrometry**; **Spectrophotometry**; **Monochromators**; **Measuring colours [4]**

3/02 . Details
3/04 . . Slit arrangements
3/06 . . Scanning arrangements
3/08 . . Beam-switching arrangements
3/10 . . Arrangements of light sources specially adapted for spectrometry or colorimetry
3/12 . Generating the spectrum; Monochromators
3/14 . . using refracting elements, e.g. prism (G01J 3/18, G01J 3/26 take precedence)
3/16 . . . with autocollimation
3/18 . . using diffraction elements, e.g. grating
3/20 . . . Rowland circle spectrometers
3/22 . . . Littrow mirror spectrometers
3/24 . . . using gratings profiled to favour a specific order
3/26 . . using multiple reflection, e.g. Fabry-Perot interferometer, variable interference filter
3/28 . Investigating the spectrum (using colour filters G01J 3/51) **[4]**
3/30 . . Measuring the intensity of spectral lines directly on the spectrum itself (G01J 3/42, G01J 3/44 take precedence)
3/32 . . . Investigating bands of a spectrum in sequence by a single detector
3/36 . . . Investigating two or more bands of a spectrum by separate detectors
3/40 . . Measuring the intensity of spectral lines by determining density of a photograph of the spectrum; Spectrography (G01J 3/42, G01J 3/44 take precedence) **[4]**
3/42 . . Absorption spectrometry; Double-beam spectrometry; Flicker spectrometry; Reflection spectrometry (beam-switching arrangements G01J 3/08) **[4]**
3/427 . . . Dual wavelength spectrometry **[4]**
3/433 . . . Modulation spectrometry; Derivative spectrometry **[4]**
3/44 . . Raman spectrometry; Scattering spectrometry **[4]**
3/443 . . Emission spectrometry **[4]**
3/447 . . Polarisation spectrometry **[4]**
3/45 . . Interferometric spectrometry **[4]**
3/453 . . . by correlation of the amplitudes **[4]**
3/457 . . Correlation spectrometry, e.g. of the intensity (G01J 3/453 takes precedence) **[4]**
3/46 . Measurement of colour; Colour measuring devices, e.g. colorimeters (measuring colour temperature G01J 5/60) **[4]**
3/50 . . using electric radiation detectors **[4]**
3/51 . . . using colour filters **[4]**
3/52 . . using colour charts

4/00 **Measuring polarisation of light [2]**

4/02 . Polarimeters of separated-field type; Polarimeters of half-shadow type **[2]**
4/04 . Polarimeters using electric detection means (G01J 4/02 takes precedence) **[2]**

5/00 **Radiation pyrometry**

5/02 . Details
5/04 . . Casings
5/06 . . Arrangements for eliminating effects of disturbing radiation
5/08 . . Optical features
5/10 . using electric radiation detectors
5/12 . . using thermoelectric elements, e.g. thermocouples
5/14 . . . Electrical features
5/16 . . . . Arrangements with respect to the cold junction; Compensating influence of ambient temperature or other variables
5/18 . . . . Special adaptation for indicating or recording
5/20 . . using resistors, thermistors, or semiconductors sensitive to radiation
5/22 . . . Electrical features
5/24 . . . . Use of a specially-adapted circuit, e.g. bridge circuit
5/26 . . . . Special adaptation for indicating or recording
5/28 . . using photo-emissive, photo-conductive, or photo-voltaic cells

5/30 . . . Electrical features
5/32 . . . . Special adaptation for indicating or recording
5/34 . . using capacitors
5/36 . . using ionisation of gases
5/38 . using extension or expansion of solids or fluids
5/40 . . using bimetallic elements
5/42 . . using Golay cells
5/44 . . using change of resonant frequency, e.g. of piezo-electric crystal
5/46 . using radiation pressure or radiometer effect
5/48 . using wholly visual means
5/50 . using techniques specified in the subgroups below
5/52 . . using comparison with reference sources, e.g. disappearing-filament pyrometer
5/54 . . . Optical features
5/56 . . . Electrical features
5/58 . . using absorption; using polarisation; using extinction effect
5/60 . . using determination of colour temperature
5/62 . . using means for chopping the light

7/00 Measuring velocity of light

9/00 Measuring optical phase difference; **Determining degree of coherence**; **Measuring optical wavelength** (spectrometry G01J 3/00) **[3]**
9/02 . by interferometric methods **[3]**
9/04 . by beating two waves of the same source but of different frequency and measuring the phase shift of the lower frequency obtained **[3]**

11/00 Measuring the characteristics of individual optical pulses or of optical pulse trains [5]

G01K MEASURING TEMPERATURE; **MEASURING QUANTITY OF HEAT**; **THERMALLY-SENSITIVE ELEMENTS NOT OTHERWISE PROVIDED FOR** (radiation pyrometry G01J 5/00)

(1) In this subclass, the following term is used with the meaning indicated:
– "thermometer" includes thermally-sensitive elements not provided for in other subclasses.
(2) Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Details of thermometers not specially adapted for particular types of thermometer (circuits for reducing thermal inertia G01K 7/42) **[6]**
1/02 . Special applications of indicating or recording means, e.g. for remote indications
1/04 . . Scales
1/06 . . . Arrangements for facilitating reading, e.g. illumination, magnifying glass
1/08 . Protective devices, e.g. casings
1/10 . . for preventing chemical attack
1/12 . . for preventing damage due to heat overloading
1/14 . Supports; Fastening devices; Mounting thermometers in particular locations
1/16 . Special arrangements for conducting heat from the object to the sensitive element
1/18 . . for reducing thermal inertia
1/20 . Compensating for effects of temperature changes other than those to be measured, e.g. changes in ambient temperature
1/22 . . by means of fluid contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the fluid
1/24 . . by means of compounded strips or plates, e.g. bimetallic strips
1/26 . Compensating for effects of pressure changes

3/00 Thermometers giving results other than momentary value of temperature (G01K 7/42 takes precedence) **[6]**
3/02 . giving mean values; giving integrated values
3/04 . . in respect of time
3/06 . . in respect of space
3/08 . giving differences of values; giving differentiated values
3/10 . . in respect of time, e.g. reacting only to a quick change of temperature
3/12 . . . based upon expansion or contraction of materials
3/14 . . in respect of space

5/00 Measuring temperature based on the expansion or contraction of a material (G01K 9/00 takes precedence; giving other than momentary value of temperature G01K 3/00)
5/02 . the material being a liquid (G01K 5/32 takes precedence)
5/04 . . Details

5/06 . . . Arrangements for driving back the liquid column
5/08 . . . Capillary tubes
5/10 . . . Containers for the liquid
5/12 . . . Selection of liquid compositions
5/14 . . the liquid displacing a further liquid column or a solid body (for maximum or minimum indication G01K 5/20)
5/16 . . with electric contacts
5/18 . . with electric conversion means for final indication
5/20 . . with means for indicating a maximum or a minimum or both (G01K 5/22 takes precedence)
5/22 . . with provision for expansion indicating over not more than a few degrees, e.g. clinical thermometer
5/24 . . with provision for measuring the difference between two temperatures
5/26 . . with provision for adjusting zero point of scale, e.g. Beckmann thermometer
5/28 . the material being a gas (G01K 5/32 takes precedence)
5/30 . . the gas displacing a liquid column
5/32 . the material being a fluid contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the material (under pressure developed by evaporation G01K 11/04)
5/34 . . the body being a capsule (G01K 5/36, G01K 5/42 take precedence)
5/36 . . the body being a tubular spring, e.g. Bourdon tube
5/38 . . . of spiral formation
5/40 . . . of helical formation
5/42 . . the body being a bellows
5/44 . . the body being a cylinder and piston
5/46 . . with electric conversion means for final indication
5/48 . the material being a solid
5/50 . . arranged for free expansion or contraction
5/52 . . . with electrical conversion means for final indication
5/54 . . consisting of pivotally-connected elements
5/56 . . constrained so that expansion or contraction causes a deformation of the solid
5/58 . . . the solid body being constrained at more than one point, e.g. rod, plate, diaphragm (G01K 5/62 takes precedence)
5/60 . . . . the body being a flexible wire or ribbon
5/62 . . . the solid body being formed of compounded strips or plates, e.g. bimetallic strip
5/64 . . . . Details of the compound system
5/66 . . . . . Selection of composition of the components of the system
5/68 . . . . . Shape of the system
5/70 . . . . specially adapted for indicating or recording
5/72 . . . . . with electric transmission means for final indication

7/00 Measuring temperature based on the use of electric or magnetic elements directly sensitive to heat (giving results other than momentary value of temperature G01K 3/00)

7/01 . using semiconducting elements having PN junctions (G01K 7/02, G01K 7/16, G01K 7/30 take precedence) **[6]**
7/02 . using thermo-electric elements, e.g. thermo-couples
7/04 . . the object to be measured not forming one of the thermo-electric materials
7/06 . . . the thermo-electric materials being arranged one within the other with the junction at one end exposed to the object, e.g. sheathed type
7/08 . . the object to be measured forming one of the thermo-electric materials, e.g. pointed type
7/10 . . Arrangements for compensating for auxiliary variables, e.g. length of lead
7/12 . . . Arrangements with respect to the cold junction, e.g. preventing influence of temperature of surrounding air
7/13 . . . . Circuits for cold-junction compensation **[6]**
7/14 . . Arrangements for modifying the output characteristic, e.g. linearising
7/16 . using resistive elements
7/18 . . the element being a linear resistance, e.g. platinum resistance thermometer (G01K 7/26 takes precedence)
7/20 . . . in a specially-adapted circuit, e.g. bridge circuit
7/21 . . . . for modifying the output characteristic, e.g. linearising **[6]**
7/22 . . the element being a non-linear resistance, e.g. thermistor (G01K 7/26 takes precedence)
7/24 . . . in a specially-adapted circuit, e.g. bridge circuit
7/25 . . . . for modifying the output characteristic, e.g. linearising **[6]**
7/26 . . the element being an electrolyte
7/28 . . . in a specially-adapted circuit, e.g. bridge circuit
7/30 . using thermal noise of resistances or conductors
7/32 . using change of resonant frequency of a crystal
7/34 . using capacitative elements
7/36 . using magnetic elements, e.g. magnets, coils
7/38 . . the variations of temperature influencing the magnetic permeability
7/40 . using ionisation of gases
7/42 . Circuits for reducing thermal inertia; Circuits for predicting the stationary value of temperature **[6]**

9/00 Measuring temperature based on movements caused by redistribution of weight, e.g. tilting thermometer (not giving momentary value of temperature G01K 3/00)

11/00 Measuring temperature based on physical or chemical changes not covered by group G01K 3/00, G01K 5/00, G01K 7/00, or G01K 9/00

11/02 . using evaporation or sublimation, e.g. by observing boiling
11/04 . . from material contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the vapour
11/06 . using melting, freezing, or softening
11/08 . . of disposable test bodies, e.g. cone
11/10 . using sintering
11/12 . using change of colour or translucency (G01K 11/32 takes precedence) **[6]**
11/14 . . of inorganic materials
11/16 . . of organic materials
11/18 . . of materials which change translucency
11/20 . using thermoluminescent materials (G01K 11/32 takes precedence) **[6]**
11/22 . using measurement of acoustic effects
11/24 . . of the velocity of propagation of sound
11/26 . . of resonant frequencies
11/28 . using measurements of density

11/30 . using measurement of the effect of a material on X-radiation, gamma radiation or particle radiation **[5]**

11/32 . using changes in transmission, scattering or fluorescence in optical fibres **[6]**

13/00 Adaptations of thermometers for specific purposes

13/02 . for measuring temperature of moving fluids or granular materials capable of flow

13/04 . for measuring temperature of moving solid bodies

13/06 . . in linear movement

13/08 . . in rotary movement

13/10 . for measuring temperature within piled or stacked materials (by special arrangements for conducting heat from the object to the sensitive element G01K 1/16)

13/12 . combined with sampling devices for measuring temperatures of samples of material

15/00 Testing or calibrating of thermometers

17/00 Measuring quantity of heat

17/02 . Calorimeters using transport of an indicating substance, e.g. evaporation calorimeters

17/04 . Calorimeters using compensation methods

17/06 . Measuring quantity of heat conveyed by flowing media, e.g. in heating systems (G01K 17/02, G01K 17/04 take precedence)

17/08 . . based upon measurement of temperature difference

17/10 . . . between an inlet and an outlet point, combined with measurement of rate of flow of the medium

17/12 . . . . Indicating product of flow and temperature difference directly

17/14 . . . . . using mechanical means for both measurements

17/16 . . . . . using electrical means for both measurements

17/18 . . . . . using electrical means for one measurement and mechanical means for the other

17/20 . . . across a radiating surface, combined with ascertainment of the heat-transmission coefficient

19/00 Testing or calibrating calorimeters

G01L MEASURING FORCE, STRESS, TORQUE, WORK, MECHANICAL POWER, MECHANICAL EFFICIENCY, OR FLUID PRESSURE (weighing G01G) **[4]**

Note

Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Measuring force or stress, in general (measuring force due to impact G01L 5/00) **[4]**

1/02 . by hydraulic or pneumatic means

1/04 . by measuring elastic deformation of gauges, e.g. of springs

1/06 . by measuring the permanent deformation of gauges, e.g. of compressed bodies

1/08 . by the use of counterbalancing forces

1/10 . by measuring variations of frequency of stressed vibrating elements, e.g. of stressed strings (using resistance strain gauges G01L 1/22)

1/12 . by measuring variations in the magnetic properties of materials resulting from the application of stress

1/14 . by measuring variations in capacitance or inductance of electrical elements, e.g. by measuring variations of frequency of electrical oscillators

1/16 . using properties of piezo-electric devices

1/18 . using properties of piezo-resistive materials, i.e. materials of which the ohmic resistance varies according to changes in magnitude or direction of force applied to the material

1/20 . by measuring variations in ohmic resistance of solid materials or of electrically-conductive fluids (of piezo-resistive materials G01L 1/18); by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electrical potential is produced or varied upon the application of stress

1/22 . . using resistance strain gauges

1/24 . by measuring variations of optical properties of material when it is stressed, e.g. by photoelastic stress analysis

1/25 . using wave or particle radiation, e.g. X-rays, neutrons (G01L 1/24 takes precedence) **[4]**

1/26 . Auxiliary measures taken, or devices used, in connection with the measurement of force, e.g. for preventing influence of transverse components of force, for preventing overload

3/00 Measuring torque, work, mechanical power, or mechanical efficiency, in general

3/02 . Rotary-transmission dynamometers

3/04 . . wherein the torque-transmitting element comprises a torsionally-flexible shaft

3/06 . . . involving mechanical means for indicating

3/08 . . . involving optical means for indicating

3/10 . . . involving electric or magnetic means for indicating

3/12 . . . . involving photoelectric means

3/14 . . wherein the torque-transmitting element is other than a torsionally-flexible shaft

3/16 . Rotary-absorption dynamometers, e.g. of brake type

3/18 . . mechanically actuated

3/20 . . fluid actuated

3/22 . . electrically or magnetically actuated

3/24 . Devices for determining the value of power, e.g. by measuring and simultaneously multiplying the values of torque and revolutions per unit of time, by multiplying the values of tractive or propulsive force and velocity

3/26 . Devices for measuring efficiency, i.e. the ratio of power output to power input

5/00 Apparatus for, or methods of, measuring force, e.g. due to impact, work, mechanical power, or torque, adapted for special purposes

5/03 . for measuring release force of ski safety bindings

5/04 . for measuring tension in ropes, cables, wires, threads, belts, bands, or like flexible members

5/06 . . using mechanical means

5/08 . . using fluid means

5/10 . . using electric means

5/12 . for measuring axial thrust in a rotary shaft, e.g. of propulsion plants

5/13 . for measuring the tractive or propulsive power of vehicles

5/14 . for measuring the force of explosions; for measuring the energy of projectiles

5/16 . for measuring several components of force

5/18 . for measuring ratios of force

5/20 . for measuring wheel side-thrust

5/22 . for measuring the force applied to control members, e.g. control members of vehicles, triggers

5/24 . for determining value of torque or twisting moment for tightening a nut or other member which is similarly stressed

5/26 . for determining the characteristic of torque in relation to revolutions per unit of time

5/28 . for testing brakes

Measuring fluid pressure

7/00 Measuring the steady or quasi-steady pressure of a fluid or a fluent solid material by mechanical or fluid pressure-sensitive elements (transmitting or indicating the displacement of mechanical pressure-sensitive elements by electric or magnetic means G01L 9/00; measuring differences of two or more pressure values G01L 13/00; measuring two or more pressure values simultaneously G01L 15/00)

7/02 . in the form of elastically-deformable gauges

7/04 . . in the form of flexible, deformable tubes, e.g. Bourdon gauges

7/06 . . of the bellows type

7/08 . . of the flexible-diaphragm type

7/10 . . of the capsule type

7/12 . . . with exhausted chamber; Aneroid barometers

7/14 . . . . with zero-setting means

7/16 . in the form of pistons

7/18 . using liquid as the pressure-sensitive medium, e.g. liquid-column gauges

7/20 . . involving a closed chamber above the liquid level, the chamber being exhausted or housing low-pressure gas; Liquid barometers

7/22 . . involving floats, e.g. floating bells

7/24 . . involving balances in the form of rings partly filled with liquid

9/00 Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by electric or magnetic pressure-sensitive elements; **Transmitting or indicating the displacement of mechanical pressure-sensitive elements, used to measure the steady or quasi-steady pressure of a fluid or fluent solid material, by electric or magnetic means** (measuring differences of two or more pressure values G01L 13/00; measuring two or more pressure values simultaneously G01L 15/00)

9/02 . by making use of variations in ohmic resistance, e.g. of potentiometers

9/04 . . of resistance strain gauges

9/06 . . of piezo-resistive devices

9/08 . by making use of piezo-electric devices

9/10 . by making use of variations in inductance

9/12 . by making use of variations in capacitance

9/14 . involving the displacement of magnets, e.g. electromagnets

9/16 . by making use of variations in the magnetic properties of material resulting from the application of stress

9/18 . by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electric potential is produced or varied upon the application of stress

11/00 Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by means not provided for in group G01L 7/00 or G01L 9/00

11/02 . by optical means **[6]**

11/04 . by acoustic means **[6]**

11/06 . . Ultrasonic means **[6]**

13/00 Devices or apparatus for measuring differences of two or more fluid pressure values

13/02 . using elastically-deformable members or pistons as sensing elements

13/04 . using floats or liquids as sensing elements

13/06 . using electric or magnetic pressure-sensitive elements

15/00 Devices or apparatus for measuring two or more fluid pressure values simultaneously

17/00 Devices or apparatus for measuring tyre pressure or the pressure in other inflated bodies

19/00 Details of, or accessories for, apparatus for measuring steady or quasi-steady pressure of a fluent medium insofar as such details or accessories are not special to particular types of pressure gauges

19/02 . Arrangements for preventing, or for compensating for, effects of inclination or acceleration of the measuring device; Zero-setting means (for aneroid barometers G01L 7/14)
19/04 . Means for compensating for effects of changes of temperature
19/06 . Means for preventing overload or deleterious influence of the measured medium on the measuring device or vice versa
19/08 . Means for indicating or recording, e.g. for remote indication
19/10 . . mechanical
19/12 . . Alarms or signals
19/14 . Housings
19/16 . Dials; Mounting of dials

21/00 Vacuum gauges

21/02 . having a compression chamber in which gas, whose pressure is to be measured, is compressed
21/04 . . wherein the chamber is closed by liquid; Vacuum gauges of the McLeod type
21/06 . . . actuated by rotating or inverting the measuring device
21/08 . by measuring variations in the transmission of acoustic waves through the medium, the pressure of which is to be measured
21/10 . by measuring variations in the heat conductivity of the medium, the pressure of which is to be measured
21/12 . . measuring changes in electric resistance of measuring members, e.g. of filaments; Vacuum gauges of the Pirani type
21/14 . . using thermocouples
21/16 . by measuring variation of frictional resistance of gases
21/18 . . using a pendulum
21/20 . . using members oscillating about a vertical axis
21/22 . . using resonance effects of a vibrating body; Vacuum gauges of the Klumb type
21/24 . . using rotating members; Vacuum gauges of the Langmuir type
21/26 . by making use of radiometer action, i.e. of the pressure caused by the momentum of molecules passing from a hotter to a cooler member; Vacuum gauges of the Knudsen type
21/28 . . using torsional rotary measuring members
21/30 . by making use of ionisation effects
21/32 . . using electric discharge tubes with thermionic cathodes
21/34 . . using electric discharge tubes with cold cathodes
21/36 . . using radioactive substances

23/00 Devices or apparatus for measuring or indicating or recording rapid changes, such as oscillations, in the pressure of steam, gas, or liquid; Indicators for determining work or energy of steam, internal-combustion, or other fluid-pressure engines from the condition of the working fluid

23/02 . mechanically indicating or recording and involving loaded or return springs
23/04 . involving means subjected to known counteracting pressure
23/06 . Indicating or recording by optical means
23/08 . operated electrically
23/10 . . by pressure-sensitive members of the piezo-electric type
23/12 . . by changing capacitance or inductance
23/14 . . by electromagnetic elements
23/16 . . by photoelectric means
23/18 . . by resistance strain gauges
23/20 . combined with planimeters or integrators
23/22 . for detecting or indicating knocks in internal-combustion engines; Units comprising pressure-sensitive members combined with ignitors for firing internal-combustion engines
23/24 . for measuring pressure in inlet or exhaust ducts of internal-combustion engines
23/26 . Details or accessories
23/28 . . Cooling means
23/30 . . Means for indicating consecutively positions of pistons or cranks of internal-combustion engines in combination with pressure indicators
23/32 . . Apparatus specially adapted for recording pressure changes measured by indicators

25/00 Testing or calibrating of apparatus for measuring force, torque, work, mechanical power, or mechanical efficiency [2]

27/00 Testing or calibrating of apparatus for measuring fluid pressure [2]

27/02 . of indicators

G01M TESTING STATIC OR DYNAMIC BALANCE OF MACHINES OR STRUCTURES; TESTING OF STRUCTURES OR APPARATUS, NOT OTHERWISE PROVIDED FOR

Note

Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Testing static or dynamic balance of machines or structures (balancing rotary bowls of centrifuges B04B 9/14; apparatus characterised by the means for holding wheels or parts thereof B60B 30/00; determining stability factors of ships B63B; stabilising of aircraft B64C 17/00; control systems for balancing automatically in operation G05; balancing rotors of dynamo-electric machines H02K 15/16)

1/02 . Details of balancing machines or devices
1/04 . . Adaptation of bearing support assemblies for receiving the body to be tested
1/06 . . Adaptation of drive assemblies for receiving the body to be tested
1/08 . . Instruments for indicating directly the magnitude and phase of the unbalance (measuring electrical variables in general G01R)
1/10 . Determining the moment of inertia
1/12 . Static balancing; Determining position of centre of gravity (by determining unbalance G01M 1/14)
1/14 . Determining unbalance (G01M 1/30, G01M 1/38 take precedence)
1/16 . . by oscillating or rotating the body to be tested
1/18 . . . and running the body down from a speed greater than normal
1/20 . . . and applying external forces compensating forces due to unbalance
1/22 . . . and converting vibrations due to unbalance into electric variables (measuring vibrations in general G01H; microphones or like acoustic electromechanical transducers H04R)
1/24 . . . Performing balancing on elastic shafts, e.g. for crankshafts
1/26 . . . with special adaptations for marking, e.g. by drilling
1/28 . . . with special adaptations for determining unbalance of the body in situ, e.g. of vehicle wheels
1/30 . Compensating unbalance (G01M 1/38 takes precedence; counterweights F16F 15/28)
1/32 . . by adding material to the body to be tested, e.g. by correcting-weights (correcting-weights per se F16F 15/32)
1/34 . . by removing material from the body to be tested, e.g. from the tread of tyres
1/36 . . by adjusting position of masses built-in the body to be tested
1/38 . Combined machines or devices for both determining and correcting unbalance

3/00 Investigating fluid tightness of structures (investigating permeability of porous material, investigating the presence of flaws in general G01N)

3/02 . by using fluid or vacuum
3/04 . . by detecting the presence of fluid at the leakage point
3/06 . . . by observing bubbles in a liquid pool
3/08 . . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
3/10 . . . . for containers, e.g. radiators
3/12 . . . by observing elastic covers or coatings, e.g. soapy water
3/14 . . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
3/16 . . . using electric detection means (G01M 3/06, G01M 3/12, G01M 3/20, G01M 3/24, G01M 3/26 take precedence)
3/18 . . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
3/20 . . . using special tracer materials, e.g. dye, fluorescent material, radioactive material
3/22 . . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
3/24 . . . using infrasonic, sonic, or ultrasonic vibrations
3/26 . . by measuring rate of loss or gain of fluid, e.g. by pressure-responsive devices, by flow detectors **[2]**
3/28 . . . for pipes, cables, or tubes; for pipe joints or seals; for valves **[2]**
3/30 . . . . using progressive displacement of one fluid by another **[2]**
3/32 . . . for containers, e.g. radiators **[2]**
3/34 . . . . by testing the possibility of maintaining the vacuum in containers, e.g. in can-testing machines **[2]**
3/36 . . by detecting change in dimensions of the structure being tested
3/38 . by using light (G01M 3/02 takes precedence)
3/40 . by using electric means, e.g. by observing electric discharges

5/00 Investigating the elasticity of structures, e.g. deflection of bridges, aircraft wings (G01M 9/00 takes precedence; strain gauges G01B)

7/00 Vibration-testing of structures; **Shock-testing of structures** (G01M 9/00 takes precedence)

7/02 . Vibration-testing **[5]**
7/04 . . Monodirectional test stands **[5]**
7/06 . . Multidirectional test stands **[5]**
7/08 . Shock-testing **[5]**

9/00 Aerodynamic testing; **Arrangements in or on wind tunnels** (building aspects section E; investigating properties of materials in general G01N)

9/02 . Wind tunnels **[5]**
9/04 . . Details **[5]**
9/06 . Measuring arrangements specially adapted for aerodynamic testing **[5]**
9/08 . Aerodynamic models **[5]**

10/00 Hydrodynamic testing; **Arrangements in or on ship-testing tanks or water tunnels** (building aspects section E; investigating properties of materials in general G01N)

11/00 Testing of optical apparatus; **Testing structures by optical methods not otherwise provided for**

11/02 . Testing of optical properties
11/04 . . Optical benches
11/06 . . Testing of alignment of vehicle head-light devices
11/08 . Testing of mechanical properties

13/00 **Testing of machine parts** (investigating the cutting power of tools G01N, e.g. G01N 3/58)
13/02 . Testing of gearing or of transmission mechanisms (measuring efficiency G01L)
13/04 . Testing of bearings

15/00 **Testing of engines [4]**
15/02 . Details or accessories of testing apparatus **[8]**
15/04 . Testing of internal-combustion engines, e.g. diagnostic testing of piston engines **[8]**
15/05 . . by combined monitoring of two or more different engine parameters **[8]**

Note

Group G01M 15/05 takes precedence over groups G01M 15/06 to G01M 15/12. **[8]**

15/06 . . by monitoring positions of pistons or cranks **[8]**
15/08 . . by monitoring pressure in cylinders **[8]**
15/09 . . by monitoring pressure in fluid ducts, e.g. in lubrication or cooling parts **[8]**
15/10 . . by monitoring exhaust gases **[8]**
15/11 . . by detecting misfire **[8]**
15/12 . . by monitoring vibrations **[8]**
15/14 . Testing of gas-turbine plants or jet-propulsion plants **[8]**

17/00 **Testing of vehicles** (G01M 15/00 takes precedence; testing fluid tightness G01M 3/00; testing elastic properties of bodies or chassis, e.g. torsion-testing, G01M 5/00; testing alignment of vehicle head-lighting devices G01M 11/06)
17/007 . of wheeled or endless-tracked vehicles (G01M 17/08 takes precedence) **[6]**
17/013 . . of wheels **[6]**
17/02 . . of tyres **[6]**
17/03 . . of endless-tracks **[6]**
17/04 . . of suspension or of damping **[6]**
17/06 . . of steering behaviour; of rolling behaviour (measuring steering angles G01B; measuring steering forces G01L) **[6]**
17/08 . of railway vehicles **[6]**
17/10 . . of suspensions, axles or wheels **[6]**

99/00 ***Subject matter not provided for in other groups of this subclass*** **[2011.01]**

G01N **INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES** (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, see the relevant subclass, e.g. B01L; measuring or testing processes other than immunoassay, involving enzymes or micro-organisms C12M, C12Q; investigation of foundation soil in situ E02D 1/00; monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00; sensing humidity changes for compensating measurements of other variables or for compensating readings of instruments for variations in humidity, see G01D or the relevant subclass for the variable measured; testing or determining the properties of structures G01M; measuring or investigating electric or magnetic properties of materials G01R; systems in general for determining distance, velocity or presence by use of propagation effects, e.g. Doppler effect, propagation time, of reflected or reradiated radio waves, analogous arrangements using other waves G01S; determining sensitivity, graininess, or density of photographic materials G03C 5/02; testing component parts of nuclear reactors G21C 17/00)

(1) In this subclass, the following terms are used with the meanings indicated:
– "investigating" means testing or determining;
– "materials" includes solid, liquid or gaseous media, e.g. the atmosphere.
(2) Attention is drawn to the Notes following the title of class G01.
(3) Investigating the properties of materials, specially adapted for use in processes covered by subclass B23K, is classified in group B23K 31/12. **[5]**

Subclass index

1/00 **Sampling**; **Preparing specimens for investigation** (handling materials for automatic analysis G01N 35/00)

1/02 . Devices for withdrawing samples (for medical or veterinary purposes A61; obtaining samples of soil or well fluids E21B 49/00)

1/04 . . in the solid state, e.g. by cutting

1/06 . . . providing a thin slice, e.g. microtome

1/08 . . . involving an extracting tool, e.g. core bit

1/10 . . in the liquid or fluent state

1/12 . . . Dippers; Dredgers (suction dredgers E02F 3/88) **[5]**

1/14 . . . Suction devices, e.g. pumps; Ejector devices

1/16 . . . with provision for intake at several levels (G01N 1/12, G01N 1/14 take precedence)

1/18 . . . with provision for splitting samples into portions (G01N 1/12, G01N 1/14 take precedence; fraction-collection apparatus for chromatography B01D 15/08)

1/20 . . . for flowing or falling materials (G01N 1/12, G01N 1/14 take precedence)

1/22 . . in the gaseous state

1/24 . . . Suction devices

1/26 . . . with provision for intake from several spaces

1/28 . Preparing specimens for investigation (mounting specimens on microscopic slides G02B 21/34; means for supporting the objects or the materials to be analysed in electron microscopes H01J 37/20)

1/30 . . Staining; Impregnating

1/31 . . . Apparatus therefor **[6]**

1/32 . . Polishing; Etching

1/34 . . Purifying; Cleaning

1/36 . . Embedding or analogous mounting of samples **[6]**

1/38 . . Diluting, dispersing or mixing samples **[6]**

1/40 . . Concentrating samples **[6]**

1/42 . . Low-temperature sample treatment, e.g. cryofixation **[6]**

1/44 . . Sample treatment involving radiation, e.g. heat **[6]**

3/00 **Investigating strength properties of solid materials by application of mechanical stress** (strain gauges G01B; measuring stress in general G01L 1/00)

Note

This group covers the stressing of materials not only below but also beyond the elastic limit, e.g. until breaking occurs.

3/02 . Details

3/04 . . Chucks

3/06 . . Special adaptations of indicating or recording means

3/08 . by applying steady tensile or compressive forces (G01N 3/28 takes precedence)

3/10 . . generated by pneumatic or hydraulic pressure (G01N 3/18 takes precedence)

3/12 . . . Pressure-testing (testing fluid-tightness G01M 3/00)

3/14 . . generated by dead weight, e.g. pendulum; generated by spring tension (G01N 3/18 takes precedence)

3/16 . . applied through gearing (G01N 3/18 takes precedence)

3/18 . . Performing tests at high or low temperatures

3/20 . by applying steady bending forces (G01N 3/26, G01N 3/28 take precedence)

3/22 . by applying steady torsional forces (G01N 3/26, G01N 3/28 take precedence)

3/24 . by applying steady shearing forces (G01N 3/26, G01N 3/28 take precedence)

3/26 . Investigating twisting or coiling properties

3/28 . Investigating ductility, e.g. suitability of sheet metal for deep-drawing or spinning

3/30 . by applying a single impulsive force (investigating hardness by performing impressions under impulsive load G01N 3/48)

3/303 . . generated only by free-falling weight **[7]**

3/307 . . generated by a compressed or tensile-stressed spring; generated by pneumatic or hydraulic means **[7]**

3/31 . . generated by a rotating fly-wheel **[7]**

3/313 . . generated by explosives **[7]**

3/317 . . generated by electromagnetic means **[7]**

3/32 . by applying repeated or pulsating forces (generation of such forces in general, see the relevant classes or subclasses, e.g. B06, G10)

3/34 . . generated by mechanical means, e.g. hammer blows

3/36 . . generated by pneumatic or hydraulic means

3/38 . . generated by electromagnetic means

3/40 . Investigating hardness or rebound hardness

3/42 . . by performing impressions under a steady load by indentors, e.g. sphere, pyramid (G01N 3/54 takes precedence)

3/44 . . . the indentors being put under a minor load and a subsequent major load, i.e. Rockwell system

3/46 . . . the indentors performing a scratching movement

3/48 . . by performing impressions under impulsive load by indentors, e.g. falling ball (G01N 3/54 takes precedence)

3/50 . . by measuring rolling friction, e.g. by rocking pendulum (G01N 3/54 takes precedence)

3/52 . . by measuring extent of rebound of a striking body (G01N 3/54 takes precedence)

3/54 . . Performing tests at high or low temperatures

3/56 . Investigating resistance to wear or abrasion

3/58 . Investigating machinability by cutting tools; Investigating the cutting ability of tools

3/60 . Investigating resistance of materials, e.g. refractory materials, to rapid heat changes

3/62 . Manufacturing, calibrating, or repairing devices used in investigations covered by the preceding subgroups

5/00 **Analysing materials by weighing, e.g. weighing small particles separated from a gas or liquid** (G01N 9/00 takes precedence)

5/02 . by absorbing or adsorbing components of a material and determining change of weight of the adsorbent, e.g. determining moisture content

5/04 . by removing a component, e.g. by evaporation, and weighing the remainder

7/00 **Analysing materials by measuring the pressure or volume of a gas or vapour**

7/02 . by absorption, adsorption, or combustion of components and measurement of the change in pressure or volume of the remainder

7/04 . . by absorption or adsorption alone

7/06 . . by combustion alone

7/08 . . by combustion followed by absorption or adsorption of the combustion products

7/10 . by allowing diffusion of components through a porous wall and measuring a pressure or volume difference
7/12 . . the diffusion being followed by combustion or catalytic oxidation
7/14 . by allowing the material to emit a gas or vapour, e.g. water vapour, and measuring a pressure or volume difference
7/16 . . by heating the material
7/18 . . by allowing the material to react
7/20 . . . the reaction being fermentation
7/22 . . . . of dough

9/00 Investigating density or specific gravity of materials; **Analysing materials by determining density or specific gravity** (weighing apparatus G01G)
9/02 . by measuring weight of a known volume
9/04 . . of fluids
9/06 . . . with continuous circulation through a pivotally-supported member
9/08 . by measuring buoyant force of solid materials by weighing both in air and in a liquid
9/10 . by observing bodies wholly or partially immersed in fluid materials
9/12 . . by observing the depth of immersion of the bodies, e.g. hydrometers
9/14 . . . the body being built into a container
9/16 . . . the body being pivoted
9/18 . . . Special adaptations for indicating, recording, or control
9/20 . . by balancing the weight of the bodies
9/22 . . . with continuous circulation of the fluid
9/24 . by observing the transmission of wave or particle radiation through the material
9/26 . by measuring pressure differences
9/28 . . by measuring the blowing pressure of gas bubbles escaping from nozzles at different depths in a liquid
9/30 . by using centrifugal effects
9/32 . by using flow properties of fluids, e.g. flow through tubes or apertures
9/34 . . by using elements moving through the fluid, e.g. vane
9/36 . Analysing materials by measuring the density or specific gravity, e.g. determining quantity of moisture (methods of measurement in general G01N 9/02 to G01N 9/32)

11/00 Investigating flow properties of materials, e.g. viscosity, plasticity; **Analysing materials by determining flow properties**
11/02 . by measuring flow of the material
11/04 . . through a restricted passage, e.g. tube, aperture
11/06 . . . by timing the outflow of a known quantity
11/08 . . . by measuring pressure required to produce a known flow
11/10 . by moving a body within the material
11/12 . . by measuring rising or falling speed of the body; by measuring penetration of wedged gauges (G01N 11/16 takes precedence)
11/14 . . by using rotary bodies, e.g. vane (G01N 11/16 takes precedence)
11/16 . . by measuring damping effect upon oscillatory body

13/00 Investigating surface or boundary effects, e.g. wetting power; **Investigating diffusion effects**; **Analysing materials by determining surface, boundary, or diffusion effects** (scanning-probe techniques or apparatus G01Q) **[1,7]**
13/02 . Investigating surface tension of liquids
13/04 . Investigating osmotic effects

15/00 Investigating characteristics of particles; **Investigating permeability, pore-volume or surface-area of porous materials** (identification of micro-organisms C12Q) **[4]**
15/02 . Investigating particle size or size distribution (G01N 15/04, G01N 15/10 take precedence; by measuring osmotic pressure G01N 7/10; by filtering B01D; by sifting B07B) **[4]**
15/04 . Investigating sedimentation of particle suspensions
15/05 . . in blood **[4]**
15/06 . Investigating concentration of particle suspensions (G01N 15/04, G01N 15/10 take precedence; by weighing G01N 5/00) **[3]**
15/08 . Investigating permeability, pore volume, or surface area of porous materials
15/10 . Investigating individual particles **[4]**
15/12 . . Coulter-counters **[4]**
15/14 . . Electro-optical investigation **[4]**

17/00 Investigating resistance of materials to the weather, to corrosion, or to light
17/02 . Electrochemical measuring systems for weathering, corrosion or corrosion-protection measurement (G01N 17/04 takes precedence) **[5]**
17/04 . Corrosion probes **[5]**

19/00 Investigating materials by mechanical methods (G01N 3/00 to G01N 17/00 take precedence)
19/02 . Measuring coefficient of friction between materials
19/04 . Measuring adhesive force between materials, e.g. of sealing tape, of coating
19/06 . Investigating by removing material, e.g. spark-testing
19/08 . Detecting presence of flaws or irregularities (measuring roughness or irregularity of surfaces G01B 5/28)
19/10 . Measuring moisture content, e.g. by measuring change in length of hygroscopic filament; Hygrometers

21/00 Investigating or analysing materials by the use of optical means, i.e. using infra-red, visible, or ultra-violet light (G01N 3/00 to G01N 19/00 take precedence; measuring stress in general G01L 1/00; optical elements of measuring instruments G02B; image analysis by data processing G06T)

Note

This group does not cover the investigation of spectral properties of light per se, or measurements of the properties of materials where spectral properties of light are sensed and primary emphasis is placed on creating, detecting or analysing the spectrum providing that the properties of the materials to be investigated are of minor importance (see also Note (4) after the title of class G01). Those subjects are covered by group G01J 3/00. **[7]**

21/01 . Arrangements or apparatus for facilitating the optical investigation **[3]**
21/03 . . Cuvette constructions **[3]**

21/05 . . . Flow-through cuvettes (G01N 21/09 takes precedence; handling fluid samples G01N 1/10) **[3]**
21/07 . . . Centrifugal type cuvettes (G01N 21/09 takes precedence; centrifuges B04B) **[3]**
21/09 . . . adapted to resist hostile environments or corrosive or abrasive materials **[3]**
21/11 . . Filling or emptying of cuvettes **[3]**
21/13 . . Moving of cuvettes or solid samples to or from the investigating station **[3]**
21/15 . . Preventing contamination of the components of the optical system or obstruction of the light path **[3]**
21/17 . Systems in which incident light is modified in accordance with the properties of the material investigated (where the material investigated is optically excited causing a change in wavelength of the incident light G01N 21/63) **[3]**
21/19 . . Dichroism **[3]**
21/21 . . Polarisation-affecting properties (G01N 21/19 takes precedence) **[3]**
21/23 . . . Bi-refringence **[3]**
21/25 . . Colour; Spectral properties, i.e. comparison of effect of material on the light at two or more different wavelengths or wavelength bands **[3]**
21/27 . . . using photo-electric detection (G01N 21/31 takes precedence) **[3]**
21/29 . . . using visual detection (G01N 21/31 takes precedence) **[3]**
21/31 . . . Investigating relative effect of material at wavelengths characteristic of specific elements or molecules, e.g. atomic absorption spectrometry **[3]**
21/33 . . . . using ultra-violet light (G01N 21/39 takes precedence) **[3]**
21/35 . . . . using infra-red light (G01N 21/39 takes precedence) **[3]**
21/37 . . . . . using pneumatic detection **[3]**
21/39 . . . . using tunable lasers **[3]**
21/41 . . Refractivity; Phase-affecting properties, e.g. optical path length (G01N 21/21 takes precedence) **[3]**
21/43 . . . by measuring critical angle **[3]**
21/45 . . . using interferometric methods; using Schlieren methods **[3]**
21/47 . . Scattering, i.e. diffuse reflection (G01N 21/25, G01N 21/41 take precedence) **[3]**
21/49 . . . within a body or fluid **[3]**
21/51 . . . . inside a container, e.g. in an ampoule (G01N 21/53 takes precedence; checking containers for cleanliness B08B 9/46) **[3]**
21/53 . . . . within a flowing fluid, e.g. smoke (alarm devices actuated by smoke G08B 17/10) **[3]**
21/55 . . Specular reflectivity **[3]**
21/57 . . . Measuring gloss **[3]**
21/59 . . Transmissivity (G01N 21/25 takes precedence) **[3]**
21/61 . . . Non-dispersive gas analysers **[3]**
21/62 . Systems in which the material investigated is excited whereby it emits light or causes a change in wavelength of the incident light **[3]**
21/63 . . optically excited **[3]**
21/64 . . . Fluorescence; Phosphorescence **[3]**
21/65 . . . Raman scattering **[3]**
21/66 . . electrically excited, e.g. electroluminescence **[3]**
21/67 . . . using electric arcs or discharges (spark gaps H01T) **[3]**
21/68 . . . using high frequency electric fields **[3]**
21/69 . . . specially adapted for fluids **[3]**
21/70 . . mechanically excited, e.g. triboluminescence **[3]**
21/71 . . thermally excited **[3]**
21/72 . . . using flame burners **[3]**
21/73 . . . using plasma burners or torches **[3]**
21/74 . . . using flameless atomising, e.g. graphite furnaces **[3]**
21/75 . Systems in which material is subjected to a chemical reaction, the progress or the result of the reaction being investigated (systems in which material is burnt in a flame or plasma G01N 21/72, G01N 21/73) **[3]**
21/76 . . Chemiluminescence; Bioluminescence **[3]**
21/77 . . by observing the effect on a chemical indicator **[3]**
21/78 . . . producing a change of colour **[3]**
21/79 . . . . Photometric titration **[3]**
21/80 . . . . Indicating pH value **[3]**
21/81 . . . . Indicating humidity **[3]**
21/82 . . . producing a precipitate or turbidity **[3]**
21/83 . . . . Turbidimetric titration **[3]**
21/84 . Systems specially adapted for particular applications **[3]**
21/85 . . Investigating moving fluids or granular solids **[3]**
21/86 . . Investigating moving sheets (G01N 21/89 takes precedence) **[3]**
21/87 . . Investigating jewels (G01N 21/88 takes precedence) **[3]**
21/88 . . Investigating the presence of flaws, defects or contamination **[3]**
21/89 . . . in moving material, e.g. paper, textiles (G01N 21/90, G01N 21/91, G01N 21/94 take precedence) **[3,7]**
21/892 . . . . characterised by the flaw, defect or object feature examined **[7]**
21/894 . . . . . Pinholes **[7]**
21/896 . . . . . Optical defects in or on transparent materials, e.g. distortion, surface flaws **[7]**
21/898 . . . . . Irregularities in textured or patterned surfaces, e.g. textiles, wood **[7]**
21/90 . . . in a container or its contents (G01N 21/91 takes precedence) **[3]**
21/91 . . . using penetration of dyes, e.g. fluorescent ink **[3]**
21/93 . . . Detection standards; Calibrating **[7]**
21/94 . . . Investigating contamination, e.g. dust (G01N 21/85 takes precedence) **[7]**
21/95 . . . characterised by the material or shape of the object to be examined (G01N 21/89 to G01N 21/91, G01N 21/94 take precedence) **[7]**
21/952 . . . . Inspecting the exterior surface of cylindrical bodies or wires (G01N 21/956 takes precedence) **[7]**
21/954 . . . . Inspecting the inner surface of hollow bodies, e.g. bores **[7]**
21/956 . . . . Inspecting patterns on the surface of objects (contactless testing of electronic circuits G01R 31/308; testing currency G07D) **[7]**
21/958 . . . . Inspecting transparent materials **[7]**

22/00 Investigating or analysing materials by the use of microwaves (G01N 3/00 to G01N 17/00, G01N 24/00 take precedence) **[3]**
22/02 . Investigating the presence of flaws **[3]**
22/04 . Investigating moisture content **[3]**

23/00 Investigating or analysing materials by the use of wave or particle radiation not covered by group G01N 21/00 or G01N 22/00, e.g. X-rays, neutrons (G01N 3/00 to G01N 17/00 take precedence; measuring stress in general G01L 1/00; measurement of nuclear or X-radiation G01T; introducing objects or materials into nuclear reactors, or removing them therefrom, or storing them after treatment therein G21C; construction or operation of X-ray apparatus or circuits therefor H05G)

23/02 . by transmitting the radiation through the material
23/04 . . and forming a picture (electron microscopes H01J)
23/05 . . . using neutrons **[3]**
23/06 . . and measuring the absorption
23/08 . . . using electric detection means
23/083 . . . . the radiation being X-rays (G01N 23/10 to G01N 23/18 take precedence) **[5]**
23/087 . . . . . using polyenergetic X-rays **[5]**
23/09 . . . . the radiation being neutrons **[3]**
23/10 . . . . the material being confined in a container (G01N 23/09 takes precedence) **[3]**
23/12 . . . . the material being a flowing fluid or a flowing granular solid (G01N 23/09 takes precedence) **[3]**
23/14 . . . . . specially adapted for controlling or monitoring operations or for signalling
23/16 . . . . the material being a moving sheet (G01N 23/09, G01N 23/18 take precedence) **[3]**
23/18 . . . . Investigating the presence of flaws or inclusions (G01N 23/09 takes precedence) **[3,5]**
23/20 . by using diffraction of the radiation, e.g. for investigating crystal structure; by using reflection of the radiation
23/201 . . by measuring small-angle scattering **[2]**
23/202 . . . using neutrons **[3]**
23/203 . . by measuring back scattering **[2]**
23/204 . . . using neutrons **[3]**
23/205 . . by means of diffraction cameras (G01N 23/201 takes precedence) **[2]**
23/206 . . . the radiation being neutrons **[3]**
23/207 . . by means of diffractometry using detectors, e.g. using an analysing crystal or a crystal to be analysed in a central position and one or more displaceable detectors in circumferential positions (G01N 23/201 takes precedence; spectrometry of detected or measured radiation intensity G01T 1/36) **[2]**
23/22 . by measuring secondary emission **[2]**
23/221 . . by activation analysis **[2]**
23/222 . . . using neutrons **[3]**
23/223 . . by irradiating the sample with X-rays and by measuring X-ray fluorescence **[2]**
23/225 . . using electron or ion microprobe (electron or ion-beam tubes for microprobe analysis H01J 37/00) **[2]**
23/227 . . by measuring photoelectric effect, e.g. Auger electrons **[2]**

24/00 Investigating or analysing materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects (arrangements or instruments for measuring magnetic resonance effects G01R 33/20) **[3,4,5]**

24/08 . by using nuclear magnetic resonance (G01N 24/12 takes precedence) **[3]**
24/10 . by using electron paramagnetic resonance (G01N 24/12 takes precedence) **[3]**
24/12 . by using double resonance **[3]**
24/14 . by using cyclotron resonance **[3]**

25/00 Investigating or analysing materials by the use of thermal means (G01N 3/00 to G01N 23/00 take precedence)

25/02 . by investigating changes of state or changes of phase; by investigating sintering
25/04 . . of melting point; of freezing point; of softening point
25/06 . . . Analysis by measuring change of freezing point
25/08 . . of boiling point
25/10 . . . Analysis by measuring change of boiling point
25/12 . . of critical point; of other phase change
25/14 . by using distillation, extraction, sublimation, condensation, freezing, or crystallisation (G01N 25/02 takes precedence)
25/16 . by investigating thermal coefficient of expansion
25/18 . by investigating thermal conductivity (by calorimetry G01N 25/20; by measuring change of resistance of an electrically-heated body G01N 27/18)
25/20 . by investigating the development of heat, i.e. calorimetry, e.g. by measuring specific heat, by measuring thermal conductivity
25/22 . . on combustion or catalytic oxidation, e.g. of components of gas mixtures
25/24 . . . using combustion tubes, e.g. for micro-analysis
25/26 . . . using combustion with oxygen under pressure, e.g. in bomb calorimeter
25/28 . . . the rise in temperature of the gases resulting from combustion being measured directly
25/30 . . . . using electric temperature-responsive elements
25/32 . . . . . using thermoelectric elements
25/34 . . . . using mechanical temperature-responsive elements, e.g. bimetallic
25/36 . . . . . for investigating the composition of gas mixtures
25/38 . . . . using the melting or combustion of a solid
25/40 . . . the heat developed being transferred to a flowing fluid
25/42 . . . . continuously
25/44 . . . the heat developed being transferred to a fixed quantity of fluid
25/46 . . . . for investigating the composition of gas mixtures
25/48 . . on solution, sorption, or a chemical reaction not involving combustion or catalytic oxidation
25/50 . by investigating flash-point; by investigating explosibility
25/52 . . by determining flash-point of liquids
25/54 . . by determining explosibility
25/56 . by investigating moisture content
25/58 . . by measuring changes of properties of the material due to heat, cold, or expansion
25/60 . . . for determining the wetness of steam
25/62 . . by psychrometric means, e.g. wet-and-dry-bulb thermometers
25/64 . . . using electric temperature-responsive elements
25/66 . . by investigating dew-point
25/68 . . . by varying the temperature of a condensing surface

25/70 . . . by varying the temperature of the material, e.g. by compression, by expansion

25/72 . Investigating presence of flaws (by investigating thermal conductivity G01N 25/18)

27/00 Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means (G01N 3/00 to G01N 25/00 take precedence; measurement or testing of electric or magnetic variables or of electric or magnetic properties of materials G01R)

27/02 . by investigating impedance

27/04 . . by investigating resistance

27/06 . . . of a liquid (involving electrolysis G01N 27/26; involving polarography G01N 27/48; measuring electric resistance of fluids G01R 27/22)

27/07 . . . . Construction of measuring vessels; Electrodes therefor **[2]**

27/08 . . . . which is flowing continuously

27/10 . . . . . Investigation or analysis specially adapted for controlling or monitoring operations or for signalling (regulating G05D)

27/12 . . . of a solid body in dependence upon absorption of a fluid; of a solid body in dependence upon reaction with a fluid

27/14 . . . of an electrically-heated body in dependence upon change of temperature

27/16 . . . . caused by burning or catalytic oxidation of surrounding material to be tested, e.g. of gas

27/18 . . . . caused by changes in the thermal conductivity of a surrounding material to be tested (G01N 27/20 takes precedence)

27/20 . . . Investigating the presence of flaws

27/22 . . by investigating capacitance

27/24 . . . Investigating the presence of flaws

27/26 . by investigating electrochemical variables; by using electrolysis or electrophoresis (investigating resistance to corrosion G01N 17/00; investigating or analysing materials by separation into components using adsorption, absorption or similar phenomena or using ion-exchange, e.g. chromatography, G01N 30/00; immunoelectrophoresis G01N 33/561; electrochemical processes or apparatus in general B01J; standard cells H01M 6/28) **[5]**

27/27 . . Association of two or more measuring systems or cells, each measuring a different parameter, where the measurement results may be either used independently, the systems or cells being physically associated, or combined to produce a value for a further parameter **[5]**

27/28 . . Electrolytic cell components

27/30 . . . Electrodes, e.g. test electrodes; Half-cells (G01N 27/414 takes precedence) **[5]**

27/31 . . . . Half-cells with permeable membranes, e.g. semi-porous or perm-selective membranes **[5]**

27/32 . . . . Calomel electrodes

27/327 . . . . Biochemical electrodes **[5]**

27/333 . . . . Ion-selective electrodes or membranes (glass electrodes G01N 27/36) **[5]**

27/34 . . . . Dropping-mercury electrodes

27/36 . . . . Glass electrodes

27/38 . . . . Cleaning of electrodes

27/40 . . . Semi-permeable membranes or partitions

27/401 . . . Salt-bridge leaks; Liquid junctions **[5]**

27/403 . . Cells and electrode assemblies **[5]**

27/404 . . . Cells with anode, cathode and cell electrolyte on the same side of a permeable membrane which separates them from the sample fluid **[5]**

27/406 . . . Cells and probes with solid electrolytes **[5]**

27/407 . . . . for investigating or analysing gases **[5]**

27/409 . . . . . Oxygen concentration cells **[5]**

27/41 . . . . . Oxygen pumping cells **[5]**

27/411 . . . . for investigating or analysing of liquid metals **[5]**

27/413 . . . Concentration cells using liquid electrolytes **[5]**

27/414 . . . Ion-sensitive or chemical field-effect transistors, i.e. ISFETS or CHEMFETS **[5]**

27/416 . . Systems (G01N 27/27 takes precedence) **[5]**

27/417 . . . using cells and probes with solid electrolytes **[5]**

27/419 . . . . Measuring voltages or currents with a combination of oxygen pumping cells and oxygen concentration cells **[5]**

27/42 . . . Measuring deposition or liberation of materials from an electrolyte; Coulometry, i.e. measuring coulomb-equivalent of material in an electrolyte **[5]**

27/44 . . . . using electrolysis to generate a reagent, e.g. for titration **[5]**

27/447 . . . using electrophoresis **[5]**

27/453 . . . . Cells therefor **[5]**

27/48 . . . using polarography, i.e. measuring changes in current under a slowly-varying voltage

27/49 . . . Systems involving the determination of the current at a single specific value, or small range of values, of applied voltage for producing selective measurement of one or more particular ionic species **[5]**

27/60 . by investigating electrostatic variables (by investigating capacitance G01N 27/22)

27/61 . . Investigating the presence of flaws **[3]**

27/62 . by investigating the ionisation of gases; by investigating electric discharges, e.g. emission of cathode (particle spectrometers H01J 49/00)

27/64 . . using wave or particle radiation to ionise a gas, e.g. in an ionisation chamber

27/66 . . . and measuring current or voltage

27/68 . . using electric discharge to ionise a gas

27/70 . . . and measuring current or voltage

27/72 . by investigating magnetic variables

27/74 . . of fluids (G01N 24/00 takes precedence)

27/76 . . . by investigating susceptibility

27/80 . . for investigating mechanical hardness, e.g. by investigating saturation or remanence of ferromagnetic material

27/82 . . for investigating the presence of flaws

27/83 . . . by investigating stray magnetic fields **[3]**

27/84 . . . . by applying magnetic powder or magnetic ink **[3]**

27/85 . . . . using magnetographic methods **[3]**

27/87 . . . . using probes **[3]**

27/90 . . . using eddy currents **[3]**

27/92 . by investigating breakdown voltage (G01N 27/60, G01N 27/62 take precedence; testing of articles or specimens of solids or fluids for dielectric strength or breakdown voltage G01R 31/12) **[3]**

29/00 **Investigating or analysing materials by the use of ultrasonic, sonic or infrasonic waves**; **Visualisation of the interior of objects by transmitting ultrasonic or sonic waves through the object** (G01N 3/00 to G01N 27/00 take precedence; measuring or indicating of ultrasonic, sonic or infrasonic waves in general G01H; systems using the reflection or reradiation of acoustic waves, e.g. acoustic imaging, G01S 15/00; obtaining records by techniques analogous to photography using ultrasonic, sonic or infrasonic waves G03B 42/06) **[4]**

29/02 . Analysing fluids (using acoustic emission techniques G01N 29/14) **[5,8]**

29/024 . . by measuring propagation velocity or propagation time of acoustic waves **[8]**

29/028 . . by measuring mechanical or acoustic impedance **[8]**

29/032 . . by measuring attenuation of acoustic waves **[8]**

29/036 . . by measuring frequency or resonance of acoustic waves **[8]**

29/04 . Analysing solids (using acoustic emission techniques G01N 29/14) **[4,5,8]**

29/06 . . Visualisation of the interior, e.g. acoustic microscopy **[4,8]**

29/07 . . by measuring propagation velocity or propagation time of acoustic waves **[8]**

29/09 . . by measuring mechanical or acoustic impedance **[8]**

29/11 . . by measuring attenuation of acoustic waves **[8]**

29/12 . . by measuring frequency or resonance of acoustic waves **[5,8]**

29/14 . using acoustic emission techniques **[5,8]**

29/22 . Details **[5]**

29/24 . . Probes **[5]**

29/26 . . Arrangements for orientation or scanning **[5]**

29/265 . . . by moving the sensor relative to a stationary material **[8]**

29/27 . . . by moving the material relative to a stationary sensor **[8]**

29/275 . . . by moving both the sensor and the material **[8]**

29/28 . . providing acoustic coupling **[5]**

29/30 . . Arrangements for calibrating or comparing, e.g. with standard objects **[8]**

29/32 . . Arrangements for suppressing undesired influences, e.g. temperature or pressure variations **[8]**

29/34 . Generating the ultrasonic, sonic or infrasonic waves **[8]**

29/36 . Detecting the response signal **[8]**

29/38 . . by time filtering, e.g. using time gates **[8]**

29/40 . . by amplitude filtering, e.g. by applying a threshold **[8]**

29/42 . . by frequency filtering **[8]**

29/44 . Processing the detected response signal **[8]**

29/46 . . by spectral analysis, e.g. Fourier analysis **[8]**

29/48 . . by amplitude comparison **[8]**

29/50 . . using auto-correlation techniques or cross-correlation techniques **[8]**

29/52 . . using inversion methods other than spectral analysis, e.g. conjugated gradient inversion **[8]**

30/00 **Investigating or analysing materials by separation into components using adsorption, absorption or similar phenomena or using ion-exchange, e.g. chromatography** (G01N 3/00 to G01N 29/00 take precedence; separation for the preparation or production of components B01D 15/00, B01D 53/02, B01D 53/14) **[4]**

30/02 . Column chromatography **[4]**

Note

In this group, the following term is used with the meaning indicated:
– "conditioning" means the adjustment or control of environmental parameters, e.g. temperature or pressure. **[4]**

30/04 . . Preparation or injection of sample to be analysed **[4]**

30/06 . . . Preparation **[4]**

30/08 . . . . using an enricher **[4]**

30/10 . . . . using a splitter **[4]**

30/12 . . . . by evaporation **[4]**

30/14 . . . . by elimination of some components **[4]**

30/16 . . . Injection (G01N 30/24 takes precedence) **[4]**

30/18 . . . . using a septum or microsyringe **[4]**

30/20 . . . . using a sampling valve **[4]**

30/22 . . . . in high pressure liquid systems **[4]**

30/24 . . . Automatic injection systems **[4]**

30/26 . . Conditioning of the fluid carrier; Flow patterns **[4]**

30/28 . . . Control of physical parameters of the fluid carrier **[4]**

30/30 . . . . of temperature **[4]**

30/32 . . . . of pressure or speed (G01N 30/36 takes precedence) **[4]**

30/34 . . . . of fluid composition, e.g. gradient (G01N 30/36 takes precedence) **[4]**

30/36 . . . . in high pressure liquid systems **[4]**

30/38 . . . Flow patterns **[4]**

30/40 . . . . using back flushing **[4]**

30/42 . . . . using counter-current **[4]**

30/44 . . . . using recycling of the fraction to be distributed **[4]**

30/46 . . . . using more than one column **[4]**

30/50 . . Conditioning of the sorbent material or stationary liquid **[4]**

30/52 . . . Physical parameters **[4]**

30/54 . . . . Temperature **[4]**

30/56 . . . Packing methods or coating methods **[4]**

30/58 . . . the sorbent moving as a whole **[4]**

30/60 . . Construction of the column **[4]**

30/62 . . Detectors specially adapted therefor **[4]**

30/64 . . . Electrical detectors **[4]**

30/66 . . . . Thermal conductivity detectors **[4]**

30/68 . . . . Flame ionisation detectors **[4]**

30/70 . . . . Electron capture detectors (G01N 30/68 takes precedence) **[4]**

30/72 . . . Mass spectrometers **[4]**

30/74 . . . Optical detectors **[4]**

30/76 . . . Acoustical detectors **[4]**

30/78 . . . using more than one detector **[4]**

30/80 . . Fraction collectors **[4]**

30/82 . . . Automatic means therefor **[4]**

30/84 . . Preparation of the fraction to be distributed **[4]**

30/86 . . Signal analysis **[4]**

30/88 . . Integrated analysis systems specially adapted therefor, not covered by a single one of groups G01N 30/04 to G01N 30/86 (signal analysis systems in general G06F, G06G, G06T) **[4]**
30/89 . Inverse chromatography, i.e. with the analyte in stationary phase **[8]**
30/90 . Plate chromatography, e.g. thin layer or paper chromatography **[4]**
30/91 . . Application of the sample **[4]**
30/92 . . Construction of the plate **[4]**
30/93 . . . Application of the sorbent layer **[4]**
30/94 . . Development **[4]**
30/95 . . Detectors specially adapted therefor; Signal analysis **[4]**
30/96 . using ion-exchange (G01N 30/02, G01N 30/90 take precedence) **[4]**

31/00 Investigating or analysing non-biological materials by the use of the chemical methods specified in the subgroups (testing the effectiveness or completeness of sterilisation procedures without using enzymes or microorganisms A61L 2/28; measuring or testing processes involving enzymes or micro-organisms C12Q 1/00); **Apparatus specially adapted for such methods [4]**

Note

The observation of the progress of the reactions covered by groups G01N 31/02 to G01N 31/22 by any of the methods specified in groups G01N 3/00 to G01N 29/00, if this observation is of major importance, is classified in the relevant group covering the method.

31/02 . using precipitation
31/10 . using catalysis
31/12 . using combustion (G01N 25/20 takes precedence)
31/16 . using titration
31/18 . . Burettes specially adapted for titration (burettes in general B01L 3/02)
31/20 . using micro-analysis, e.g. drop reaction
31/22 . using chemical indicators (G01N 31/02 takes precedence)

33/00 Investigating or analysing materials by specific methods not covered by groups G01N 1/00 to G01N 31/00

33/02 . Food
33/03 . . Edible oils or edible fats **[4]**
33/04 . . Dairy products
33/06 . . . Determining fat content, e.g. by butyrometer
33/08 . . Eggs, e.g. by candling
33/10 . . Starch-containing substances, e.g. dough
33/12 . . Meat; fish
33/14 . . Beverages
33/15 . Medicinal preparations **[3]**
33/18 . Water
33/20 . Metals
33/22 . Fuels; explosives
33/24 . Earth materials (G01N 33/42 takes precedence)
33/26 . Oils; viscous liquids; paints; inks (G01N 33/22 takes precedence)
33/28 . . Oils (edible oils or edible fats G01N 33/03) **[4]**
33/30 . . . for lubricating properties
33/32 . . Paints; inks
33/34 . Paper
33/36 . Textiles
33/38 . Concrete; lime; mortar; gypsum; bricks; ceramics; glass
33/40 . Grinding-materials
33/42 . Road-making materials (G01N 33/38 takes precedence)
33/44 . Resins; plastics; rubber; leather
33/46 . Wood
33/48 . Biological material, e.g. blood, urine (G01N 33/02 to G01N 33/14, G01N 33/26, G01N 33/44, G01N 33/46 take precedence; determining the germinating capacity of seeds A01C 1/02); Haemocytometers (counting blood corpuscules distributed over a surface by scanning the surface G06M 11/02) **[3,4]**
33/483 . . Physical analysis of biological material **[4]**
33/487 . . . of liquid biological material **[4]**
33/49 . . . . blood **[4]**
33/493 . . . . urine **[4]**
33/497 . . . of gaseous biological material, e.g. breath **[4]**
33/50 . . Chemical analysis of biological material, e.g. blood, urine; Testing involving biospecific ligand binding methods; Immunological testing (measuring or testing processes other than immunological involving enzymes or micro-organisms, compositions or test papers therefor; processes of forming such compositions, condition responsive control in microbiological or enzymological processes C12Q) **[3]**

Note

In this group, the following expression is used with the meaning indicated:
– "involving", when used in relation to a material, includes the testing for the material as well as employing the material as a determinant or reactant in a test for a different material. **[3]**

Note

In groups G01N 33/52 to G01N 33/98, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[3]**

33/52 . . . Use of compounds or compositions for colorimetric, spectrophotometric or fluorometric investigation, e.g. use of reagent paper **[3]**
33/53 . . . Immunoassay; Biospecific binding assay; Materials therefor (medicinal preparations containing antigens or antibodies A61K; haptens in general, see the relevant places in class C07; peptides, e.g. proteins, in general C07K) **[4]**
33/531 . . . . Production of immunochemical test materials **[4]**
33/532 . . . . . Production of labelled immunochemicals **[4]**
33/533 . . . . . with fluorescent label **[4]**
33/534 . . . . . with radioactive label **[4]**
33/535 . . . . . with enzyme label **[4]**
33/536 . . . . with immune complex formed in liquid phase **[4]**
33/537 . . . . . with separation of immune complex from unbound antigen or antibody **[4]**
33/538 . . . . . by sorbent column, particles or resin strip **[4]**
33/539 . . . . . involving precipitating reagent **[4]**
33/541 . . . . . Double or second antibody **[4]**

33/542 . . . . . with steric inhibition or signal modification, e.g. fluorescent quenching **[4]**
33/543 . . . . with an insoluble carrier for immobilising immunochemicals **[4]**
33/544 . . . . . the carrier being organic **[4]**
33/545 . . . . . Synthetic resin **[4]**
33/546 . . . . . as water suspendable particles **[4]**
33/547 . . . . . with antigen or antibody attached to the carrier via a bridging agent **[4]**
33/548 . . . . . Carbohydrates, e.g. dextran **[4]**
33/549 . . . . . with antigen or antibody entrapped within the carrier **[4]**
33/551 . . . . . the carrier being inorganic **[4]**
33/552 . . . . . Glass or silica **[4]**
33/553 . . . . . Metal or metal coated **[4]**
33/554 . . . . . the carrier being a biological cell or cell fragment, e.g. bacteria, yeast cells **[4]**
33/555 . . . . . Red blood cell **[4]**
33/556 . . . . . Fixed or stabilised red blood cell **[4]**
33/557 . . . . using kinetic measurement, i.e. time rate of progress of an antigen-antibody interaction **[4]**
33/558 . . . . using diffusion or migration of antigen or antibody **[4]**
33/559 . . . . . through a gel, e.g. Ouchterlony technique **[4]**
33/561 . . . . . Immunoelectrophoresis **[4]**
33/563 . . . . involving antibody fragments **[4]**
33/564 . . . . for pre-existing immune complex or autoimmune disease **[4]**
33/566 . . . . using specific carrier or receptor proteins as ligand binding reagent **[4]**
33/567 . . . . . utilising isolate of tissue or organ as binding agent **[4]**
33/569 . . . . for micro-organisms, e.g. protozoa, bacteria, viruses **[4]**
33/571 . . . . . for venereal disease, e.g. syphilis, gonorrhoea, herpes **[4]**
33/573 . . . . for enzymes or isoenzymes **[4]**
33/574 . . . . for cancer **[4]**
33/576 . . . . for hepatitis **[4]**
33/577 . . . . involving monoclonal antibodies **[4]**
33/579 . . . involving limulus lysate **[4]**
33/58 . . . involving labelled substances (G01N 33/53 takes precedence; for testing in vivo A61K 51/00) **[3]**
33/60 . . . . involving radioactive labelled substances (tracers G21H 5/02) **[3]**
33/62 . . . involving urea **[3]**
33/64 . . . involving ketones **[3]**
33/66 . . . involving blood sugars, e.g. galactose **[3]**
33/68 . . . involving proteins, peptides or amino acids **[3]**
33/70 . . . involving creatine or creatinine **[3]**
33/72 . . . involving blood pigments, e.g. hemoglobin, bilirubin **[3]**
33/74 . . . involving hormones **[3]**
33/76 . . . . Human chorionic gonadotropin **[3]**
33/78 . . . . Thyroid gland hormones **[3]**
33/80 . . . involving blood groups or blood types **[3]**
33/82 . . . involving vitamins **[3]**
33/84 . . . involving inorganic compounds or pH **[3]**
33/86 . . . involving blood coagulating time **[3]**
33/88 . . . involving prostaglandins **[3]**
33/90 . . . involving iron binding capacity of blood **[3]**
33/92 . . . involving lipids, e.g. cholesterol **[3]**
33/94 . . . involving narcotics **[3]**
33/96 . . . involving blood or serum control standard **[3]**
33/98 . . . involving alcohol, e.g. ethanol in breath **[4]**

35/00 Automatic analysis not limited to methods or materials provided for in any single one of groups G01N 1/00 to G01N 33/00; **Handling materials therefor [3]**

35/02 . using a plurality of sample containers moved by a conveyer system past one or more treatment or analysis stations **[3]**
35/04 . . Details of the conveyer system **[3]**
35/08 . using a stream of discrete samples flowing along a tube system, e.g. flow injection analysis **[3]**
35/10 . Devices for transferring samples to, in, or from, the analysis apparatus, e.g. suction devices, injection devices **[6]**

37/00 Details not covered by any other group of this subclass [3]

G01P MEASURING LINEAR OR ANGULAR SPEED, ACCELERATION, DECELERATION, OR SHOCK; **INDICATING PRESENCE, ABSENCE, OR DIRECTION, OF MOVEMENT** (measuring or recording blood flow A61B 5/02, A61B 8/06; monitoring speed or deceleration of electrically-propelled vehicles B60L 3/00; vehicle lighting systems adapted to indicate speed B60Q 1/54; determining position or course in navigation, measuring ground distance in geodesy or surveying G01C; combined measuring devices for measuring two or more variables of movement G01C 23/00; measuring velocity of sound G01H; measuring velocity of light G01J 7/00; determining direction or velocity of solid objects by reflection or reradiation of radio or other waves and based on propagation effects, e.g. Doppler effect, propagation time, direction of propagation, G01S; measuring speed of nuclear radiation G01T; measuring acceleration of gravity G01V)

(1) This subclass covers measuring direction or velocity of flowing fluids using propagation effects of radiowaves or other waves caused in the fluid itself, e.g. by laser anemometer, by ultrasonic flowmeter with “sing-around-system”. **[4]**
(2) Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 **Details of instruments**

1/02 . Housings

1/04 . Special adaptations of driving means

1/07 . Indicating devices, e.g. for remote indication (indicating working conditions of vehicles G07C 5/00) **[3]**

1/08 . . Arrangements of scales, pointers, lamps, or acoustic indicators, e.g. in automobile speedometers

1/10 . . . for indicating predetermined speeds

1/11 . . . . by the detection of the position of the indicator needle **[3]**

1/12 . Recording devices (registering working conditions of vehicles G07C 5/00) **[3]**

1/14 . . for permanent recording **[3]**

1/16 . . for erasable recording, e.g. magnetic recording **[3]**

3/00 **Measuring linear or angular speed**; **Measuring differences of linear or angular speeds** (G01P 5/00 to G01P 11/00 take precedence; counting mechanisms G06M)

Note

Groups G01P 3/02 to G01P 3/64 are distinguished by the method of measurement which is of major importance. Thus the mere application of other methods for giving a final indication does not affect the classification.

3/02 . Devices characterised by the use of mechanical means

3/04 . . by comparing two speeds

3/06 . . . using a friction gear

3/08 . . . using differential gearing

3/10 . . by actuating an indicating element, e.g. pointer, for a fixed time

3/12 . . by making use of a system excited by impact

3/14 . . by exciting one or more mechanical resonance systems

3/16 . . by using centrifugal forces of solid masses (governors G05D 13/00)

3/18 . . . transferred to the indicator by mechanical means

3/20 . . . transferred to the indicator by fluid means

3/22 . . . transferred to the indicator by electric or magnetic means

3/24 . . by using friction effects (G01P 3/06 takes precedence)

3/26 . Devices characterised by the use of fluids

3/28 . . by using pumps

3/30 . . by using centrifugal forces of fluids

3/32 . . . in a rotary container communicating with a fixed container

3/34 . . by using friction effects

3/36 . Devices characterised by the use of optical means, e.g. using infra-red, visible, or ultra-violet light (G01P 3/68 takes precedence; gyrometers using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams, G01C 19/64)

3/38 . . using photographic means

3/40 . . using stroboscopic means

3/42 . Devices characterised by the use of electric or magnetic means (G01P 3/66 takes precedence; measuring electric or magnetic values in general G01R)

3/44 . . for measuring angular speed (G01P 3/56 takes precedence)

3/46 . . . by measuring amplitude of generated current or voltage

3/48 . . . by measuring frequency of generated current or voltage

3/481 . . . . of pulse signals **[3]**

3/482 . . . . . delivered by nuclear radiation detectors **[3]**

3/483 . . . . . delivered by variable capacitance detectors **[3]**

3/484 . . . . . delivered by contact-making switches **[3]**

3/486 . . . . . delivered by photo-electric detectors **[3]**

3/487 . . . . . delivered by rotating magnets **[3]**

3/488 . . . . . delivered by variable reluctance detectors **[3]**

3/489 . . . . . Digital circuits therefor **[3]**

3/49 . . . using eddy currents

3/495 . . . . where the indicating means responds to forces produced by the eddy currents and the generating magnetic field **[3]**

3/50 . . for measuring linear speed (G01P 3/56 takes precedence)

3/52 . . . by measuring amplitude of generated current or voltage

3/54 . . . by measuring frequency of generated current or voltage

3/56 . . for comparing two speeds

3/58 . . . by measuring or comparing amplitudes of generated currents or voltages

3/60 . . . by measuring or comparing frequency of generated currents or voltages

3/62 . Devices characterised by the determination of the variation of atmospheric pressure with height to measure the vertical components of speed (measuring pressure in general G01L)

3/64 . Devices characterised by the determination of the time taken to traverse a fixed distance

3/66 . . using electric or magnetic means (G01P 3/80 takes precedence; measuring short time intervals G04F) **[4]**

3/68 . . using optical means, i.e. using infra-red, visible, or ultra-violet light (G01P 3/80 takes precedence) **[4]**

3/80 . . using auto-correlation or cross-correlation detection means **[4]**

5/00 **Measuring speed of fluids, e.g. of air stream**; **Measuring speed of bodies relative to fluids, e.g. of ship, of aircraft** (application of speed-measuring devices for measuring volume of fluids G01F)

5/01 . by using swirlflowmeter **[3]**

5/02 . by measuring forces exerted by the fluid on solid bodies, e.g. anemometer

5/04 . . using deflection of baffle-plates

5/06 . . using rotation of vanes (measuring speed of rotating shafts G01P 3/00)

5/07 . . . with electrical coupling to the indicating device **[3]**

5/08 . by measuring variation of an electric variable directly affected by the flow, e.g. by using dynamo-electric effect

5/10 . by measuring thermal variables

5/12 . . using variation of resistance of a heated conductor

5/14 . by measuring differences of pressure in the fluid

5/16 . . using Pitot tubes

5/165 . . . Arrangements or constructions of Pitot tubes **[3]**

5/17 . . . Coupling arrangements to the indicating device **[3]**

5/175 . . . . with the determination of Mach number (analogue computers therefor G06G 7/57) **[3]**

5/18 . by measuring the time taken by the fluid to traverse a fixed distance **[1,7]**

5/20 . . using particles entrained by a fluid stream (G01P 5/22 takes precedence) **[4]**

5/22 . . using auto-correlation or cross-correlation detection means **[4]**

5/24 . by measuring the direct influence of the streaming fluid on the properties of a detecting acoustical wave **[7]**

5/26 . by measuring the direct influence of the streaming fluid on the properties of a detecting optical wave **[7]**

7/00 **Measuring speed by integrating acceleration** (measuring travelled distance by double integration of acceleration G01C 21/16)

9/00 **Measuring speed by using gyroscopic effect, e.g. using gas, using electron beam** (gyroscopes or turn-sensitive devices per se G01C 19/00)

9/02 . using rotary gyroscopes

9/04 . using turn-sensitive devices with vibrating masses, e.g. tuning-fork

11/00 **Measuring average value of speed** (by determining time taken to traverse a fixed distance G01P 3/64, G01P 5/18)

11/02 . Measuring average speed of a number of bodies, e.g. of vehicles for traffic control

13/00 **Indicating or recording presence, absence, or direction, of movement** (counting moving objects G06M 7/00; electric switches H01H)

13/02 . Indicating direction only, e.g. by weather vane

13/04 . . Indicating positive or negative direction of a linear movement or clockwise or anti-clockwise direction of a rotational movement **[3]**

15/00 **Measuring acceleration**; **Measuring deceleration**; **Measuring shock, i.e. sudden change of acceleration**

15/02 . by making use of inertia forces (G01P 15/14, G01P 15/18 take precedence) **[1,7]**

15/03 . . by using non-electrical means **[3]**

15/04 . . for indicating maximum value

15/06 . . . using members subjected to a permanent deformation

15/08 . . with conversion into electric or magnetic values

15/09 . . . by piezo-electric pick-up **[3]**

15/093 . . . by photoelectric pick-up **[7]**

15/097 . . . by vibratory elements **[7]**

15/10 . . . . by vibratory strings

15/105 . . . by magnetically sensitive devices **[7]**

15/11 . . . . by inductive pick-up **[3]**

15/12 . . . by alteration of electrical resistance

15/125 . . . by capacitive pick-up **[3]**

15/13 . . . by measuring the force required to restore a proofmass subjected to inertial forces to a null position **[3]**

15/135 . . . by making use of contacts which are actuated by a movable inertial mass **[3]**

15/14 . by making use of gyroscopes (G01P 15/18 takes precedence; gyroscopes per se G01C 19/00) **[1,7]**

15/16 . by evaluating the time-derivative of a measured speed signal (G01P 15/18 takes precedence) **[3,7]**

15/18 . in two or more dimensions **[7]**

21/00 **Testing or calibrating of apparatus or devices covered by the other groups of this subclass**

21/02 . of speedometers

G01Q **SCANNING-PROBE TECHNIQUES OR APPARATUS**; **APPLICATIONS OF SCANNING-PROBE TECHNIQUES, E.G. SCANNING-PROBE MICROSCOPY [SPM] [2010.01]**

Note

In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[2010.01]**

10/00 **Scanning or positioning arrangements, i.e. arrangements for actively controlling the movement or position of the probe [2010.01]**

10/02 . Coarse scanning or positioning **[2010.01]**

10/04 . Fine scanning or positioning **[2010.01]**

10/06 . . Circuits or algorithms therefor **[2010.01]**

20/00 Monitoring the movement or position of the probe [2010.01]

20/02 . by optical means **[2010.01]**

20/04 . Self-detecting probes, i.e. wherein the probe itself generates a signal representative of its position, e.g. piezo-electric gauge **[2010.01]**

30/00 Auxiliary means serving to assist or improve the scanning probe techniques or apparatus, e.g. display or data processing devices [2010.01]

30/02 . Non-SPM analysing devices, e.g. SEM [Scanning Electron Microscope], spectrometer or optical microscope **[2010.01]**

30/04 . Display or data processing devices **[2010.01]**

30/06 . . for error compensation **[2010.01]**

30/08 . Means for establishing or regulating a desired environmental condition within a sample chamber **[2010.01]**

30/10 . . Thermal environment **[2010.01]**

30/12 . . Fluid environment **[2010.01]**

30/14 . . . Liquid environment **[2010.01]**

30/16 . . Vacuum environment **[2010.01]**

30/18 . Means for protecting or isolating the interior of a sample chamber from external environmental conditions or influences, e.g. vibrations or electromagnetic fields **[2010.01]**

30/20 . Sample handling devices or methods **[2010.01]**

40/00 Calibration, e.g. of probes [2010.01]

40/02 . Calibration standards or methods of fabrication thereof **[2010.01]**

60/00 Particular types of SPM [Scanning-Probe Microscopy] or apparatus therefor; Essential components thereof [2010.01]

60/02 . Multiple-type SPM, i.e. involving two or more SPM techniques **[2010.01]**

60/04 . . STM [Scanning Tunnelling Microscopy] combined with AFM [Atomic Force Microscopy] **[2010.01]**

60/06 . . SNOM [Scanning Near-field Optical Microscopy] combined with AFM [Atomic Force Microscopy] **[2010.01]**

60/08 . . MFM [Magnetic Force Microscopy] combined with AFM [Atomic Force Microscopy] **[2010.01]**

60/10 . STM [Scanning Tunnelling Microscopy] or apparatus therefor, e.g. STM probes **[2010.01]**

60/12 . . STS [Scanning Tunnelling Spectroscopy] **[2010.01]**

60/14 . . STP [Scanning Tunnelling Potentiometry] **[2010.01]**

60/16 . . Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**

60/18 . SNOM [Scanning Near-Field Optical Microscopy] or apparatus therefor, e.g. SNOM probes **[2010.01]**

60/20 . . Fluorescence **[2010.01]**

60/22 . . Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**

60/24 . AFM [Atomic Force Microscopy] or apparatus therefor, e.g. AFM probes **[2010.01]**

60/26 . . Friction force microscopy **[2010.01]**

60/28 . . Adhesion force microscopy **[2010.01]**

60/30 . . Scanning potential microscopy **[2010.01]**

60/32 . . AC mode **[2010.01]**

60/34 . . . Tapping mode **[2010.01]**

60/36 . . DC mode **[2010.01]**

60/38 . . Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**

60/40 . . . Conductive probes **[2010.01]**

60/42 . . . Functionalisation **[2010.01]**

60/44 . SICM [Scanning Ion-Conductance Microscopy] or apparatus therefor, e.g. SICM probes **[2010.01]**

60/46 . SCM [Scanning Capacitance Microscopy] or apparatus therefor, e.g. SCM probes **[2010.01]**

60/48 . . Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**

60/50 . MFM [Magnetic Force Microscopy] or apparatus therefor, e.g. MFM probes **[2010.01]**

60/52 . . Resonance **[2010.01]**

60/54 . . Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**

60/56 . . . Probes with magnetic coating **[2010.01]**

60/58 . SThM [Scanning Thermal Microscopy] or apparatus therefor, e.g. SThM probes **[2010.01]**

60/60 . SECM [Scanning Electro-Chemical Microscopy] or apparatus therefor, e.g. SECM probes **[2010.01]**

70/00 General aspects of SPM probes, their manufacture or their related instrumentation, insofar as they are not specially adapted to a single SPM technique covered by group G01Q 60/00 [2010.01]

70/02 . Probe holders **[2010.01]**

70/04 . . with compensation for temperature or vibration induced errors **[2010.01]**

70/06 . Probe tip arrays **[2010.01]**

70/08 . Probe characteristics **[2010.01]**

70/10 . . Shape or taper **[2010.01]**

70/12 . . . Nano-tube tips **[2010.01]**

70/14 . . Particular materials **[2010.01]**

70/16 . Probe manufacture **[2010.01]**

70/18 . . Functionalisation **[2010.01]**

80/00 Applications, other than SPM, of scanning-probe techniques (manufacture or treatment of micro-structures B81C; manufacture or treatment of nano-structures B82B 3/00; recording or reproducing information using near-field interaction G11B 9/12, G11B 11/24 or G11B 13/08) **[2010.01]**

90/00 Scanning-probe techniques or apparatus not otherwise provided for [2010.01]

G01R **MEASURING ELECTRIC VARIABLES**; **MEASURING MAGNETIC VARIABLES** (measuring physical variables of any kind by conversion into electric variables, see Note (4) following the title of class G01; measuring diffusion of ions in an electric field, e.g. electrophoresis, electro-osmosis, G01N; investigating non-electric or non-magnetic properties of materials by using electric or magnetic methods G01N; indicating correct tuning of resonant circuits H03J 3/12; monitoring electronic pulse counters H03K 21/40; monitoring operation of communication systems H04)

(1) This subclass covers:
- measuring all kinds of electric or magnetic variables directly or by derivation from other electric or magnetic variables;
- measuring all kinds of electric or magnetic properties of materials;
- testing electric or magnetic devices, apparatus or networks (e.g. discharge tubes, amplifiers) or measuring their characteristics;
- indicating presence or sign of current or voltage;
- NMR, EPR or other spin-effect apparatus, not specially adapted for a particular application; **[5]**
- equipment for generating signals to be used for carrying out such tests and measurements.

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "measuring" includes investigating;
- "instruments" or "measuring instruments" means electro-mechanical measuring mechanisms;
- "arrangements for measuring" means apparatus, circuits, or methods for measuring;

(3) Attention is drawn to the Notes following the title of class G01.

(4) In this subclass, instruments or arrangements for measuring electric variables are classified in the following way: **[8]**
- Electromechanical instruments where the measured electric variables direcly effect the indication of the measured value, including combined effects of two or more values, are classified in groups G01R 5/00 to G01R 11/00. **[8]**
- Details common to different types of the instruments covered by groups G01R 5/00 to G01R 11/00 are classified in group G01R 1/00. **[8]**
- Arrangements involving circuitry to obtain an indication of a measured value by deriving, calculating or otherwise processing electric variables, e.g. by comparison with another value, are classified in groups G01R 17/00 to G01R 29/00. **[8]**
- Details common to different types of arrangements covered by groups G01R 17/00 to G01R 29/00 are classified in group G01R 15/00. **[8]**

(5) In this subclass, group G01R 17/00 takes precedence over groups G01R 19/00 to G01R 31/00.

Subclass index

1/00 **Details of instruments or arrangements of the types included in groups G01R 5/00 to G01R 13/00 and G01R 31/00** (constructional details particular to arrangements for measuring the electric consumption G01R 11/02) **[3,8]**

1/02 . General constructional details (details of a kind applicable to measuring arrangements not specially adapted for a specific variable G01D 7/00)

1/04 . . Housings; Supporting members; Arrangements of terminals

1/06 . . Measuring leads; Measuring probes (G01R 19/145, G01R 19/165 take precedence; end pieces for leads H01R 11/00) **[3]**

1/067 . . . Measuring probes **[3]**

1/07 . . . . Non contact-making probes **[6]**

1/073 . . . . Multiple probes **[3]**

1/08 . . Pointers; Scales, Scale illumination

1/10 . . Arrangements of bearings

1/12 . . . of strip or wire bearings

1/14 . . Braking arrangements; Damping arrangements

1/16 . . Magnets

1/18 . . Screening arrangements against electric or magnetic fields, e.g. against earth's field

1/20 . Modifications of basic electric elements for use in electric measuring instruments; Structural combinations of such elements with such instruments

1/22 . . Tong testers acting as secondary windings of current transformers (voltage or current isolation using transformers G01R 15/18)

1/24 . . Transmission-line, e.g. waveguide, measuring sections, e.g. slotted section

1/26 . . . with linear movement of probe

1/28 . Provision in measuring instruments for reference values, e.g. standard voltage, standard waveform

1/30 . Structural combination of electric measuring instruments with basic electronic circuits, e.g. with amplifier

1/36 . Overload-protection arrangements or circuits for electric measuring instruments

1/38 . Arrangements for altering the indicating characteristic, e.g. by modifying the air gap (circuits G01D 3/02)
1/40 . Modifications of instruments to indicate the maximum or the minimum value reached in a time interval, e.g. by maximum indicator pointer **[3]**
1/42 . . thermally operated
1/44 . Modifications of instruments for temperature compensation **[2]**

3/00 Apparatus or processes specially adapted for the manufacture of measuring instruments

5/00 Instruments for converting a single current or a single voltage into a mechanical displacement (vibration galvanometers G01R 9/02)
5/02 . Moving-coil instruments
5/04 . . with magnet external to the coil
5/06 . . with core magnet
5/08 . . specially adapted for wide angle deflection; with eccentrically-pivoted moving coil
5/10 . String galvanometers
5/12 . Loop galvanometers
5/14 . Moving-iron instruments
5/16 . . with pivoting magnet
5/18 . . with pivoting soft iron, e.g. needle galvanometer
5/20 . Induction instruments e.g. Ferraris instruments
5/22 . Thermoelectric instruments (measuring effective values of currents or voltages using thermoconverters G01R 19/03)
5/24 . . operated by elongation of a strip or wire or by expansion of a gas or fluid
5/26 . . operated by deformation of a bimetallic element
5/28 . Electrostatic instruments (combined with radiation detector G01T)
5/30 . . Leaf electrometers
5/32 . . Wire electrometers; Needle electrometers
5/34 . . Quadrant electrometers

7/00 Instruments capable of converting two or more currents or voltages into a single mechanical displacement (G01R 9/00 takes precedence)
7/02 . for forming a sum or a difference
7/04 . for forming a quotient (for measuring resistance G01R 27/08)
7/06 . . moving-iron type
7/08 . . moving-coil type, e.g. crossed-coil type
7/10 . . . having more than two moving coils
7/12 . for forming product
7/14 . . moving-iron type
7/16 . . having both fixed and moving coils, i.e. dynamometers
7/18 . . . with iron core magnetically coupling fixed and moving coils

9/00 Instruments employing mechanical resonance
9/02 . Vibration galvanometers, e.g. for measuring current
9/04 . using vibrating reeds, e.g. for measuring frequency
9/06 . . magnetically driven
9/08 . . piezo-electrically driven

11/00 Electromechanical arrangements for measuring time integral of electric power or current, e.g. of consumption (monitoring electric consumption of electrically-propelled vehicles B60L 3/00)
11/02 . Constructional details (applicable to electric measuring instruments in general G01R 1/00)
11/04 . . Housings; Supporting racks; Arrangements of terminals
11/06 . . Magnetic circuits of induction meters **[2]**
11/067 . . . Coils therefor **[2]**
11/073 . . . Armatures therefor **[2]**
11/09 . . . . Disc armatures **[2]**
11/10 . . Braking magnets; Damping arrangements
11/12 . . Arrangements of bearings
11/14 . . . with magnetic relief
11/16 . . Adaptations of counters to electricity meters
11/17 . . Compensating for errors; Adjusting or regulating means therefor **[2]**
11/18 . . . Compensating for variations in ambient conditions **[2]**
11/185 . . . . Temperature compensation **[2]**
11/19 . . . Compensating for errors caused by disturbing torque, e.g. rotating-field errors of polyphase meters **[2]**
11/20 . . . Compensating for phase errors in induction meters **[2]**
11/21 . . . Compensating for errors caused by damping effects of the current, e.g. adjustment in the overload range **[2]**
11/22 . . . Adjusting torque, e.g. adjusting starting torque, adjusting of polyphase meters for obtaining equal torques **[2]**
11/23 . . . Compensating for errors caused by friction, e.g. adjustment in the light-load range **[2]**
11/24 . . Arrangements for avoiding or indicating fraudulent use **[4]**
11/25 . . Arrangements for indicating or signalling faults **[2,4]**

Note

Groups G01R 11/48 to G01R 11/56 take precedence over groups G01R 11/30 to G01R 11/46. **[4]**

11/30 . Dynamo-electric motor meters
11/32 . . Watt-hour meters
11/34 . . Ampère-hour meters
11/36 . Induction meters, e.g. Ferraris meters (Ferraris instruments G01R 5/20)
11/38 . . for single-phase operation
11/40 . . for polyphase operation
11/42 . . . Circuitry therefor
11/46 . Electrically-operated clockwork meters; Oscillatory meters; Pendulum meters
11/48 . Meters specially adapted for measuring real or reactive components; Meters specially adapted for measuring apparent energy
11/50 . . for measuring real component
11/52 . . for measuring reactive component
11/54 . . for measuring simultaneously at least two of the following three variables: real component, reactive component, apparent energy
11/56 . Special tariff meters
11/57 . . Multi-rate meters (G01R 11/63 takes precedence) **[2]**
11/58 . . . Tariff-switching devices therefor **[2]**
11/60 . . Subtraction meters; Meters measuring maximum or minimum-load hours
11/63 . . Over-consumption meters, e.g. measuring consumption while a predetermined level of power is exceeded **[2]**

11/64 . . Maximum meters, e.g. tariff for a period is based on maximum demand within that period

11/66 . . . Circuitry

13/00 Arrangements for displaying electric variables or waveforms (display by mechanical displacement only G01R 5/00, G01R 7/00, G01R 9/00; recording frequency spectrum G01R 23/18) **[4]**

13/02 . for displaying measured electric variables in digital form (counters G06M; analogue/digital conversion in general H03M 1/00) **[4]**

13/04 . for producing permanent records **[4]**

13/06 . . Modifications for recording transient disturbances, e.g. by starting or accelerating a recording medium

13/08 . . Electromechanical recording system using a mechanical direct-writing method

13/10 . . . with intermittent recording by representing the variable by the length of a stroke or by the position of a dot

13/12 . . Chemical recording, e.g. clydonographs (G01R 13/14 takes precedence)

13/14 . . Recording on a light-sensitive material

13/16 . . Recording on a magnetic medium

13/18 . . . using boundary displacement

13/20 . Cathode-ray oscilloscopes (cathode-ray tubes H01J 31/00)

13/22 . . Circuits therefor (circuits for generating pulses, e.g. sawtooth waveforms H03K 3/00)

13/24 . . . Time-base deflection circuits

13/26 . . . Circuits for controlling the intensity of the electron beam (brilliance control H01J 29/98)

13/28 . . . Circuits for simultaneous or sequential presentation of more than one variable (electronic switches H03K 17/00)

13/30 . . . Circuits for inserting reference markers, e.g. for timing, for calibrating, for frequency marking

13/32 . . . Circuits for displaying non-recurrent functions such as transients; Circuits for triggering; Circuits for synchronisation; Circuits for time-base expansion

13/34 . . . Circuits for representing a single waveform by sampling, e.g. for very high frequencies (sample-and-hold arrangements G11C 27/02) **[2]**

13/36 . using length of glow discharge, e.g. glowlight oscilloscopes (discharge tubes H01J) **[4]**

13/38 . using the steady or oscillatory displacement of a light beam by an electromechanical measuring system (such measuring systems per se G01R 5/00, G01R 7/00, G01R 9/00) **[4]**

13/40 . using modulation of a light beam otherwise than by mechanical displacement, e.g. by Kerr effect **[4]**

13/42 . Instruments using length of spark discharge, e.g. by measuring maximum separation of electrodes to produce spark

15/00 Details of measuring arrangements of the types provided for in groups G01R 17/00 to G01R 29/00, G01R 33/00 to G01R 33/26 and G01R 35/00 (details of instruments G01R 1/00; measuring leads, measuring probes G01R 1/06; overload protection arrangements G01R 1/36; circuits for correcting the transfer function G01D 3/02) **[1,8]**

15/04 . Voltage dividers **[6]**

15/06 . . having reactive components, e.g. capacitive transformer **[6]**

15/08 . Circuits for altering the measuring range

15/09 . . Autoranging circuits **[6]**

15/12 . Circuits for multi-testers, e.g. for measuring voltage, current, or impedance at will

15/14 . Adaptations providing voltage or current isolation, e.g. for high-voltage or high-current networks (voltage dividers G01R 15/04) **[6]**

15/16 . . using capacitive devices **[6]**

15/18 . . using inductive devices, e.g. transformers **[6]**

15/20 . . using galvano-magnetic devices, e.g. Hall-effect devices **[6]**

15/22 . . using light-emitting devices, e.g. LED, optocouplers **[6]**

15/24 . . using light-modulating devices **[6]**

15/26 . . using modulation of waves other than light, e.g. radio or acoustic waves **[6]**

17/00 Measuring arrangements involving comparison with a reference value, e.g. bridge

17/02 . Arrangements in which the value to be measured is automatically compared with a reference value

17/04 . . in which the reference value is continuously or periodically swept over the range of values to be measured

17/06 . . Automatic balancing arrangements

17/08 . . . in which a force or torque representing the measured value is balanced by a force or torque representing the reference value

17/10 . ac or dc measuring bridges (automatic comparison or re-balancing arrangements G01R 17/02)

17/12 . . using comparison of currents, e.g. bridges with differential current output

17/14 . . with indication of measured value by calibrated null indicator, e.g. percent bridge, tolerance bridge (G01R 17/12, G01R 17/16 take precedence)

17/16 . . with discharge tubes or semiconductor devices in one or more arms of the bridge, e.g. voltmeter using a difference amplifier

17/18 . . with more than four branches

17/20 . ac or dc potentiometric measuring arrangements (automatic comparison or re-balancing arrangements G01R 17/02)

17/22 . . with indication of measured value by calibrated null indicator

19/00 Arrangements for measuring currents or voltages or for indicating presence or sign thereof (G01R 5/00 takes precedence; for measuring bioelectric currents or voltages A61B 5/04) **[4]**

Note

Within groups G01R 19/02 to G01R 19/32, group G01R 19/28 takes precedence. Groups G01R 19/18 to G01R 19/25 take precedence over groups G01R 19/02 to G01R 19/165 and G01R 19/30. **[3]**

19/02 . Measuring effective values, i.e. root-mean-square values

19/03 . . using thermoconverters **[4]**

19/04 . Measuring peak values of ac or of pulses **[2]**

19/06 . Measuring real component; Measuring reactive component

19/08 . Measuring current density

19/10 . Measuring sum, difference, or ratio

19/12 . Measuring rate of change

19/14 . Indicating direction of current; Indicating polarity of voltage

19/145 . Indicating the presence of current or voltage **[3]**

19/15 . . Indicating the presence of current **[3]**

19/155 . . Indicating the presence of voltage **[3]**
19/165 . Indicating that current or voltage is either above or below a predetermined value or within or outside a predetermined range of values (circuits with regenerative action, e.g. Schmitt trigger H03K 3/00; threshold switches H03K 17/00) **[3]**
19/17 . . giving an indication of the number of times this occurs **[3]**
19/175 . Indicating the instants of passage of current or voltage through a given value, e.g. passage through zero **[3]**
19/18 . using conversion of dc into ac, e.g. with choppers
19/20 . . using transductors
19/22 . using conversion of ac into dc
19/25 . using digital measurement techniques (arrangements for displaying measured electric variables in digital form G01R 13/02) **[3]**
19/252 . . using analogue/digital converters of the type with conversion of voltage or current into frequency and measuring of this frequency **[4]**
19/255 . . using analogue/digital converters of the type with counting of pulses during a period of time proportional to voltage or current, delivered by a pulse generator with fixed frequency **[4]**
19/257 . . using analogue/digital converters of the type with comparison of different reference values with the value of voltage or current, e.g. using step-by-step method **[4]**
19/28 . adapted for measuring in circuits having distributed constants
19/30 . Measuring the maximum or the minimum value of current or voltage reached in a time interval (G01R 19/04 takes precedence; modifications of instruments to indicate the maximum or the minimum value reached in a time interval G01R 1/40) **[2,3]**
19/32 . Compensating for temperature change (modifications of instruments for temperature compensation G01R 1/44) **[2]**

21/00 Arrangements for measuring electric power or power factor (G01R 7/12 takes precedence) **[4]**
21/01 . in circuits having distributed constants (G01R 21/04, G01R 21/07, G01R 21/09, G01R 21/12 take precedence) **[2]**
21/02 . by thermal methods **[2]**
21/04 . . in circuits having distributed constants
21/06 . by measuring current and voltage (G01R 21/08 to G01R 21/133 take precedence) **[4]**
21/07 . . in circuits having distributed constants (G01R 21/09 takes precedence) **[2]**
21/08 . by using galvanomagnetic-effect devices, e.g. Hall-effect devices (such devices per se H01L) **[2]**
21/09 . . in circuits having distributed constants **[2]**
21/10 . by using square-law characteristics of circuit elements, e.g. diodes, to measure power absorbed by loads of known impedance (G01R 21/02 takes precedence) **[2]**
21/12 . . in circuits having distributed constants
21/127 . by using pulse modulation (G01R 21/133 takes precedence) **[4]**
21/133 . by using digital technique **[4]**
21/14 . Compensating for temperature change **[2]**

22/00 Arrangements for measuring time integral of electric power or current, e.g. electricity meters (electromechanical arrangements therefor G01R 11/00; monitoring electric consumption of electrically-propelled vehicles B60L 3/00) **[4,8]**

Note

An arrangement for measuring time integral of electric power is classified in group G01R 21/00 if the essential characteristic is the measuring of electric power. **[4]**

22/02 . by electrolytic methods **[4]**
22/04 . by calorimetric methods **[4]**
22/06 . by electronic methods **[8]**
22/08 . . using analogue techniques **[8]**
22/10 . . using digital techniques **[8]**

23/00 Arrangements for measuring frequencies; **Arrangements for analysing frequency spectra** (frequency discriminators H03D)
23/02 . Arrangements for measuring frequency, e.g. pulse repetition rate; Arrangements for measuring period of current or voltage (measuring short time intervals G04F)
23/04 . . adapted for measuring in circuits having distributed constants
23/06 . . by converting frequency into an amplitude of current or voltage
23/07 . . . using response of circuits tuned on resonance, e.g. grid-drip meter **[2]**
23/08 . . . using response of circuits tuned off resonance
23/09 . . . using analogue integrators, e.g. capacitors establishing a mean value by balance of input signals and defined discharge signals or leakage (radiation-measuring instruments in which pulses generated by a radiation detector are integrated G01T 1/15) **[2]**
23/10 . . by converting frequency into a train of pulses, which are then counted
23/12 . . by converting frequency into phase shift
23/14 . . by heterodyning; by beat-frequency comparison (generation of oscillations by beating unmodulated signals of different frequencies H03B 21/00) **[2]**
23/15 . . Indicating that frequency of pulses is either above or below a predetermined value or within or outside a predetermined range of values, by making use of non-linear or digital elements **[3]**
23/16 . Spectrum analysis; Fourier analysis
23/163 . . adapted for measuring in circuits having distributed constants **[3]**
23/165 . . using filters **[3]**
23/167 . . . with digital filters **[3]**
23/17 . . with optical auxiliary devices **[3]**
23/173 . . Wobbulating devices similar to swept panoramic receivers (panoramic receivers per se H03J 7/32) **[3]**
23/175 . . by delay means, e.g. tapped delay lines **[3]**
23/177 . . Analysis of very low frequencies **[3]**
23/18 . . with provision for recording frequency spectrum
23/20 . . Measurement of non-linear distortion

25/00 Arrangements for measuring phase angle between a voltage and a current or between voltages or currents (measuring power factor G01R 21/00; measuring position of individual pulses in a pulse train G01R 29/02; phase discriminators H03D) **[2]**
25/02 . in circuits having distributed constants
25/04 . involving adjustment of a phase shifter to produce a predetermined phase difference, e.g. zero difference
25/06 . employing quotient instrument
25/08 . by counting of standard pulses (measuring time intervals G04F) **[2]**

27/00 Arrangements for measuring resistance, reactance, impedance, or electric characteristics derived therefrom

27/02 . Measuring real or complex resistance, reactance, impedance, or other two-pole characteristics derived therefrom, e.g. time constant (by measuring phase angle only G01R 25/00)

27/04 . . in circuits having distributed constants

27/06 . . . Measuring reflection coefficients; Measuring standing-wave ratio

27/08 . . Measuring resistance by measuring both voltage and current

27/10 . . . using two-coil or crossed-coil instruments forming quotient

27/12 . . . . using hand generators, e.g. meggers

27/14 . . Measuring resistance by measuring current or voltage obtained from a reference source (G01R 27/16, G01R 27/20, G01R 27/22 take precedence)

27/16 . . Measuring impedance of element or network through which a current is passing from another source, e.g. cable, power line

27/18 . . . Measuring resistance to earth

27/20 . . Measuring earth resistance; Measuring contact resistance of earth connections, e.g. plates

27/22 . . Measuring resistance of fluids (measuring vessels, electrodes therefor G01N 27/07)

27/26 . . Measuring inductance or capacitance; Measuring quality factor, e.g. by using the resonance method; Measuring loss factor; Measuring dielectric constants

27/28 . Measuring attenuation, gain, phase shift, or derived characteristics of electric four-pole networks, i.e. two-port networks; Measuring transient response (in line transmission systems H04B 3/46)

27/30 . . with provision for recording characteristics, e.g. by plotting Nyquist diagram

27/32 . . in circuits having distributed constants **[2]**

29/00 Arrangements for measuring or indicating electric quantities not covered by groups G01R 19/00 to G01R 27/00

29/02 . Measuring characteristics of individual pulses, e.g. deviation from pulse flatness, rise time, duration (of amplitude G01R 19/00; of repetition rate G01R 23/00; of phase difference of two cyclic pulse trains G01R 25/00; monitoring pattern of pulse trains H03K 5/19) **[3]**

29/027 . . Indicating that a pulse characteristic is either above or below a predetermined value or within or beyond a predetermined range of values **[3]**

29/033 . . . giving an indication of the number of times this occurs **[3]**

29/04 . Measuring form factor, i.e. quotient of root-mean-square value and arithmetic mean of instantaneous value; Measuring peak factor, i.e. quotient of maximum value and root-mean-square value

29/06 . Measuring depth of modulation

29/08 . Measuring electromagnetic field characteristics

29/10 . . Radiation diagrams of aerials

29/12 . Measuring electrostatic fields

29/14 . . Measuring field distribution

29/16 . Measuring asymmetry of polyphase networks

29/18 . Indicating phase sequence; Indicating synchronism

29/20 . Measuring number of turns; Measuring transformation ratio or coupling factor of windings (calibrating instrument transformers G01R 35/02)

29/22 . Measuring piezo-electric properties

29/24 . Arrangements for measuring quantities of charge (electrostatic instruments G01R 5/28; indicating presence of current G01R 19/15; arrangements for measuring time integral of electric power or current G01R 22/00) **[2]**

29/26 . Measuring noise figure; Measuring signal-to-noise ratio **[2]**

31/00 Arrangements for testing electric properties; **Arrangements for locating electric faults**; **Arrangements for electrical testing characterised by what is being tested not provided for elsewhere** (measuring leads, measuring probes G01R 1/06; indicating electrical condition of switchgear or protective devices H01H 71/04, H01H 73/12, H02B 11/10, H02H 3/04; testing or measuring semiconductors or solid state devices during manufacture H01L 21/66; testing line transmission systems H04B 3/46)

31/01 . Subjecting similar articles in turn to test, e.g. "go/no-go" tests in mass production; Testing objects at points as they pass through a testing station (G01R 31/18 takes precedence) **[6]**

31/02 . Testing of electric apparatus, lines, or components for short-circuits, discontinuities, leakage, or incorrect line connection

31/04 . . Testing connections, e.g. of plugs, of non-disconnectable joints

31/06 . . Testing of electric windings, e.g. for polarity (measuring number of turns, transformation ratio, or coupling factor G01R 29/20)

31/07 . . Testing of fuses (means for indicating condition of fuse structurally associated with the fuse H01H 85/30) **[6]**

31/08 . Locating faults in cables, transmission lines, or networks (emergency protective circuit arrangements H02H)

31/10 . . by increasing destruction at fault, e.g. burning-in by using a pulse generator operating a special programme

31/11 . . using pulse-reflection methods

31/12 . Testing dielectric strength or breakdown voltage

31/14 . . Circuits therefor

31/16 . . Construction of testing vessels; Electrodes therefor

31/18 . . Subjecting similar articles in turn to test, e.g. "go/no-go" tests in mass production

31/20 . . Preparation of articles or specimens to facilitate testing

31/24 . Testing of discharge tubes (during manufacture H01J 9/42) **[2]**

31/25 . . Testing of vacuum tubes **[2]**

31/26 . Testing of individual semiconductor devices (measurement of impurity content of materials G01N) **[2]**

31/265 . . Contactless testing **[6]**

31/27 . . Testing of devices without physical removal from the circuit of which they form part, e.g. compensating for effects due to surrounding elements **[6]**

31/28 . Testing of electronic circuits, e.g. by signal tracer (testing for short-circuits, discontinuities, leakage or incorrect line connection G01R 31/02; checking computers G06F 11/00; checking static stores for correct operation or testing static stores during standby or offline operation G11C 29/00)

31/30 . . Marginal testing, e.g. by varying supply voltage (marginal testing of computers G06) **[2]**

31/302 . . Contactless testing (non contact-making probes G01R 1/07) **[5]**
31/303 . . . of integrated circuits (G01R 31/305 to G01R 31/315 take precedence) **[6]**
31/304 . . . of printed or hybrid circuits (G01R 31/305 to G01R 31/315 take precedence) **[6]**
31/305 . . . using electron beams **[5]**
31/306 . . . . of printed or hybrid circuits **[6]**
31/307 . . . . of integrated circuits **[6]**
31/308 . . . using non-ionising electromagnetic radiation, e.g. optical radiation **[5]**
31/309 . . . . of printed or hybrid circuits **[6]**
31/311 . . . . of integrated circuits **[6]**
31/312 . . . by capacitive methods **[5]**
31/315 . . . by inductive methods **[5]**
31/316 . . Testing of analog circuits **[6]**
31/3161 . . . Marginal testing **[6]**
31/3163 . . . Functional testing **[6]**
31/3167 . . Testing of combined analog and digital circuits **[6]**
31/317 . . Testing of digital circuits **[6]**
31/3173 . . . Marginal testing **[6]**
31/3177 . . . Testing of logic operation, e.g. by logic analysers **[6]**
31/3181 . . . Functional testing (G01R 31/3177 takes precedence) **[6]**
31/3183 . . . . Generation of test inputs, e.g. test vectors, patterns or sequences **[6]**
31/3185 . . . . Reconfiguring for testing, e.g. LSSD, partitioning **[6]**
31/3187 . . . . Built-in tests **[6]**
31/319 . . . . Tester hardware, i.e. output processing circuits **[6]**
31/3193 . . . . . with comparison between actual response and known fault-free response **[6]**
31/327 . Testing of circuit interrupters, switches or circuit-breakers (structural association with switches H01H) **[6]**
31/333 . . Testing of the switching capacity of high-voltage circuit-breakers (means for detecting the presence of an arc or discharge in switching devices H01H 9/50, H01H 33/26) **[6]**
31/34 . Testing dynamo-electric machines (testing electric windings G01R 31/06; methods or apparatus specially adapted for manufacturing, assembling, maintaining or repairing dynamo-electric machines H02K 15/00) **[3]**
31/36 . Apparatus for testing electrical condition of accumulators or electric batteries, e.g. capacity or charge condition (accumulators combined with arrangements for measuring, testing or indicating condition H01M 10/48; circuit arrangements for charging, or depolarising batteries or for supplying loads from batteries H02J 7/00) **[3]**
31/40 . Testing power supplies **[6]**
31/42 . . AC power supplies **[6]**
31/44 . Testing lamps (discharge lamps G01R 31/24; structurally associated with light source circuit arrangements for detecting lamp failure H05B 37/03) **[6]**

33/00 Arrangements or instruments for measuring magnetic variables

33/02 . Measuring direction or magnitude of magnetic fields or magnetic flux (G01R 33/20 takes precedence; measuring direction or magnitude of the earth's field for navigation or surveying G01C; for prospecting, for measuring the magnetic field of the earth G01V 3/00) **[4]**
33/022 . . Measuring gradient **[3]**

Note

Group G01R 33/022 or group G01R 33/10 takes precedence over groups G01R 33/025 to G01R 33/06.

33/025 . . Compensating stray fields **[3]**
33/028 . . Electrodynamic magnetometers **[3]**
33/032 . . using magneto-optic devices, e.g. Faraday **[3]**
33/035 . . using superconductive devices **[3]**
33/038 . . using permanent magnets, e.g. balances, torsion devices **[3]**
33/04 . . using the flux-gate principle
33/05 . . . in thin-film element **[3]**
33/06 . . using galvano-magnetic devices
33/07 . . . Hall-effect devices **[6]**
33/09 . . . Magneto-resistive devices **[6]**
33/10 . . Plotting field distribution
33/12 . Measuring magnetic properties of articles or specimens of solids or fluids (involving magnetic resonance G01R 33/20) **[4]**
33/14 . . Measuring or plotting hysteresis curves
33/16 . . Measuring susceptibility
33/18 . . Measuring magnetostrictive properties
33/20 . involving magnetic resonance (medical aspects A61B 5/055; magnetic resonance gyrometers G01C 19/60) **[4,5]**
33/24 . . for measuring direction or magnitude of magnetic fields or magnetic flux **[4]**
33/26 . . . using optical pumping **[4]**
33/28 . . Details of apparatus provided for in groups G01R 33/44 to G01R 33/64 **[5]**
33/30 . . . Sample handling arrangements, e.g. sample cells, spinning mechanisms **[5]**
33/31 . . . . Temperature control thereof **[6]**
33/32 . . . Excitation or detection systems, e.g. using radiofrequency signals **[5]**
33/34 . . . . Constructional details, e.g. resonators **[5]**
33/341 . . . . . comprising surface coils **[6]**
33/3415 . . . . . comprising arrays of sub-coils **[6]**
33/343 . . . . . of slotted-tube or loop-gap type **[6]**
33/345 . . . . . of waveguide type (G01R 33/343 takes precedence) **[6]**
33/36 . . . . Electrical details, e.g. matching or coupling of the coil to the receiver **[5]**
33/38 . . . Systems for generation, homogenisation or stabilisation of the main or gradient magnetic field **[5]**

Note

Groups G01R 33/385 to G01R 33/389 take precedence over groups G01R 33/381 to G01R 33/383. **[6]**

33/381 . . . . using electromagnets (electromagnets per se H01F 7/06) **[6]**

33/3815 . . . . . with superconducting coils, e.g. power supply therefor (superconductive magnets H01F 6/00) **[6]**
33/383 . . . . using permanent magnets (permanent magnets per se H01F 7/02) **[6]**
33/385 . . . . using gradient magnetic field coils **[6]**
33/387 . . . . Compensation of inhomogeneities (screening G01R 33/42) **[6]**
33/3873 . . . . . using ferromagnetic bodies **[6]**
33/3875 . . . . . using correction coil assemblies, e.g. active shimming **[6]**
33/389 . . . . Field stabilisation **[6]**
33/42 . . . Screening (screening in general H05K 9/00) **[5,6]**
33/421 . . . . of main or gradient magnetic field **[6]**
33/422 . . . . of the radiofrequency field **[6]**
33/44 . . using nuclear magnetic resonance (NMR) (G01R 33/24, G01R 33/62 take precedence) **[5]**
33/46 . . . NMR spectroscopy **[5]**
33/465 . . . . applied to biological material, e.g. in vitro testing **[6]**
33/48 . . . NMR imaging systems **[5]**
33/483 . . . . with selection of signal or spectra from particular regions of the volume, e.g. in vivo spectroscopy **[6]**
33/485 . . . . . based on chemical shift information **[6]**
33/50 . . . . based on the determination of relaxation times **[5]**
33/54 . . . . Signal processing systems, e.g. using pulse sequences **[5]**
33/56 . . . . . Image enhancement or correction, e.g. subtraction or averaging techniques **[5]**
33/561 . . . . . by reduction of the scanning time, i.e. fast acquiring systems, e.g. using echo-planar pulse sequences **[6]**
33/563 . . . . . of moving material, e.g. flow-contrast angiography **[6]**
33/565 . . . . . Correction of image distortions, e.g. due to magnetic field inhomogeneities **[6]**
33/567 . . . . . gated by physiological signals **[6]**
33/58 . . . . Calibration of imaging systems, e.g. using test probes **[5]**
33/60 . . using electron paramagnetic resonance (G01R 33/24, G01R 33/62 take precedence) **[5]**
33/62 . . using double resonance (G01R 33/24 takes precedence) **[5]**
33/64 . . using cyclotron resonance (G01R 33/24 takes precedence) **[5]**

35/00 Testing or calibrating of apparatus covered by the other groups of this subclass [2]
35/02 . of auxiliary devices, e.g. of instrument transformers according to prescribed transformation ratio, phase angle, or wattage rating
35/04 . of instruments for measuring time integral of power or current
35/06 . . by stroboscopic methods

G01S RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES

(1) In this subclass, the following term is used with the meaning indicated: **[6]**
– "transponder" means an arrangement which reacts to an incoming interrogating or detecting wave by emitting a specific answering or identifying wave. **[6]**
(2) Attention is drawn to the Notes following the title of class G01 and to Note (1) following the title of subclass G09B.

Subclass index

1/00 Beacons or beacon systems transmitting signals having a characteristic or characteristics capable of being detected by non-directional receivers and defining directions, positions, or position lines fixed relatively to the beacon transmitters; Receivers co-operating therewith (position-fixing by co-ordinating a plurality of determinations of direction or position lines G01S 5/00) **[2]**
1/02 . using radio waves (G01S 19/00 takes precedence) **[1,2010.01]**
1/04 . . Details
1/06 . . . Means for providing multiple indication, e.g. coarse and fine indications
1/08 . . Systems for determining direction or position line
1/10 . . . using amplitude comparison of signals transmitted sequentially from aerials or aerial systems having differently-oriented overlapping directivity-characteristics, e.g. equi-signal A-N type

1/12 . . . . the signals being transmitted sequentially from an aerial or aerial system having the orientation of its directivity characteristic periodically varied, e.g. by means of sequentially effective reflectors

1/14 . . . using amplitude comparison of signals transmitted simultaneously from aerials or aerial systems having differently-oriented overlapping directivity-characteristics

1/16 . . . . Azimuthal guidance systems, e.g. system for defining aircraft approach path, localiser system

1/18 . . . . Elevational guidance systems, e.g. system for defining aircraft glide path

1/20 . . . using a comparison of transit time of synchronised signals transmitted from non-directional aerials or aerial systems spaced apart, i.e. path-difference systems

1/22 . . . . the synchronised signals being frequency modulations on carrier waves and the transit times being compared by measuring difference of instantaneous frequencies of received carrier waves

1/24 . . . . the synchronised signals being pulses or equivalent modulations on carrier waves and the transit times being compared by measuring the difference in arrival time of a significant part of the modulations

1/26 . . . . . Systems in which pulses or time-base signals are generated locally at the receiver and brought into predetermined time-relationship with received signals, e.g. pulse duration coincides with time interval between arrival of significant part of modulation of signals received from first and second aerials or aerial systems

1/28 . . . . . wherein the predetermined time-relationship is maintained automatically

1/30 . . . . the synchronised signals being continuous waves or intermittent trains of continuous waves, the intermittency not being for the purpose of determining direction or position line and the transit times being compared by measuring the phase difference

1/32 . . . . . Systems in which the signals received, with or without amplification, or signals derived therefrom, are compared in phase directly

1/34 . . . . . Systems in which first and second synchronised signals are transmitted from both aerials or aerial systems and a beat frequency, obtained by heterodyning the first signals with each other is compared in phase with a beat frequency obtained by heterodyning the second signals with each other

1/36 . . . . . Systems in which a beat frequency, obtained by heterodyning the synchronised signals, is compared in phase with a reference signal having a phase substantially independent of direction

1/38 . . . using comparison of (1) the phase of the envelope of the change of frequency, due to Doppler effect, of the signal transmitted by an aerial moving, or appearing to move, in a cyclic path with (2) the phase of a reference signal, the frequency of this reference signal being synchronised with that of the cyclic movement, or apparent cyclic movement, of the aerial

1/40 . . . . the apparent movement of the aerial being produced by cyclic sequential energisation of fixed aerials

1/42 . . . Conical-scan beam beacons transmitting signals which indicate at a mobile receiver any displacement of the receiver from the conical-scan axis, e.g. for “beam-riding” missile control **[5]**

1/44 . . . Rotating or oscillating beam beacons defining directions in the plane of rotation or oscillation **[5]**

1/46 . . . . Broad-beam systems producing at a receiver a substantially continuous sinusoidal envelope signal of the carrier wave of the beam, the phase angle of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon, e.g. cardioid system **[5]**

1/48 . . . . . wherein the phase angle of the direction-dependent envelope signal is a multiple of the direction angle, e.g. for “fine” bearing indication **[5]**

1/50 . . . . . wherein the phase angle of the direction-dependent envelope signal is compared with a non-direction- dependent reference signal **[5]**

1/52 . . . . . wherein the phase angles of a plurality of direction-dependent envelope signals produced by a plurality of beams rotating at different speeds or in different directions are compared **[5]**

1/54 . . . . Narrow-beam systems producing at a receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon; Overlapping broad beam systems defining a narrow zone and producing at a receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon **[5]**

1/56 . . . . . Timing the pulse-type envelope signals derived by reception of beam **[5]**

1/58 . . . . . wherein a characteristic of the beam transmitted or of an auxiliary signal is varied in time synchronously with rotation or oscillation of the beam **[5]**

1/60 . . . . . Varying frequency of beam signal or of auxiliary signal **[5]**

1/62 . . . . . Varying phase-relationship between beam and auxiliary signal **[5]**

1/64 . . . . . Varying pulse timing, e.g. varying interval between pulses radiated in pairs **[5]**

1/66 . . . . . Superimposing direction-indicating intelligence signals, e.g. speech, Morse **[5]**

1/68 . . Marker, boundary, call-sign, or like beacons transmitting signals not carrying directional information
1/70 . using electromagnetic waves other than radio waves
1/72 . using ultrasonic, sonic, or infrasonic waves
1/74 . . Details **[5]**
1/76 . . Systems for determining direction or position line **[5]**
1/78 . . . using amplitude comparison of signals transmitted from transducers or transducer systems having differently-oriented characteristics **[5]**
1/80 . . . using a comparison of transit time of synchronised signals transmitted from non-directional transducers or transducer systems spaced apart, i.e. path-difference systems **[5]**
1/82 . . . Rotating or oscillating beam beacons defining directions in the plane of rotation or oscillation **[5]**

3/00 Direction-finders for determining the direction from which infrasonic, sonic, ultrasonic, or electromagnetic waves, or particle emission, not having a directional significance, are being received (position-fixing by co-ordinating a plurality of determinations of direction or position lines G01S 5/00)
3/02 . using radio waves
3/04 . . Details
3/06 . . . Means for increasing effective directivity, e.g. by combining signals having differently-oriented directivity characteristics or by sharpening the envelope waveform of the signal derived from a rotating or oscillating beam aerial (comparing amplitude of signals having differently-oriented directivity characteristics to determine direction G01S 3/16, G01S 3/28)
3/08 . . . Means for reducing polarisation errors, e.g. by use of Adcock or spaced loop aerial systems
3/10 . . . Means for reducing or compensating for quadrantal, site, or like errors
3/12 . . . Means for determining sense of direction, e.g. by combining signals from directional aerial or goniometer search coil with those from non-directional aerial (determining direction by amplitude comparison of signals derived by combining directional and non-directional signals G01S 3/24, G01S 3/34)
3/14 . . Systems for determining direction or deviation from predetermined direction
3/16 . . . using amplitude comparison of signals derived sequentially from receiving aerials or aerial systems having differently-oriented directivity characteristics or from an aerial system having periodically-varied orientation of directivity characteristic
3/18 . . . . derived directly from separate directional aerials
3/20 . . . . derived by sampling signal received by an aerial system having periodically-varied orientation of directivity characteristic
3/22 . . . . derived from different combinations of signals from separate aerials, e.g. comparing sum with difference
3/24 . . . . . the separate aerials comprising one directional aerial and one non-directional aerial, e.g. combination of loop and open aerials producing a reversed cardioid directivity characteristic
3/26 . . . . . the separate aerials having differently-oriented directivity characteristics
3/28 . . . using amplitude comparison of signals derived simultaneously from receiving aerials or aerial systems having differently-oriented directivity characteristics
3/30 . . . . derived directly from separate directional systems
3/32 . . . . derived from different combinations of signals from separate aerials, e.g. comparing sum with difference
3/34 . . . . . the separate aerials comprising one directional aerial and one non-directional aerial, e.g. combination of loop and open aerials producing a reversed cardioid directivity characteristic
3/36 . . . . . the separate aerials having differently-oriented directivity characteristics
3/38 . . . using adjustment of real or effective orientation of directivity characteristic of an aerial or an aerial system to give a desired condition of signal derived from that aerial or aerial system, e.g. to give a maximum or minimum signal (G01S 3/16, G01S 3/28 take precedence)
3/40 . . . . adjusting orientation of a single directivity characteristic to produce maximum or minimum signal, e.g. rotatable loop aerial, equivalent goniometer system
3/42 . . . . the desired condition being maintained automatically
3/44 . . . . the adjustment being varied periodically or continuously until it is halted automatically when the desired condition is attained
3/46 . . . using aerials spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems
3/48 . . . . the waves arriving at the aerials being continuous or intermittent and the phase difference of signals derived therefrom being measured
3/50 . . . . the waves arriving at the aerials being pulse modulated and the time difference of their arrival being measured
3/52 . . . using a receiving aerial moving, or appearing to move, in a cyclic path to produce a Doppler variation of frequency of the received signal
3/54 . . . . the apparent movement of the aerial being produced by coupling the receiver cyclically and sequentially to each of several fixed spaced aerials
3/56 . . . Conical-scan beam systems using signals indicative of the deviation of the direction of reception from the scan axis
3/58 . . . Rotating or oscillating beam systems using continuous analysis of received signal for determining direction in the plane of rotation or oscillation or for determining deviation from a predetermined direction in such a plane (G01S 3/14 takes precedence)
3/60 . . . . Broad-beam systems producing in the receiver a substantially-sinusoidal envelope signal of the carrier wave of the beam, the phase angle of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver, e.g. cardioid system
3/62 . . . . . wherein the phase angle of the signal is indicated by a cathode-ray tube

3/64 . . . . . wherein the phase angle of the signal is determined by phase comparison with a reference alternating signal varying in synchronism with the directivity variation

3/66 . . . . Narrow-beam systems producing in the receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver; Overlapping broad-beam systems defining in the receiver a narrow zone and producing a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver

3/68 . . . . . wherein the timing of the pulse-type envelope signal is indicated by cathode-ray tube

3/70 . . . . . wherein the timing of the pulse-type envelope signal is determined by bringing a locally-generated pulse-type signal into coincidence or other predetermined time-relationship with the envelope signal

3/72 . . Diversity systems specially adapted for direction-finding

3/74 . . Multi-channel systems specially adapted for direction-finding, i.e. having a single aerial system capable of giving simultaneous indications of the directions of different signals (systems in which the directions of different signals are determined sequentially and displayed simultaneously G01S 3/04, G01S 3/14)

3/78 . using electromagnetic waves other than radio waves

3/781 . . Details **[5]**

3/782 . . Systems for determining direction or deviation from predetermined direction **[5]**

3/783 . . . using amplitude comparison of signals derived from static detectors or detector systems **[5]**

3/784 . . . . using a mosaic of detectors **[5]**

3/785 . . . using adjustment of orientation of directivity characteristics of a detector or detector system to give a desired condition of signal derived from that detector or detector system **[5]**

3/786 . . . . the desired condition being maintained automatically **[5]**

3/787 . . . using rotating reticles producing a direction-dependent modulation characteristic **[5]**

3/788 . . . . producing a frequency modulation characteristic **[5]**

3/789 . . . using rotating or oscillating beam systems, e.g. using mirrors, prisms **[5]**

3/80 . using ultrasonic, sonic, or infrasonic waves

3/801 . . Details **[5]**

3/802 . . Systems for determining direction or deviation from predetermined direction **[5]**

3/803 . . . using amplitude comparison of signals derived from receiving transducers or transducer systems having differently-oriented directivity characteristics **[5]**

3/805 . . . using adjustment of real or effective orientation of directivity characteristics of a transducer or transducer system to give a desired condition of signal derived from that transducer or transducer system, e.g. to give a maximum or minimum signal **[5]**

3/807 . . . . the desired condition being maintained automatically **[5]**

3/808 . . . using transducers spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems **[5]**

3/809 . . . Rotating or oscillating beam systems using continuous analysis of received signal for determining direction in the plane of rotation or oscillation or for determining deviation from a predetermined direction in such a plane **[5]**

3/82 . . with means for adjusting phase or compensating for time-lag errors

3/84 . . with indication presented on cathode-ray tubes

3/86 . . with means for eliminating undesired waves, e.g. disturbing noises

5/00 Position-fixing by co-ordinating two or more direction or position-line determinations; Position-fixing by co-ordinating two or more distance determinations [2]

5/02 . using radio waves (G01S 19/00 takes precedence) **[1,2010.01]**

5/04 . . Position of source determined by a plurality of spaced direction-finders

5/06 . . Position of source determined by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/12 takes precedence) **[3]**

5/08 . . Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location

5/10 . . Position of receiver fixed by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/12 takes precedence) **[3]**

5/12 . . by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical or radial

5/14 . . Determining absolute distances from a plurality of spaced points of known location

5/16 . using electromagnetic waves other than radio waves

5/18 . using ultrasonic, sonic, or infrasonic waves

5/20 . . Position of source determined by a plurality of spaced direction-finders **[5]**

5/22 . . Position of source determined by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/28 takes precedence) **[5]**

5/24 . . Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location **[5]**

5/26 . . Position of receiver fixed by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/28 takes precedence) **[5]**

5/28 . . by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical or radial **[5]**

5/30 . . Determining absolute distances from a plurality of spaced points of known location **[5]**

7/00 Details of systems according to groups G01S 13/00, G01S 15/00, G01S 17/00

7/02 . of systems according to group G01S 13/00

7/03 . . Details of HF subsystems specially adapted therefor, e.g. common to transmitter and receiver **[5]**

7/04 . . Display arrangements

7/06 . . . Cathode-ray tube displays

7/08 . . . . with vernier indication of distance, e.g. using two cathode-ray tubes
7/10 . . . . Providing two-dimensional co-ordinated display of distance and direction
7/12 . . . . . Plan-position indicators, i.e. P. P. I.
7/14 . . . . . Sector, off-centre, or expanded- angle display
7/16 . . . . . Signals displayed as intensity modulation with rectangular co-ordinates representing distance and bearing, e.g. type B
7/18 . . . . . Distance-height displays; Distance-elevation displays, e.g. type RHI, type E
7/20 . . . . Stereoscopic displays; Three-dimensional displays; Pseudo-three-dimensional displays
7/22 . . . . Producing cursor lines and indicia by electronic means
7/24 . . . . the display being orientated or displaced in accordance with movement of object carrying the transmitting and receiving apparatus, e.g. true-motion radar
7/26 . . . Displays using electroluminescent panels
7/28 . . Details of pulse systems
7/282 . . . Transmitters **[5]**
7/285 . . . Receivers **[5]**
7/288 . . . . Coherent receivers **[5]**
7/292 . . . . Extracting wanted echo-signals **[5]**
7/295 . . . . Means for transforming co-ordinates or for evaluating data, e.g. using computers **[5]**
7/298 . . . . . Scan converters **[5]**
7/32 . . . . Shaping echo pulse signals; Deriving non-pulse signals from echo pulse signals **[5]**
7/34 . . . . Gain of receiver varied automatically during pulse-recurrence period, e.g. anti-clutter gain control **[5]**
7/35 . . Details of non-pulse systems **[5]**
7/36 . . Means for anti-jamming
7/38 . . Jamming means, e.g. producing false echoes **[2]**
7/40 . . Means for monitoring or calibrating
7/41 . . using analysis of echo signal for target characterisation; Target signature; Target cross-section **[6]**
7/42 . . Diversity systems specially adapted for radar
7/48 . of systems according to group G01S 17/00
7/481 . . Constructional features, e.g. arrangements of optical elements **[6]**
7/483 . . Details of pulse systems **[6]**
7/484 . . . Transmitters **[6]**
7/486 . . . Receivers **[6]**
7/487 . . . . Extracting wanted echo signals **[6]**
7/489 . . . . Gain of receiver varied automatically during pulse-recurrence period **[6]**
7/491 . . Details of non-pulse systems **[6]**
7/493 . . . Extracting wanted echo signals **[6]**
7/495 . . Counter-measures or counter-counter-measures **[6]**
7/497 . . Means for monitoring or calibrating **[6]**
7/499 . . using polarisation effects **[6]**
7/51 . . Display arrangements **[6]**
7/52 . of systems according to group G01S 15/00
7/521 . . Constructional features **[6]**
7/523 . . Details of pulse systems **[6]**
7/524 . . . Transmitters **[6]**
7/526 . . . Receivers **[6]**
7/527 . . . . Extracting wanted echo signals **[6]**
7/529 . . . . Gain of receiver varied automatically during pulse-recurrence period **[6]**
7/53 . . . . Means for transforming co-ordinates or for evaluating data, e.g. using computers **[6]**
7/531 . . . . . Scan converters **[6]**
7/533 . . . . . Data rate converters **[6]**
7/534 . . Details of non-pulse systems **[6]**
7/536 . . . Extracting wanted echo signals **[6]**
7/537 . . Counter measures or counter-counter-measures, e.g. jamming, anti-jamming **[6]**
7/539 . . using analysis of echo signal for target characterisation; Target signature; Target cross-section **[6]**
7/54 . . with receivers spaced apart
7/56 . . Display arrangements
7/58 . . . for providing variable ranges
7/60 . . . for providing a permanent recording
7/62 . . . Cathode-ray tube displays
7/64 . . Luminous indications (G01S 7/62 takes precedence) **[5]**

11/00 **Systems for determining distance or velocity not using reflection or reradiation** (position-fixing by co-ordinating two or more distance determinations G01S 5/00) **[2]**

11/02 . using radio waves (G01S 19/00 takes precedence) **[5,2010.01]**
11/04 . . using angle measurements **[5]**
11/06 . . using intensity measurements **[5]**
11/08 . . using synchronised clocks **[5]**
11/10 . . using Doppler effect **[5]**
11/12 . using electromagnetic waves other than radio waves **[5]**
11/14 . using ultrasonic, sonic or infrasonic waves **[5]**
11/16 . using difference in transit time between electromagnetic and sonic waves **[5]**

(1) Groups G01S 13/00 to G01S 17/00 cover:
- systems for detecting the presence of an object, e.g. by reflection or reradiation from the object itself, or from a transponder associated with the object, for determining the distance or relative velocity of an object, for providing a co-ordinated display of the distance and direction of an object or for obtaining an image thereof; **[3]**
- systems arranged for mounting on a moving craft or vehicle and using the reflection of waves from an extended surface external to the craft, e.g. the surface of the earth, to determine the velocity and direction of motion of the craft relative to the surface. **[3]**

(2) Groups G01S 13/00 to G01S 17/00 do not cover:
- systems for determining the direction of an object by means not employing reflection or reradiation, which are covered by groups G01S 1/00 or G01S 3/00; **[3]**
- systems for determining distance or velocity of an object by means not employing reflection or reradiation, which are covered by group G01S 11/00. **[3]**

13/00 **Systems using the reflection or reradiation of radio waves, e.g. radar systems**; **Analogous systems using reflection or reradiation of waves whose nature or wavelength is irrelevant or unspecified [3]**

13/02 . Systems using reflection of radio waves, e.g. primary radar systems; Analogous systems **[3]**

13/04 . . Systems determining presence of a target (based on relative movement of target G01S 13/56) **[3]**
13/06 . . Systems determining position data of a target **[3]**
13/08 . . . Systems for measuring distance only (indirect measurement G01S 13/46) **[3]**
13/10 . . . . using transmission of interrupted pulse modulated waves (determination of distance by phase measurement G01S 13/32) **[3]**
13/12 . . . . . wherein the pulse-recurrence frequency is varied to provide a desired time relationship between the transmission of a pulse and the receipt of the echo of a preceding pulse **[3]**
13/14 . . . . . wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception **[3]**
13/16 . . . . . using counters **[3]**
13/18 . . . . . wherein range gates are used **[3]**
13/20 . . . . . whereby multiple time-around echos are used or eliminated **[3]**
13/22 . . . . . using irregular pulse repetition frequency **[3]**
13/24 . . . . . using frequency agility of carrier wave **[3]**
13/26 . . . . . wherein the transmitted pulses use a frequency- or phase-modulated carrier wave **[3]**
13/28 . . . . . with time compression of received pulses **[3]**
13/30 . . . . . using more than one pulse per radar period **[3]**
13/32 . . . . using transmission of continuous unmodulated waves, amplitude-, frequency- or phase-modulated waves **[3]**
13/34 . . . . . using transmission of frequency-modulated waves and the received signal, or a signal derived therefrom, being heterodyned with a locally-generated signal related to the contemporaneous transmitted signal to give a beat-frequency signal **[3]**
13/36 . . . . . with phase comparison between the received signal and the contemporaneously transmitted signal **[3]**
13/38 . . . . . wherein more than one modulation frequency is used **[3]**
13/40 . . . . . wherein the frequency of transmitted signal is adjusted to give a predetermined phase relationship **[3]**
13/42 . . . Simultaneous measurement of distance and other coordinates (indirect measurement G01S 13/46) **[3]**
13/44 . . . . Monopulse radar, i.e. simultaneous lobing **[3]**
13/46 . . . Indirect determination of position data **[3]**
13/48 . . . . using multiple beams at emission or reception **[3]**
13/50 . . Systems of measurement based on relative movement of target **[3]**
13/52 . . . Discriminating between fixed and moving objects or between objects moving at different speeds **[3]**
13/522 . . . . using transmissions of interrupted pulse modulated waves **[5]**
13/524 . . . . . based upon the phase or frequency shift resulting from movement of objects, with reference to the transmitted signals, e.g. coherent MTi **[5]**
13/526 . . . . . performing filtering on the whole spectrum without loss of range information, e.g. using delay line cancellers or comb filters **[5]**
13/528 . . . . . with elimination of blind speeds **[5]**
13/53 . . . . . performing filtering on a single spectral line and associated with one or more range gates with a phase detector or a frequency mixer to extract the Doppler information, e.g. pulse Doppler radar **[5]**
13/532 . . . . . using a bank of range gates or a memory matrix **[5]**
13/534 . . . . . based upon amplitude or phase shift resulting from movement of objects, with reference to the surrounding clutter echo signal, e.g. non-coherent MTi, clutter referenced MTi, externally coherent MTi **[5]**
13/536 . . . . using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves **[5]**
13/538 . . . . eliminating objects that have not moved between successive antenna scans, e.g. area MTi **[5]**
13/56 . . . . for presence detection **[3]**
13/58 . . . Velocity or trajectory determination systems; Sense-of-movement determination systems **[3]**
13/60 . . . . wherein the transmitter and receiver are mounted on the moving object, e.g. for determining ground speed, drift angle, ground track (G01S 13/64 takes precedence) **[3]**
13/62 . . . . Sense-of-movement determination **[3]**
13/64 . . . . Velocity measuring systems using range gates **[3]**
13/66 . Radar-tracking systems; Analogous systems **[3]**
13/68 . . for angle tracking only **[3]**
13/70 . . for range tracking only **[3]**
13/72 . . for two-dimensional tracking, e.g. combination of angle and range tracking, track-while-scan radar **[3]**
13/74 . Systems using reradiation of radio waves, e.g. secondary radar systems; Analogous systems **[3,6]**
13/75 . . using transponders powered from received waves, e.g. using passive transponders **[6]**
13/76 . . wherein pulse-type signals are transmitted **[3]**
13/78 . . . discriminating between different kinds of targets, e.g. IFF-radar, i.e. identification of friend or foe (G01S 13/75, G01S 13/79 takes precedence) **[3]**
13/79 . . Systems using random coded signals or random pulse repetition frequencies **[6]**
13/82 . . wherein continuous-type signals are transmitted **[3]**
13/84 . . . for distance determination by phase measurement **[3]**
13/86 . Combinations of radar systems with non-radar systems, e.g. sonar, direction finder **[3]**
13/87 . Combinations of radar systems, e.g. primary radar and secondary radar **[3]**

13/88 . Radar or analogous systems, specially adapted for specific applications (electromagnetic prospecting or detecting of objects, e.g. near-field detection, G01V 3/00) **[3,6]**
13/89 . . for mapping or imaging **[3]**
13/90 . . . using synthetic aperture techniques **[3,6]**
13/91 . . for traffic control (G01S 13/93 takes precedence) **[3]**
13/92 . . . for velocity measurement **[3]**
13/93 . . for anti-collision purposes **[3]**
13/94 . . for terrain-avoidance **[3]**
13/95 . . for meteorological use **[3]**

15/00 Systems using the reflection or reradiation of acoustic waves, e.g. sonar systems [3]
15/02 . using reflection of acoustic waves (G01S 15/66 takes precedence) **[3]**
15/04 . . Systems determining presence of a target **[3]**
15/06 . . Systems determining position data of a target **[3]**
15/08 . . . Systems for measuring distance only (indirect measurement G01S 15/46) **[3]**
15/10 . . . . using transmission of interrupted pulse-modulated waves (determination of distance by phase measurement G01S 15/32) **[3]**
15/12 . . . . . wherein the pulse-recurrence frequency is varied to provide a desired time relationship between the transmission of a pulse and the receipt of the echo of a preceding pulse **[3]**
15/14 . . . . . wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception **[3]**
15/18 . . . . . wherein range gates are used **[3]**
15/32 . . . . using transmission of continuous unmodulated waves, amplitude-, frequency- or phase-modulated waves **[3]**
15/34 . . . . . using transmission of frequency-modulated waves and the received signal, or a signal derived therefrom, being heterodyned with a locally-generated signal related to the contemporaneous transmitted signal to give a beat-frequency signal **[3]**
15/36 . . . . . with phase comparison between the received signal and the contemporaneously transmitted signal **[3]**
15/42 . . . Simultaneous measurement of distance and other coordinates (indirect measurement G01S 15/46) **[3]**
15/46 . . . Indirect determination of position data **[3]**
15/50 . . Systems of measurement based on relative movement of target **[3]**
15/52 . . . Discriminating between fixed and moving objects or between objects moving at different speeds **[3]**
15/58 . . . Velocity or trajectory determination systems; Sense-of-movement determination systems **[3]**
15/60 . . . . wherein the transmitter and receiver are mounted on the moving object, e.g. for determining ground speed, drift angle, ground track **[3]**
15/62 . . . . Sense-of-movement determination **[3]**
15/66 . Sonar tracking systems **[3]**
15/74 . Systems using reradiation of acoustic waves, e.g. IFF, i.e. identification of friend or foe **[3]**
15/87 . Combinations of sonar systems **[3]**
15/88 . Sonar systems, specially adapted for specific applications (seismic or acoustic prospecting or detecting G01V 1/00) **[3,6]**
15/89 . . for mapping or imaging **[3]**
15/93 . . for anti-collision purposes **[3]**
15/96 . . for locating fish **[3]**

17/00 Systems using the reflection or reradiation of electromagnetic waves other than radio waves, e.g. lidar systems [3]
17/02 . Systems using the reflection of electromagnetic waves other than radio waves (G01S 17/66 takes precedence) **[3]**
17/06 . . Systems determining position data of a target **[3]**
17/08 . . . for measuring distance only (indirect measurement G01S 17/46; active triangulation systems G01S 17/48) **[3,8]**
17/10 . . . . using transmission of interrupted pulse-modulated waves (determination of distance by phase measurements G01S 17/32) **[3]**
17/32 . . . . using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves **[3]**
17/36 . . . . . with phase comparison between the received signal and the contemporaneously transmitted signal **[3]**
17/42 . . . Simultaneous measurement of distance and other coordinates (indirect measurement G01S 17/46) **[3]**
17/46 . . . Indirect determination of position data **[3]**
17/48 . . . . Active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves **[8]**
17/50 . . Systems of measurement based on relative movement of target **[3]**
17/58 . . . Velocity or trajectory determination systems; Sense-of-movement determination systems **[3]**
17/66 . Tracking systems using electromagnetic waves other than radio waves **[3]**
17/74 . Systems using reradiation of electromagnetic waves other than radio waves, e.g. IFF, i.e. identification of friend or foe **[3]**
17/87 . Combinations of systems using electromagnetic waves other than radio waves **[3]**
17/88 . Lidar systems, specially adapted for specific applications **[3]**
17/89 . . for mapping or imaging **[6,8]**
17/93 . . for anti-collision purposes **[6,8]**
17/95 . . for meteorological use **[6,8]**

19/00 Satellite radio beacon positioning systems; **Determining position, velocity or attitude using signals transmitted by such systems [2010.01]**
19/01 . Satellite radio beacon positioning systems transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO **[2010.01]**
19/02 . . Details of the space or ground control segments **[2010.01]**
19/03 . . Cooperating elements; Interaction or communication between different cooperating elements or between cooperating elements and receivers **[2010.01]**

Note

The term “cooperating elements” designates additional elements or subsystems, including receivers of other users, which interact or communicate with the receiver or the satellite positioning system. **[2010.01]**

19/04 . . . providing carrier phase data **[2010.01]**
19/05 . . . providing aiding data **[2010.01]**
19/06 . . . . employing an initial estimate of the location of the receiver as aiding data or in generating aiding data **[2010.01]**
19/07 . . . providing data for correcting measured positioning data, e.g. DGPS [differential GPS] or ionosphere corrections **[2010.01]**
19/08 . . . providing integrity information, e.g. health of satellites or quality of ephemeris data **[2010.01]**
19/09 . . . providing processing capability normally carried out by the receiver **[2010.01]**
19/10 . . . providing dedicated supplementary positioning signals **[2010.01]**
19/11 . . . . wherein the cooperating elements are pseudolites or satellite radio beacon positioning system signal repeaters **[2010.01]**
19/12 . . . . wherein the cooperating elements are telecommunication base stations **[2010.01]**
19/13 . . Receivers **[2010.01]**
19/14 . . . specially adapted for specific applications **[2010.01]**
19/15 . . . . Aircraft landing systems **[2010.01]**
19/16 . . . . Anti-theft; Abduction **[2010.01]**
19/17 . . . . Emergency applications **[2010.01]**
19/18 . . . . Military applications **[2010.01]**
19/19 . . . . Sporting applications **[2010.01]**
19/20 . . . Integrity monitoring, fault detection or fault isolation of space segment **[2010.01]**
19/21 . . . Interference related issues **[2010.01]**
19/22 . . . Multipath-related issues **[2010.01]**
19/23 . . . Testing, monitoring, correcting or calibrating of a receiver element **[2010.01]**
19/24 . . . Acquisition or tracking of signals transmitted by the system **[2010.01]**
19/25 . . . . involving aiding data received from a cooperating element, e.g. assisted GPS **[2010.01]**
19/26 . . . . involving a sensor measurement for aiding acquisition or tracking **[2010.01]**
19/27 . . . . creating, predicting or correcting ephemeris or almanac data within the receiver **[2010.01]**
19/28 . . . . Satellite selection **[2010.01]**
19/29 . . . . carrier related **[2010.01]**
19/30 . . . . code related **[2010.01]**
19/31 . . . Acquisition or tracking of other signals for positioning **[2010.01]**
19/32 . . . Multimode operation in a single same satellite system, e.g. GPS L1/L2 **[2010.01]**
19/33 . . . Multimode operation in different systems which transmit time stamped messages, e.g. GPS/GLONASS **[2010.01]**
19/34 . . . Power consumption **[2010.01]**
19/35 . . . Constructional details or hardware or software details of the signal processing chain **[2010.01]**
19/36 . . . . relating to the receiver frond end **[2010.01]**
19/37 . . . . Hardware or software details of the signal processing chain **[2010.01]**
19/38 . Determining a navigation solution using signals transmitted by a satellite radio beacon positioning system **[2010.01]**
19/39 . . the satellite radio beacon positioning system transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO **[2010.01]**
19/40 . . . Correcting position, velocity or attitude **[2010.01]**
19/41 . . . . Differential correction, e.g. DGPS [differential GPS] **[2010.01]**
19/42 . . . Determining position **[2010.01]**
19/43 . . . . using carrier phase measurements, e.g. kinematic positioning; using long or short baseline interferometry **[2010.01]**
19/44 . . . . . Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method **[2010.01]**
19/45 . . . . by combining measurements of signals from the satellite radio beacon positioning system with a supplementary measurement **[2010.01]**
19/46 . . . . . the supplementary measurement being of a radio-wave signal type **[2010.01]**
19/47 . . . . . the supplementary measurement being an inertial measurement, e.g. tightly coupled inertial **[2010.01]**
19/48 . . . . by combining or switching between position solutions derived from the satellite radio beacon positioning system and position solutions derived from a further system **[2010.01]**
19/49 . . . . . whereby the further system is an inertial position system, e.g. loosely-coupled **[2010.01]**
19/50 . . . . whereby the position solution is constrained to lie upon a particular curve or surface, e.g. for locomotives on railway tracks **[2010.01]**
19/51 . . . . Relative positioning **[2010.01]**
19/52 . . . Determining velocity **[2010.01]**
19/53 . . . Determining attitude **[2010.01]**
19/54 . . . . using carrier phase measurements; using long or short baseline interferometry **[2010.01]**
19/55 . . . . . Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method **[2010.01]**

G01T MEASUREMENT OF NUCLEAR OR X-RADIATION (radiation analysis of materials, mass spectrometry G01N 23/00; tubes for determining the presence, intensity, density or energy of radiation or particles H01J 47/00)

(1) This subclass covers the measurement of X-radiation, gamma radiation, corpuscular radiation, cosmic radiation, or neutron radiation.
(2) Attention is drawn to the Notes following the title of class G01.

1/00 Measuring X-radiation, gamma radiation, corpuscular radiation, or cosmic radiation (G01T 3/00, G01T 5/00 take precedence) **[2]**
1/02 . Dosimeters (G01T 1/15 takes precedence) **[2]**
1/04 . . Chemical dosimeters (G01T 1/06, G01T 1/08 take precedence)
1/06 . . Glass dosimeters
1/08 . . Photographic dosimeters
1/10 . . Luminescent dosimeters
1/105 . . . Read-out devices (G01T 1/115 takes precedence) **[2]**
1/11 . . . Thermo-luminescent dosimeters
1/115 . . . . Read-out devices **[2]**
1/12 . . Calorimetric dosimeters
1/14 . . Electrostatic dosimeters (construction of ionisation chambers H01J 47/02)
1/142 . . . Charging devices; Read-out devices **[2]**
1/15 . Instruments in which pulses generated by a radiation detector are integrated, e.g. by a diode pump circuit
1/16 . Measuring radiation intensity (G01T 1/29 takes precedence) **[2]**
1/161 . . Applications in the field of nuclear medicine, e.g. in vivo counting **[2]**
1/163 . . . Whole-body counters **[2]**
1/164 . . . Scintigraphy **[2]**
1/166 . . . . involving relative movement between detector and subject **[2]**
1/167 . . Measuring radioactive content of objects, e.g. contamination (whole-body counters G01T 1/163) **[2]**
1/169 . . Exploration, location of contaminated surface areas **[2]**
1/17 . . Circuit arrangements not adapted to a particular type of detector
1/172 . . . with coincidence circuit arrangements (G01T 1/178 takes precedence) **[2]**
1/175 . . . Power supply circuits **[2]**
1/178 . . . for measuring specific activity in the presence of other radioactive substances, e.g. natural, in the air or in liquids such as rain-water **[2]**
1/18 . . with counting-tube arrangements, e.g. with Geiger counters (tubes H01J 47/00)
1/185 . . with ionisation-chamber arrangements **[2]**
1/20 . . with scintillation detectors
1/202 . . . the detector being a crystal
1/203 . . . the detector being made of plastics
1/204 . . . the detector being a liquid
1/205 . . . the detector being a gas
1/208 . . . Circuits specially adapted for scintillation detectors, e.g. for the photo-multiplier section **[2]**
1/22 . . with Cerenkov detectors
1/24 . . with semiconductor detectors
1/26 . . with resistance detectors
1/28 . . with secondary-emission detectors
1/29 . Measurement performed on radiation beams, e.g. position or section of the beam; Measurement of spatial distribution of radiation **[2]**
1/30 . Measuring half-life of a radioactive substance
1/32 . Measuring polarisation of particles
1/34 . Measuring cross-section, e.g. absorption cross-section of particles
1/36 . Measuring spectral distribution of X-rays or of nuclear radiation
1/38 . . Particle discrimination and measurement of relative mass, e.g. by measurement of loss of energy with distance (dE/dx) **[2]**
1/40 . . Stabilisation of spectrometers **[2]**

3/00 Measuring neutron radiation (G01T 5/00 takes precedence) **[2]**
3/02 . by shielding other radiation
3/04 . using calorimetric devices
3/06 . with scintillation detectors **[2]**
3/08 . with semiconductor detectors **[2]**

5/00 Recording of movements or tracks of particles (spark chambers H01J 47/14); **Processing or analysis of such tracks [2]**
5/02 . Processing of tracks; Analysis of tracks
5/04 . Cloud chambers, e.g. Wilson chamber
5/06 . Bubble chambers
5/08 . Scintillation chambers (discharge tubes H01J 40/00, H01J 47/00)
5/10 . Plates or blocks in which tracks of nuclear particles are made visible by after-treatment, e.g. using photographic emulsion, using mica
5/12 . Circuit arrangements with multi-wire or parallel-plate chambers, e.g. spark chambers (tubes per se H01J 47/00) **[2]**

7/00 Details of radiation-measuring instruments
7/02 . Collecting-means for receiving or storing samples to be investigated
7/04 . . by filtration
7/06 . . by electrostatic precipitation (G01T 7/04 takes precedence)
7/08 . Means for conveying samples received
7/10 . . using turntables
7/12 . Provision for actuation of an alarm

G01V **GEOPHYSICS**; **GRAVITATIONAL MEASUREMENTS**; **DETECTING MASSES OR OBJECTS**; **TAGS** (means for indicating the location of accidentally buried, e.g. snow-buried, persons A63B 29/02) **[4,6]**

(1) This subclass covers radar, sonar, lidar or analogous systems specifically designed for geophysical use. Radar, sonar, lidar or analogous systems, or details of such systems, if of a general interest, are also classified in subclass G01S. **[6]**

(2) In this subclass, the following term is used with the meaning indicated: **[6]**
– "tags" means arrangements cooperating with a detecting field, e.g. near field, and designed to produce a specific detectable effect; "tags" also means active markers capable of generating a detectable field. **[6]**

(3) In this subclass, the geophysical methods apply both to the earth and to other celestial objects, e.g. planets.

(4) Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 **Seismology**; **Seismic or acoustic prospecting or detecting**

1/02 . Generating seismic energy

1/04 . . Details

1/047 . . . Arrangements for coupling the generator to the ground **[3]**

1/053 . . . . for generating transverse waves **[3]**

1/06 . . . Ignition devices (G01V 1/393 takes precedence) **[3]**

1/08 . . . . involving time-delay devices

1/09 . . . Transporting arrangements, e.g. on vehicles (G01V 1/38 takes precedence) **[3]**

1/104 . . using explosive charges (G01V 1/157 takes precedence) **[3]**

1/108 . . . by deforming or displacing surfaces of enclosures **[3]**

1/112 . . . . for use on the surface of the earth **[3]**

1/116 . . . where pressurised combustion gases escape from the generator in a pulsating manner, e.g. for generating bursts **[3]**

1/13 . . . Arrangements or disposition of charges to produce a desired pattern in space or time

1/133 . . using fluidic driving means, e.g. using highly pressurised fluids (G01V 1/104 takes precedence) **[3]**

1/135 . . . by deforming or displacing surfaces of enclosures **[3]**

1/137 . . . which fluids escape from the generator in a pulsating manner, e.g. for generating bursts **[3]**

1/143 . . using mechanical driving means (G01V 1/104, G01V 1/133 takes precedence) **[3]**

1/145 . . . by deforming or displacing surfaces **[3]**

1/147 . . . using impact of dropping masses **[3]**

1/153 . . . using rotary unbalanced masses **[3]**

1/155 . . . using reciprocating masses **[3]**

1/157 . . using spark discharges; using exploding wires **[3]**

1/16 . Receiving elements for seismic signals; Arrangements or adaptations of receiving elements

1/18 . . Receiving elements, e.g. seismometer, geophone **[2]**

1/20 . . Arrangements of receiving elements, e.g. geophone pattern

1/22 . Transmitting seismic signals to recording or processing apparatus

1/24 . Recording seismic data

1/26 . . Reference-signal-transmitting devices, e.g. indicating moment of firing of shot

1/28 . Processing seismic data, e.g. analysis, for interpretation, for correction (G01V 1/48 takes precedence) **[6]**

1/30 . . Analysis (G01V 1/50 takes precedence) **[6]**

1/32 . . Transforming one recording into another

1/34 . . Displaying seismic recordings

1/36 . . Effecting static or dynamic corrections on records, e.g. correcting spread; Correlating seismic signals; Eliminating effects of unwanted energy

1/37 . . . specially adapted for seismic systems using continuous agitation of the ground **[3]**

1/38 . specially adapted for water-covered areas (G01V 1/28 takes precedence)

1/387 . . Reducing secondary bubble pulse, i.e. reducing the detected signals resulting from the generation and release of gas bubbles after the primary explosion **[3]**

1/393 . . Means for loading explosive underwater charges, e.g. combined with ignition devices **[3]**

1/40 . specially adapted for well-logging

1/42 . . using generators in one well and receivers elsewhere or vice-versa (G01V 1/52 takes precedence) **[6]**

1/44 . . using generators and receivers in the same well (G01V 1/52 takes precedence) **[6]**

1/46 . . . Data acquisition **[6]**

1/48 . . . Processing data **[6]**

1/50 . . . . Analysing data **[6]**

1/52 . . Structural details **[6]**

3/00 **Electric or magnetic prospecting or detecting**; **Measuring magnetic field characteristics of the earth, e.g. declination or deviation [2,4]**

Note

Groups G01V 3/15 to G01V 3/18 take precedence over groups G01V 3/02 to G01V 3/14. **[3]**

3/02 . operating with propagation of electric current
3/04 . . using dc
3/06 . . using ac
3/08 . operating with magnetic or electric fields produced or modified by objects or geological structures or by detecting devices (with electromagnetic waves G01V 3/12)
3/10 . . using induction coils
3/11 . . . for detecting conductive objects, e.g. firearms, cables or pipes **[3]**
3/12 . operating with electromagnetic waves
3/14 . operating with electron or nuclear magnetic resonance
3/15 . specially adapted for use during transport, e.g. by a person, vehicle or boat **[3]**
3/16 . . specially adapted for use from aircraft (G01V 3/165 to G01V 3/175 take precedence) **[3]**
3/165 . . operating with magnetic or electric fields produced or modified by the object or by the detecting device (with electromagnetic waves G01V 3/17) **[3]**
3/17 . . operating with electromagnetic waves **[3]**
3/175 . . operating with electron or nuclear magnetic resonance **[3]**
3/18 . specially adapted for well-logging
3/20 . . operating with propagation of electric current **[3]**
3/22 . . . using dc **[3]**
3/24 . . . using ac **[3]**
3/26 . . operating with magnetic or electric fields produced or modified either by the surrounding earth formation or by the detecting device (with electromagnetic waves G01V 3/30) **[3]**
3/28 . . . using induction coils **[3]**
3/30 . . operating with electromagnetic waves **[3]**
3/32 . . operating with electron or nuclear magnetic resonance **[3]**
3/34 . . Transmitting data to recording or processing apparatus; Recording data **[3]**
3/36 . Recording data (G01V 3/34 takes precedence) **[3]**
3/38 . Processing data, e.g. for analysis, for interpretation or for correction **[3]**
3/40 . specially adapted for measuring magnetic field characteristics of the earth **[3]**

5/00 Prospecting or detecting by the use of nuclear radiation, e.g. of natural or induced radioactivity

5/02 . specially adapted for surface logging, e.g. from aircraft **[3]**
5/04 . specially adapted for well-logging **[3]**
5/06 . . for detecting naturally radioactive minerals **[3]**
5/08 . . using primary nuclear radiation sources or X-rays **[3]**
5/10 . . . using neutron sources **[3]**
5/12 . . . using gamma- or X-ray sources **[3]**
5/14 . . . using a combination of several sources, e.g. a neutron and a gamma source **[3]**

7/00 Measuring gravitational fields or waves; **Gravimetric prospecting or detecting**

7/02 . Details
7/04 . . Electric, photoelectric, or magnetic indicating or recording means
7/06 . . Analysis or interpretation of gravimetric records
7/08 . using balances
7/10 . . using torsion balances, e.g. Eötvös balance
7/12 . using pendulums
7/14 . using free-fall time
7/16 . specially adapted for use on moving platforms, e.g. ship, aircraft

8/00 Prospecting or detecting by optical means [6]

Note

This group covers the use of infra-red, visible or ultra-violet light. **[6]**

8/02 . Prospecting **[6]**
8/10 . Detecting, e.g. by using light barriers (by reflection from the object G01S 17/00) **[6]**
8/12 . . using one transmitter and one receiver **[6]**
8/14 . . . using reflectors **[6]**
8/16 . . . using optical fibres **[6]**
8/18 . . . using mechanical scanning systems **[6]**
8/20 . . using multiple transmitters or receivers **[6]**
8/22 . . . using reflectors **[6]**
8/24 . . . using optical fibres **[6]**
8/26 . . . using mechanical scanning systems **[6]**

9/00 Prospecting or detecting by methods not provided for in groups G01V 1/00 to G01V 8/00 [6]

9/02 . Determining existence or flow of underground water

11/00 Prospecting or detecting by methods combining techniques covered by two or more of main groups G01V 1/00 to G01V 9/00

13/00 Manufacturing, calibrating, cleaning, or repairing instruments or devices covered by groups G01V 1/00 to G01V 11/00

15/00 Tags attached to, or associated with, an object, in order to enable detection of the object (record carriers for use with machines having a detectable tag or marker G06K 19/00) **[6]**

Note

This group does not cover detectors or detection methods, e.g. methods in which the object to be detected produces or modifies magnetic or electric fields, which are covered elsewhere, e.g. in group G01V 3/00. **[6]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

G01W **METEOROLOGY** (radar, sonar, lidar or analogous systems, designed for meteorological use G01S 13/95, G01S 15/88, G01S 17/95)

(1) In this subclass, the following term is used with the meaning indicated:
– "meteorology" includes measurement of certain ambient atmospheric conditions.

(2) Attention is drawn to the Notes following the title of class G01.

1/00 **Meteorology**

1/02 . Instruments for indicating weather conditions by measuring two or more variables, e.g. humidity, pressure, temperature, cloud cover, wind speed (G01W 1/10 takes precedence)

1/04 . . giving only separate indications of the variables measured

1/06 . . giving a combined indication of weather conditions (catathermometers for measuring "cooling value" related either to weather conditions or to comfort of other human environment G01W 1/17)

1/08 . Adaptations of balloons, missiles, or aircraft for meteorological purposes; Radiosondes

1/10 . Devices for predicting weather conditions

1/11 . Weather houses or other ornaments for indicating humidity

1/12 . Sunshine-duration recorders

1/14 . Rainfall or precipitation gauges

1/16 . Measuring atmospheric potential differences, e.g. due to electrical charges in clouds

1/17 . Catathermometers for measuring "cooling value" related either to weather conditions or to comfort of other human environment

1/18 . Testing or calibrating meteorological apparatus

G02 OPTICS

Note

In this class, the following expression is used with the meaning indicated:
– "optical" applies not only to visible light but also to ultra-violet or infra-red radiations. **[4]**

G02B **OPTICAL ELEMENTS, SYSTEMS, OR APPARATUS** (G02F takes precedence; optical elements specially adapted for use in lighting devices or systems thereof F21V 1/00 to F21V 13/00; measuring-instruments, see the relevant subclass of class G01, e.g. optical rangefinders G01C; testing of optical elements, systems, or apparatus G01M 11/00; spectacles G02C; apparatus or arrangements for taking photographs or for projecting or viewing them G03B; sound lenses G10K 11/30; electron and ion "optics" H01J; X-ray "optics" H01J, H05G 1/00; optical elements structurally combined with electric discharge tubes H01J 5/16, H01J 29/89, H01J 37/22; microwave "optics" H01Q; combination of optical elements with television receivers H04N 5/72; optical systems or arrangements in colour television systems H04N 9/00; heating arrangements specially adapted for transparent or reflecting areas H05B 3/84) **[1,7]**

(1) In this subclass, the following terms or expressions are used with the meanings indicated:
– "simple lens or prism" means a single lens or prism;
– "compound lens or prism" means an optical member, the constituents of which either are close together without air-space or (except in group G02B 11/00) are "in broken contact", i.e. with the air-space between the constituents having no essential optical influence;
– "objective" means a lens or an optical system designed to produce a real image of a real object;
– "eyepiece" means a lens or an optical system designed to produce a virtual image for viewing by the eye or by another optical system;
– "front" or "rear" is determined by looking from the more distant conjugate.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

Subclass index

1/00 **Optical elements characterised by the material of which they are made** (compositions of optical glasses C03C 3/00); **Optical coatings for optical elements**

1/02 . made of crystals, e.g. rock-salt, semiconductors (G02B 1/08 takes precedence)

1/04 . made of organic materials, e.g. plastics (G02B 1/08 takes precedence)

1/06 . made of fluids in transparent cells

1/08 . made of polarising materials

1/10 . Optical coatings produced by application to, or surface treatment of, optical elements (G02B 1/08 takes precedence)

1/11 . . Anti-reflection coatings **[6]**

1/12 . . by surface treatment, e.g. by irradiation

3/00 **Simple or compound lenses** (artificial eyes A61F 2/14; spectacle lenses or contact lenses for the eyes G02C; watch or clock glasses G04B 39/00)

3/02 . with non-spherical faces (G02B 3/10 takes precedence)

3/04 . . with continuous faces that are rotationally symmetrical but deviate from a true sphere

3/06 . . with cylindrical or toric faces

3/08 . . with discontinuous faces, e.g. Fresnel lens

3/10 . Bifocal lenses; Multifocal lenses

3/12 . Fluid-filled or evacuated lenses

3/14 . . of variable focal length

5/00 **Optical elements other than lenses** (light guides G02B 6/00; optical logic elements G02F 3/00) **[4]**

5/02 . Diffusing elements; Afocal elements

5/04 . Prisms
5/06 . . Fluid-filled or evacuated prisms
5/08 . Mirrors
5/09 . . Multifaceted or polygonal mirrors **[6]**
5/10 . . with curved faces
5/12 . Reflex reflectors
5/122 . . cube corner, trihedral or triple reflector type **[2]**
5/124 . . . plural reflecting elements forming part of a unitary plate or sheet **[2]**
5/126 . . including curved refracting surface **[2]**
5/128 . . . transparent spheres being embedded in matrix **[2]**
5/13 . . . plural curved refracting elements forming part of a unitary body **[2]**
5/132 . . . with individual reflector mounting means **[2]**
5/134 . . . . including a threaded mounting member **[2]**
5/136 . . plural reflecting elements forming part of a unitary body (G02B 5/124 takes precedence) **[2]**
5/18 . Diffracting gratings
5/20 . Filters (polarising elements G02B 5/30; filters specially adapted for photographic purposes G03B 11/00)
5/22 . . Absorbing filters
5/23 . . . Photochromic filters **[2]**
5/24 . . . Liquid filters (G02B 5/23 takes precedence) **[2]**
5/26 . . Reflecting filters (G02B 5/28 takes precedence)
5/28 . . Interference filters
5/30 . Polarising elements (light-modulating devices G02F 1/00)
5/32 . Holograms used as optical elements (processes or apparatus for producing holograms G03H) **[2]**

6/00 Light guides; **Structural details of arrangements comprising light guides and other optical elements, e.g. couplings [4,6]**

6/02 . Optical fibre with cladding (mechanical structures for providing tensile strength and external protection G02B 6/44) **[4,8]**
6/024 . . with polarisation-maintaining properties **[8]**
6/028 . . with core or cladding having graded refractive index **[8]**
6/032 . . with non-solid core or cladding **[8]**
6/036 . . core or cladding comprising multiple layers **[8]**
6/04 . formed by bundles of fibres (G02B 6/24 takes precedence) **[4]**
6/06 . . the relative position of the fibres being the same at both ends, e.g. for transporting images **[4]**
6/08 . . . with fibre bundle in form of plate **[4]**
6/10 . of the optical waveguide type (G02B 6/02, G02B 6/24 take precedence; devices or arrangements for the control of light by electric, magnetic, electro-magnetic or acoustic means G02F 1/00; transferring the modulation of modulated light G02F 2/00; optical logic elements G02F 3/00; optical analogue/digital converters G02F 7/00; stores using opto-electronic devices G11C 11/42; electric waveguides H01P; transmission of information by optical means H04B 10/00; multiplex systems H04J 14/00) **[4,8]**
6/12 . . of the integrated circuit kind (production or processing of single crystals C30B; electric integrated circuits H01L 27/00) **[4]**
6/122 . . . Basic optical elements, e.g. light-guiding paths **[6]**
6/124 . . . . Geodesic lenses or integrated gratings **[6]**
6/125 . . . . Bends, branchings or intersections **[6]**
6/126 . . . using polarisation effects **[6]**
6/13 . . . Integrated optical circuits characterised by the manufacturing method **[6]**
6/132 . . . . by deposition of thin films **[6]**
6/134 . . . . by substitution by dopant atoms **[6]**
6/136 . . . . by etching **[6]**
6/138 . . . . by using polymerisation **[6]**
6/14 . . Mode converters **[4]**
6/24 . Coupling light guides (for electric waveguides H01P 1/00) **[4,5]**
6/245 . . Removing protective coverings of light guides before coupling **[5]**
6/25 . . Preparing the ends of light guides for coupling, e.g. cutting **[5]**
6/255 . . Splicing of light guides, e.g. by fusion or bonding **[5]**
6/26 . . Optical coupling means (G02B 6/36, G02B 6/42 take precedence) **[4]**
6/27 . . . with polarisation selective and adjusting means (polarisation elements in general G02B 5/30; polarisation systems in general G02B 27/28; optical polarisation multiplex systems H04J 14/06) **[6]**
6/28 . . . having data bus means, i.e. plural waveguides interconnected and providing an inherently bidirectional system by mixing and splitting signals **[4]**
6/287 . . . . Structuring of light guides to shape optical elements with heat application (G02B 6/255 takes precedence) **[6]**
6/293 . . . . with wavelength selective means (for optical elements in use, see the relevant subgroups of this subclass; optical wavelength-division multiplexing systems H04J 14/02) **[6]**
6/30 . . . for use between fibre and thin-film device **[4]**
6/32 . . . having lens focusing means **[4]**
6/34 . . . utilising prism or grating **[4]**
6/35 . . . having switching means (optical switching in general G02B 26/08; by changing the optical properties of the medium G02F 1/00) **[6]**
6/36 . . Mechanical coupling means (G02B 6/255, G02B 6/42 take precedence) **[4,5]**
6/38 . . . having fibre to fibre mating means **[4]**
6/40 . . . having fibre bundle mating means **[4]**
6/42 . . Coupling light guides with opto-electronic elements **[4]**
6/43 . . . Arrangements comprising a plurality of opto-electronic elements and associated optical interconnections (light-emissive or light-sensitive semiconductor devices H01L 27/00, H01L 31/00, H01L 33/00; semiconductor lasers monolithically integrated with other components H01S 5/026) **[6]**
6/44 . Mechanical structures for providing tensile strength and external protection for fibres, e.g. optical transmission cables (cables incorporating electric conductors and optical fibres H01B 11/22) **[4]**
6/46 . Processes or apparatus adapted for installing optical fibres or optical cables (installation of cables containing electric conductors and optical fibres H02G) **[6]**
6/48 . . Overhead installation **[6]**
6/50 . . Underground or underwater installation; Installation through tubing, conduits or ducts **[6]**
6/52 . . . using fluid, e.g. air **[6]**
6/54 . . . using mechanical means, e.g. pulling or pushing devices **[6]**

7/00 **Mountings, adjusting means, or light-tight connections, for optical elements**

7/02 . for lenses
7/04 . . with mechanism for focusing or varying magnification **[2]**
7/06 . . . Focusing binocular pairs
7/08 . . . adapted to co-operate with a remote control mechanism
7/09 . . . adapted for automatic focusing or varying magnification (automatic generation of focusing signals G02B 7/28) **[5]**
7/10 . . . by relative axial movement of several lenses, e.g. of varifocal objective lens
7/105 . . . . with movable lens means specially adapted for focusing at close distances **[4]**
7/12 . . Adjusting pupillary distance of binocular pairs
7/14 . . adapted to interchange lenses
7/16 . . . Rotatable turrets
7/18 . for prisms; for mirrors
7/182 . . for mirrors (optical devices or arrangements using movable or deformable optical elements for controlling the intensity, colour, phase, polarisation or direction of light G02B 26/00) **[5]**
7/183 . . . specially adapted for very large mirrors, e.g. for astronomy (G02B 7/185, G02B 7/192, G02B 7/198 take precedence) **[6]**
7/185 . . . with means for adjusting the shape of the mirror surface (mirrors with curved faces G02B 5/10) **[5]**
7/188 . . . . Membrane mirrors **[5]**
7/192 . . . with means for minimising internal mirror stresses **[5]**
7/195 . . . . Fluid-cooled mirrors **[5]**
7/198 . . . with means for adjusting the mirror relative to its support **[5]**
7/20 . Light-tight connections for movable optical elements
7/22 . . Extensible connections, e.g. bellows
7/24 . . Pivoted connections
7/28 . Systems for automatic generation of focusing signals (measuring distance per se G01C, G01S; using such signals to control focus of particular apparatus, see the subclasses for the apparatus, e.g. G03B, G03F) **[5]**
7/30 . . using parallactic triangle with a base line **[5]**
7/32 . . . using active means, e.g. light emitter **[5]**
7/34 . . using different areas in a pupil plane **[5]**
7/36 . . using image sharpness techniques **[5]**
7/38 . . . measured at different points on the optical axis **[5]**
7/40 . . using time delay of the reflected waves, e.g. of ultrasonic waves **[5]**

9/00 **Optical objectives characterised both by the number of the components and their arrangements according to their sign, i.e. + or −**(G02B 13/00, G02B 15/00 take precedence)

Note

In this group, a component is deemed to be a simple lens or a compound lens or a divided lens equivalent to a simple or to a compound lens.

9/02 . having one + component only (simple lenses G02B 3/00)
9/04 . having two components only
9/06 . . two + components
9/08 . . . arranged about a stop
9/10 . . one + and one −component
9/12 . having three components only
9/14 . . arranged + −+
9/16 . . . all the components being simple
9/18 . . . only one component having a compound lens (G02B 9/30 takes precedence)
9/20 . . . . the rear component having the compound
9/22 . . . . the middle component having the compound
9/24 . . . two of the components having compound lenses (G02B 9/30 takes precedence)
9/26 . . . . the front and rear components having compound lenses
9/28 . . . . the middle and rear components having compound lenses
9/30 . . . the middle component being a −compound meniscus having a + lens
9/32 . . . . the + lens being a meniscus
9/34 . having four components only
9/36 . . arranged + −−+

Note

In this group, the first place priority rule is applied.

9/38 . . . both −components being meniscus
9/40 . . . . one −component being compound
9/42 . . . . two −components being compound
9/44 . . . both −components being biconcave
9/46 . . . . one −component being compound
9/48 . . . . two −components being compound
9/50 . . . both + components being meniscus
9/52 . . . the rear + component being compound
9/54 . . . the front + component being compound
9/56 . . . all components being simple lenses
9/58 . . arranged −+ + −
9/60 . having five components only
9/62 . having six components only
9/64 . having more than six components

11/00 **Optical objectives characterised by the total number of simple and compound lenses forming the objective and their arrangement** (G02B 9/00 takes precedence; having only one simple lens G02B 3/00)

Note

In groups G02B 11/02 to G02B 11/34, lenses in broken contact are counted separately. Simple lenses are denoted by L, compound lenses by C, and the front lens is mentioned first.

11/02 . having two lenses only
11/04 . . arranged C C
11/06 . having three lenses only
11/08 . . arranged L L L
11/10 . . arranged L C L
11/12 . . arranged L L C
11/14 . . arranged C L C
11/16 . . arranged C C L
11/18 . . arranged C C C
11/20 . having four lenses only
11/22 . . arranged L L L L
11/24 . . arranged C L L C
11/26 . . arranged L C C L

11/28 . . arranged C C C C
11/30 . having five lenses only
11/32 . having six lenses only
11/34 . having more than six lenses

13/00 **Optical objectives specially designed for the purposes specified below** (with variable magnification G02B 15/00)

13/02 . Telephoto objectives, i.e. systems of the type + − in which the distance from the front vertex to the image plane is less than the equivalent focal length
13/04 . Reversed telephoto objectives
13/06 . Panoramic objectives; So-called “sky lenses”
13/08 . Anamorphotic objectives
13/10 . . involving prisms (G02B 13/12 takes precedence)
13/12 . . with variable magnification
13/14 . for use with infra-red or ultra-violet radiation (G02B 13/16 takes precedence)
13/16 . for use in conjunction with image converters or intensifiers
13/18 . with lenses having one or more non-spherical faces, e.g. for reducing geometrical aberration
13/20 . Soft-focus objectives (diffusing elements in general G02B 5/02)
13/22 . Telecentric objectives or lens systems
13/24 . for reproducing or copying at short object distances
13/26 . . for reproducing with unit magnification **[3]**

15/00 **Optical objectives with means for varying the magnification** (anamorphotic objectives G02B 13/08)

15/02 . by changing, adding, or subtracting a part of the objective, e.g. convertible objective
15/04 . . by changing a part
15/06 . . . by changing the front part
15/08 . . . by changing the rear part
15/10 . . by adding a part, e.g. close-up attachment
15/12 . . . by adding telescopic attachments (G02B 15/14 takes precedence)
15/14 . by axial movement of one or more lenses or groups of lenses relative to the image plane for continuously varying the equivalent focal length of the objective **[4]**
15/15 . . compensation by means of only one movement or by means of only linearly related movements, e.g. optical compensation **[4]**
15/16 . . with interdependent non-linearly related movements between one lens or lens group, and another lens or lens group (G02B 15/22 takes precedence) **[4]**
15/163 . . . having a first movable lens or lens group and a second movable lens or lens group, both in front of a fixed lens or lens group (G02B 15/177 takes precedence) **[4]**
15/167 . . . . having an additional fixed front lens or group of lenses **[4]**
15/17 . . . . . arranged + − − **[4]**
15/173 . . . . . arranged + − + **[4]**
15/177 . . . having a negative front lens or group of lenses **[4]**
15/20 . . . having an additional movable lens or lens group for varying the objective focal length **[4]**
15/22 . . with movable lens means specially adapted for focusing at close distances **[4]**
15/24 . . . having a front fixed lens or lens group and two movable lenses or lens groups in front of a fixed lens or lens group **[4]**
15/26 . . . . arranged + − − **[4]**
15/28 . . . . arranged + − + **[4]**

17/00 **Systems with reflecting surfaces, with or without refracting elements** (microscopes G02B 21/00; telescopes, periscopes G02B 23/00; beam shaping not otherwise provided for G02B 27/09; for beam splitting or combining G02B 27/10; for optical projection G02B 27/18) **[6]**

17/02 . Catoptric systems, e.g. image erecting and reversing system
17/04 . . using prisms only
17/06 . . using mirrors only
17/08 . Catadioptric systems

19/00 **Condensers** (for microscopes G02B 21/08)

21/00 **Microscopes** (eyepieces G02B 25/00; polarising systems G02B 27/28; measuring microscopes G01B 9/04; microtomes G01N 1/06; scanning-probe techniques or apparatus G01Q) **[1,7]**

21/02 . Objectives
21/04 . . involving mirrors
21/06 . Means for illuminating specimen
21/08 . . Condensers
21/10 . . . affording dark-field illumination (G02B 21/14 takes precedence)
21/12 . . . affording bright-field illumination (G02B 21/14 takes precedence)
21/14 . . . affording illumination for phase-contrast observation
21/16 . adapted for ultra-violet illumination
21/18 . Arrangements with more than one light-path, e.g. for comparing two specimens
21/20 . . Binocular arrangements
21/22 . . . Stereoscopic arrangements
21/24 . Base structure
21/26 . . Stages; Adjusting means therefor
21/28 . . with cooling device
21/30 . . with heating device
21/32 . Micromanipulators structurally combined with microscopes
21/33 . Immersion oils **[6]**
21/34 . Microscope slides, e.g. mounting specimens on microscope slides (preparing specimens for investigation G01N 1/28; means for supporting the objects or the materials to be analysed in electron microscopes H01J 37/20)
21/36 . arranged for photographic purposes or projection purposes (G02B 21/18 takes precedence)

23/00 **Telescopes, e.g. binoculars** (measuring telescopes G01B 9/06); **Periscopes**; **Instruments for viewing the inside of hollow bodies** (diagnostic instruments A61B); **Viewfinders** (objectives G02B 9/00, G02B 11/00, G02B 15/00, G02B 17/00; eyepieces G02B 25/00); **Optical aiming or sighting devices** (non-optical aspects of weapon aiming or sighting devices F41G) **[4]**

23/02 . involving prisms or mirrors (G02B 23/14 takes precedence)
23/04 . . for the purpose of beam splitting or combining, e.g. fitted with eyepieces for more than one observer (G02B 23/10 takes precedence)
23/06 . . having a focusing action, e.g. parabolic mirror
23/08 . . Periscopes
23/10 . . reflecting into the field of view additional indications, e.g. from collimator (collimators in general G02B 27/30; graticules G02B 27/34)

23/12 . with means for image conversion or intensification (objectives for image conversion or intensification G02B 13/16; electrical image converters with optical input and optical output H01J 31/50)
23/14 . Viewfinders (for photographic apparatus G03B 13/02)
23/16 . Housings; Caps; Mountings; Supports, e.g. with counterweight (cases or receptacles A45C)
23/18 . . for binocular arrangements
23/20 . . Collapsible housings (G02B 23/18 takes precedence)
23/22 . . Underwater equipments, e.g. for submarine periscope
23/24 . Instruments for viewing the inside of hollow bodies, e.g. fibrescopes **[4]**
23/26 . . using light guides **[4]**

25/00 **Eyepieces**; **Magnifying glasses** (simple lenses G02B 3/00)
25/02 . with means for illuminating object viewed
25/04 . affording a wide-angle view, e.g. through a spy-hole

26/00 **Optical devices or arrangements using movable or deformable optical elements for controlling the intensity, colour, phase, polarisation or direction of light, e.g. switching, gating, modulating** (mechanically operable parts of lighting devices for the control of light order F21V; specially adapted for measuring characteristics of light G01J; devices or arrangements, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements G02F 1/00; control of light in general G05D 25/00; control of light sources H01S 3/10, H05B 37/00 to H05B 43/00) **[4]**
26/02 . for controlling the intensity of light **[4]**
26/04 . . by periodically varying the intensity of light, e.g. using choppers **[4]**
26/06 . for controlling the phase of light (G02B 26/08 takes precedence) **[4]**
26/08 . for controlling the direction of light (in light guides G02B 6/35) **[4]**
26/10 . . Scanning systems (for special applications, see the relevant places, e.g. G03B 27/32, G03F 3/08, G03G 15/04, G09G 3/00, H04N) **[4]**
26/12 . . . using multifaceted mirrors **[6]**

27/00 **Other optical systems**; **Other optical apparatus** (means for bringing-about special optical effects in shop-windows, showcases A47F, e.g. A47F 11/06; optical toys A63H 33/22; designs or pictures characterised by special light effects B44F 1/00)
27/01 . Head-up displays **[6]**
27/02 . Viewing or reading apparatus (stereoscopic systems G02B 27/22; of the projection type G03B; slide-changing apparatus G03B)
27/04 . . having collapsible parts
27/06 . . with moving-picture effect
27/08 . . Kaleidoscopes
27/09 . Beam shaping, e.g. changing the cross-sectioned area, not otherwise provided for **[6]**
27/10 . Beam splitting or combining systems (mixing and splitting light signals using optical waveguides G02B 6/28; polarising systems G02B 27/28) **[4]**
27/12 . . operating by refraction only
27/14 . . operating by reflection only
27/16 . . used as aids for focusing
27/18 . for optical projection, e.g. combination of mirror and condenser and objective
27/20 . . for imaging minute objects, e.g. light-pointer
27/22 . for producing stereoscopic or other three-dimensional effects (in microscopes G02B 21/22; viewing apparatus G02B 27/02)
27/24 . . involving reflecting prisms and mirrors only
27/26 . . involving polarising means
27/28 . for polarising (used in stereoscopes G02B 27/26)
27/30 . Collimators
27/32 . Fiducial marks or measuring scales within the optical system
27/34 . . illuminated
27/36 . . adjustable
27/40 . Optical focusing aids (beam splitting or combining systems G02B 27/10)
27/42 . Diffraction optics (G02B 27/60 takes precedence) **[3]**
27/44 . . Grating systems; Zone plate systems (G02B 27/46 takes precedence; spectrometry G01J) **[3]**
27/46 . . Systems using spatial filters (character recognition G06K 9/00) **[3]**

Note

In this group, the filter may be in any plane, e.g. the image or the Fourier transfer plane. **[3]**

27/48 . Laser speckle optics (speckle suppression in holography G03H 1/32) **[3]**
27/50 . Optics for phase object visualisation (in microscopes G02B 21/14) **[3]**
27/52 . . Phase contrast optics **[3]**
27/54 . . Schlieren-optical systems **[3]**
27/56 . Optics using evanescent waves, i.e. inhomogeneous waves **[3]**
27/58 . Optics for apodization or superresolution; Optical synthetic aperture systems **[3]**
27/60 . Systems using moire fringes (means for converting the output of a sensing member using diffraction gratings G01D 5/38) **[3]**
27/62 . Optical apparatus specially adapted for adjusting optical elements during the assembly of optical systems (adjusting means being part of the system to be assembled G02B 7/00) **[3]**
27/64 . Imaging systems using optical elements for stabilisation of the lateral and angular position of the image (focusing systems G02B 7/04; adjustment of optical system relative to image or object surface G03B 5/00) **[3]**

G02C **SPECTACLES**; **SUNGLASSES OR GOGGLES INSOFAR AS THEY HAVE THE SAME FEATURES AS SPECTACLES**; **CONTACT LENSES** (trial frames for testing the eyes A61B 3/04; goggles or eyeshields not having the same features as spectacles A61F 9/00)

Note

This subclass also covers monocles, pince-nez or lorgnettes.

Subclass index

1/00 **Assemblies of lenses with bridges or browbars**

1/02 . Bridge or browbar secured to lenses without the use of rims

1/04 . Bridge or browbar secured to, or integral with, partial rims, e.g. with partially-flexible rim for holding the lens

1/06 . Bridge or browbar secured to, or integral with, closed rigid rims for the lenses

1/08 . . the rims being transversely-split and provided with securing means

3/00 **Special supporting arrangement for lens assemblies or monocles** (lenses therefor G02C 7/00; by walking-sticks A45B 3/00)

3/02 . Arrangements for supporting by headgear

3/04 . Arrangements for supporting by hand, e.g. lorgnette; Arrangements for supporting by articles

5/00 **Constructions of non-optical parts**

5/02 . Bridges; Browbars; Intermediate bars (nose-engaging surfaces G02C 5/12)

5/04 . . with adjustable means

5/06 . . with resilient means

5/08 . . foldable

5/10 . . Intermediate bar or bars between bridge and side-members

5/12 . Nose-pads; Nose-engaging surfaces of bridges or rims

5/14 . Side-members

5/16 . . resilient or with resilient parts

5/18 . . reinforced

5/20 . . adjustable, e.g. telescopic

5/22 . Hinges (pivotal connection in general F16C 11/00)

7/00 **Optical parts** (characterised by the material G02B 1/00)

7/02 . Lenses; Lens systems

7/04 . . Contact lenses for the eyes (disinfection or sterilisation of contact lenses A61L 12/00)

7/06 . . bifocal; multifocal

7/08 . . Auxiliary lenses; Arrangements for varying focal length

7/10 . Filters, e.g. for facilitating adaptation of the eyes to the dark; Sunglasses

7/12 . Polarisers

7/14 . Mirrors; Prisms

7/16 . Shades, shields; Obturators, e.g. with pinhole, with slot

9/00 **Attaching auxiliary optical parts**

9/02 . by hinging

9/04 . by fitting over or clamping on

11/00 **Non-optical adjuncts** (H05B 3/84 takes precedence); **Attachment thereof** (G02C 7/16 takes precedence; cases A45C 11/04)

11/02 . Ornaments, e.g. exchangeable

11/04 . Illuminating means

11/06 . Hearing aids (construction of hearing aids H04R 25/00)

11/08 . Anti-misting means, e.g. ventilating, heating; Wipers **[5]**

13/00 **Assembling** (producing spectacle frames from plastics or from substances in a plastic state B29D 12/02); **Repairing**; **Cleaning** (disinfection or sterilisation of contact lenses A61L 12/00)

G02F DEVICES OR ARRANGEMENTS, THE OPTICAL OPERATION OF WHICH IS MODIFIED BY CHANGING THE OPTICAL PROPERTIES OF THE MEDIUM OF THE DEVICES OR ARRANGEMENTS FOR THE CONTROL OF THE INTENSITY, COLOUR, PHASE, POLARISATION OR DIRECTION OF LIGHT, E.G. SWITCHING, GATING, MODULATING OR DEMODULATING; **TECHNIQUES OR PROCEDURES FOR THE OPERATION THEREOF**; **FREQUENCY-CHANGING**; **NON-LINEAR OPTICS**; **OPTICAL LOGIC ELEMENTS**; **OPTICAL ANALOGUE/DIGITAL CONVERTERS** (optical transfer means between sensing member and indicating or recording part in connection with measuring G01D 5/26; devices in which mathematical operations are carried out with optical elements G06E 3/00; electrical signal transmission systems using optical means to convert the input signal G08C 19/36; information-recording by electric or magnetic means and reproducing by sensing optical properties G11B 11/00; static stores using optical elements G11C 13/04; transmission systems employing electromagnetic waves other than radio waves, e.g. light, infra-red radiation, H04B 10/00; optical multiplex systems H04J 14/00; pictorial communication, e.g. television H04N) **[2,4]**

1/00 Devices or arrangements for the control of the intensity, colour, phase, polarisation or direction of light arriving from an independent light source, e.g. switching, gating or modulating; **Non-linear optics** (thermometers using change of colour or translucency G01K 11/12, using changes in fluorescence G01K 11/32; light guide devices G02B 6/00; optical devices or arrangements using movable or deformable elements for controlling light independent of the light source G02B 26/00; control of light in general G05D 25/00; visible signalling systems G08B 5/00; indicating arrangements for variable information by selection or combination of individual elements G09F 9/00; control arrangements or circuits for visual indicators other than cathode-ray tubes G09G 3/00; control of light sources H01S 3/10, H05B 33/08, H05B 35/00 to H05B 43/00) **[2,4]**

Note

This group covers only:
- devices or arrangements, e.g. cells, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements by the influence or control of physical parameters, e.g. electric fields, electric current, magnetic fields, sound or mechanical vibrations, stress or thermal effects; **[2]**
- devices or arrangements in which the electric or magnetic field component of the light beams influences the optical properties of the medium, i.e. non-linear optics; **[2]**
- control of light by electromagnetic waves, e.g. radio waves, or by electrons or other elementary particles. **[2]**

1/01 . for the control of the intensity, phase, polarisation or colour (G02F 1/29, G02F 1/35 take precedence; polarizing elements per se G02B 5/30; static storage per se G11C; image tube screens acting as light valves by shutter operation H01J 29/12; such screen acting by discoloration H01J 29/14) **[2,7]**

1/015 . . based on semiconductor elements with at least one potential jump barrier, e.g. PN, PIN junction (G02F 1/03 takes precedence) **[3]**

1/017 . . . Structures with periodic or quasi periodic potential variation, e.g. superlattices, quantum wells **[7]**

1/025 . . . in an optical waveguide structure (G02F 1/017 takes precedence) **[5,7]**

1/03 . . based on ceramics or electro-optical crystals, e.g. exhibiting Pockels or Kerr effect (G02F 1/061 takes precedence) **[2,4,7]**

1/035 . . . in an optical waveguide structure **[5]**

1/05 . . . with ferro-electric properties (G02F 1/035, G02F 1/055 take precedence) **[2,5]**

1/055 . . . the active material being a ceramic (G02F 1/035 takes precedence) **[4,5]**

1/061 . . based on electro-optical organic material (G02F 1/07 takes precedence) **[7]**

1/065 . . . in an optical waveguide structure **[7]**

1/07 . . based on electro-optical liquids exhibiting Kerr effect **[2]**

1/09 . . based on magneto-optical elements, e.g. exhibiting Faraday effect **[2]**

1/095 . . . in an optical waveguide structure **[5]**

1/11 . . based on acousto-optical elements, e.g. using variable diffraction by sound or like mechanical waves (acousto-optical deflection G02F 1/33) **[2]**

1/125 . . . in an optical waveguide structure **[5]**

1/13 . . based on liquid crystals, e.g. single liquid crystal display cells (liquid crystal materials C09K 19/00) **[2]**

1/133 . . . Constructional arrangements; Operation of liquid crystal cells; Circuit arrangements (arrangements or circuits for control of liquid crystal elements in a matrix, not structurally associated with these elements G09G 3/36) **[3,7]**

1/1333 . . . . Constructional arrangements (G02F 1/135, G02F 1/136 take precedence) **[5]**

1/1334 . . . . . based on polymer-dispersed liquid crystals, e.g. microencapsulated liquid crystals **[7]**

1/1335 . . . . . Structural association of optical devices, e.g. polarisers, reflectors, with the cell **[5]**

1/13357. . . . . Illuminating devices **[7]**

1/13363. . . . . Birefringent elements, e.g. for optical compensation **[7]**

1/1337 . . . . . Surface-induced orientation of the liquid crystal molecules, e.g. by alignment layers **[5]**

1/1339 . . . . . Gaskets; Spacers; Sealing of the cell **[5]**

1/1341 . . . . . Filling or closing of the cell **[5]**

1/1343 . . . . . Electrodes **[5]**

1/1345 . . . . . Conductors connecting electrodes to cell terminals **[5]**

1/1347 . . . . . Arrangement of liquid crystal layers or cells in which the final condition of one light beam is achieved by the addition of the effects of two or more layers or cells **[5]**

1/135 . . . . Liquid crystal cells structurally associated with a photoconducting or a ferro-electric layer, the properties of which can be optically or electrically varied **[3]**

1/136 . . . . Liquid crystal cells structurally associated with a semi-conducting layer or substrate, e.g. cells forming part of an integrated circuit (G02F 1/135 takes precedence) **[5]**

1/1362 . . . . . Active matrix addressed cells **[7]**
1/1365 . . . . . . in which the switching element is a two-electrode device **[7]**
1/1368 . . . . . . in which the switching element is a three-electrode device **[7]**
1/137 . . . characterised by a particular electro- or magneto-optical effect, e.g. field-induced phase transition, orientation effect, guest-host interaction, dynamic scattering **[3]**
1/139 . . . . based on orientation effects in which the liquid crystal remains transparent **[6]**
1/141 . . . . . using ferroelectric liquid crystals **[6]**
1/15 . . based on electrochromic elements **[5]**
1/153 . . . Constructional arrangements **[5]**
1/155 . . . . Electrodes **[5]**
1/157 . . . . Structural association of optical devices, e.g. reflectors or illuminating devices, with the cell **[5]**
1/161 . . . . Gaskets; Spacers; Sealing of the cell; Filling or closing of the cell **[5]**
1/163 . . . Operation of electrochromic cells; Circuit arrangements **[5]**
1/167 . . based on electrophoresis **[5]**
1/17 . . based on variable absorption elements (G02F 1/015 to G02F 1/167 take precedence) **[2,5]**
1/19 . . based on variable reflection or refraction elements (G02F 1/015 to G02F 1/167 take precedence) **[2,5]**
1/21 . . by interference **[2]**
1/225 . . . in an optical waveguide structure **[5]**
1/23 . . for the control of the colour (G02F 1/03 to G02F 1/21 take precedence) **[2]**
1/25 . . . as to hue or predominant wavelength **[2]**
1/29 . for the control of the position or the direction of light beams, i.e. deflection (static stores with electric or magnetic read-in and optical read-out G11C; lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted H01S 3/101) **[4]**
1/295 . . in an optical waveguide structure (G02F 1/313, G02F 1/335 take precedence) **[5]**
1/31 . . Digital deflection devices (G02F 1/33 takes precedence) **[2]**
1/313 . . . in an optical waveguide structure **[5]**
1/315 . . . based on the use of controlled total internal reflection **[3]**
1/33 . . Acousto-optical deflection devices **[2]**
1/335 . . . having an optical waveguide structure **[5]**
1/35 . Non-linear optics (optical bistable devices G02F 3/02; lasers using stimulated Brillouin or Raman effect H01S 3/30) **[2,5]**
1/355 . . characterised by the materials used **[7]**
1/361 . . . Organic materials **[7]**
1/365 . . in an optical waveguide structure (G02F 1/377 takes precedence) **[7]**
1/37 . . for second-harmonic generation **[2]**
1/377 . . . in an optical waveguide structure **[7]**
1/383 . . . . of the optical fibre type **[7]**
1/39 . . for parametric generation or amplification of light, infra-red, or ultra-violet waves (electrical parametric amplifiers H03F 7/00) **[2]**

2/00 **Demodulating light**; **Transferring the modulation of modulated light**; **Frequency-changing of light** (G02F 1/35 takes precedence; photoelectric detecting or measuring devices G01J, H01J 40/00, H01L 31/00; demodulating laser arrangements H01S 3/10; demodulation or transference of modulation of modulated electromagnetic waves in general H03D 9/00) **[2]**
2/02 . Frequency-changing of light, e.g. by quantum counters (luminescent materials C09K 11/00) **[2]**

3/00 **Optical logic elements** (electric-pulse generators using opto-electronic devices as active elements H03K 3/42; logic circuits using opto-electronic devices H03K 19/14); **Optical bistable devices [5]**
3/02 . Optical bistable devices **[5]**

7/00 **Optical analogue/digital converters**

Note

This group covers only converters based in substantial manner on elements which are provided for in group G02F 1/00. **[4]**

G03 PHOTOGRAPHY; CINEMATOGRAPHY; ANALOGOUS TECHNIQUES USING WAVES OTHER THAN OPTICAL WAVES; ELECTROGRAPHY; HOLOGRAPHY [4]

(1) *This class does not cover reproduction of pictures or patterns by scanning and converting into electrical signals, which is covered by subclass H04N.* **[2011.01]**

(2) In this class, the following terms are used with the meaning indicated:
- "records" means photographs or any other kind of latent, directly-visible or permanent storage of pictorial information, which consist of an imagewise distribution of a quantity, e.g. an electric charge pattern, recorded on a carrier member;
- "optical" applies not only to visible light but also to ultra-violet or infra-red radiations. **[4]**

G03B APPARATUS OR ARRANGEMENTS FOR TAKING PHOTOGRAPHS OR FOR PROJECTING OR VIEWING THEM; APPARATUS OR ARRANGEMENTS EMPLOYING ANALOGOUS TECHNIQUES USING WAVES OTHER THAN OPTICAL WAVES; ACCESSORIES THEREFOR (optical parts of such apparatus G02B; photosensitive materials or processes for photographic purposes G03C; apparatus for processing exposed photographic materials G03D) **[4]**

Note

This subclass covers, as far as processes are concerned, only processes characterised by the use or manipulation of apparatus classifiable per se in this subclass.

Subclass index

Details common to at least two of the following types of apparatus: cameras, projectors, printers

1/00 Film-strip handling of general interest for cameras, projectors or printers

1/02 . Moving film strip by pull on end thereof
1/04 . . Pull exerted by take-up spool
1/06 . . . rotated by lever-operated ratchet and pawl
1/08 . . . rotated by band, chain, rack, or other linear reciprocating operation
1/10 . . . rotated by knob through gearing
1/12 . . . rotated by motor, e.g. spring
1/14 . . Special arrangements to ensure constant length of movement of film
1/16 . . . by film-arresting pins
1/18 . Moving film strip by means which act on the film between the ends thereof
1/20 . . Acting means
1/22 . . . Claws or pins engaging holes in the film
1/24 . . . Sprockets engaging holes in the film
1/26 . . . Spiked wheels or pins not penetrating the film
1/28 . . . Shuttle feed
1/30 . . . Belt feed
1/32 . . . Friction grippers or rollers
1/34 . . . Beaters
1/36 . . . Pneumatic acting means
1/38 . . embodying Geneva motion, e.g. Maltese-cross gearing
1/40 . embodying frictional coupling or clutches
1/42 . Guiding, framing, or constraining film in desired position relative to lens system
1/44 . . Guides engaging edge of film (gates G03B 1/48)
1/46 . . Rollers engaging face of film, e.g. barrel, waisted, conical (gates G03B 1/48)
1/48 . . Gates or pressure devices, e.g. plate
1/50 . . . adjustable or interchangeable, e.g. for different film widths
1/52 . . . Pneumatic pressure devices
1/54 . . Tensioning or loop-maintaining devices
1/56 . Threading; Loop forming
1/58 . . automatic

1/60 . Measuring or indicating length of the used or unused film; Counting number of exposures (measuring length in general G01B)
1/62 . . involving locking or stop-motion devices
1/64 . . by means which ascertain the radius of the film coiled on a spool
1/66 . . Counting number of exposures (counting mechanisms per se G06M)

3/00 Focusing arrangements of general interest for cameras, projectors or printers (focusing means, autofocus systems for cameras G03B 13/00; means for automatic focusing of projectors G03B 21/53; means for automatic focusing of projection-printing apparatus or copying cameras G03B 27/34, G03F)
3/02 . moving lens along baseboard
3/04 . adjusting position of image plane without moving lens
3/06 . . using movable reflectors to alter length of light-path
3/10 . Power-operated focusing
3/12 . . adapted for remote control (control systems in general G05)

5/00 Adjustment of optical system relative to image or object surface other than for focusing of general interest for cameras, projectors or printers
5/02 . Lateral adjustment of lens
5/04 . Vertical adjustment of lens; Rising fronts
5/06 . Swinging lens about normal to the optical axis
5/08 . Swing backs

Details common to cameras

7/00 Control of exposure by setting shutters, diaphragms, or filters separately or conjointly (measuring intensity of light G01J; control of exposure in television cameras by means of circuitry for compensating for variation in the brightness of the object H04N 5/235)
7/02 . Control effected by setting a graduated member on the camera in accordance with indication or reading afforded by a light meter, which may be either separate from, or built into, camera body
7/04 . Control effected by hand adjustment of a member that senses indication of a pointer of a built-in light-sensitive device, e.g. by restoring pointer to a fixed associated reference mark
7/06 . . by a follow-up movement of an associated reference mark to the pointer
7/08 . Control effected solely by response to built-in light-sensitive device to the intensity of light received by the camera
7/081 . . Analogue circuits **[3]**
7/083 . . . for control of exposure time **[3]**
7/085 . . . for control of aperture **[3]**
7/087 . . . for control of both exposure time and aperture **[3]**
7/089 . . . for storage of exposure value in mirror reflex cameras **[3]**
7/091 . . Digital circuits **[3]**
7/093 . . . for control of exposure time **[3]**
7/095 . . . for control of aperture **[3]**
7/097 . . . for control of both exposure time and aperture **[3]**
7/099 . . Arrangement of photoelectric elements in or on the camera **[3]**
7/10 . . a servo-motor providing energy to move the setting member
7/12 . . a hand-actuated member moved from one position to another providing the energy to move the setting member, e.g. depression of shutter release button causes a stepped feeler to co-operate with the pointer of the light-sensitive device to set the diaphragm and thereafter release the shutter
7/14 . . . setting of both shutter and diaphragm aperture being effected so as to give the optimum compromise between depth of field and shortness of exposure
7/16 . in accordance with both the intensity of the flash source and the distance of the flash source from object, e.g. in accordance with "guide number" of flash bulb and the focusing of the camera
7/18 . in accordance with light-reducing "factor" of filter or other obturator used with or on the lens of the camera
7/20 . in accordance with change of lens
7/22 . in accordance with temperature or height, e.g. in aircraft
7/24 . automatically in accordance with markings or other means indicating film speed or kind of film on the magazine to be inserted in the camera **[3]**
7/26 . Power supplies; Circuitry or arrangement to switch on the power source; Circuitry to check the power source voltage **[3]**
7/28 . Circuitry to measure or to take account of the object contrast **[3]**

9/00 Exposure-making shutters; **Diaphragms**
9/02 . Diaphragms **[2]**
9/04 . . Single movable plate with two or more apertures of graded size, e.g. sliding plate, pivoting plate
9/06 . . Two or more co-operating pivoted blades e.g. iris type (shutters functioning as diaphragms by limiting extent of opening movement G03B 9/08)
9/07 . . with means for presetting the diaphragm
9/08 . Shutters (electro-, magneto-, or acousto-optical shutters G02F 1/00) **[2]**
9/10 . . Blade or disc rotating or pivoting about axis normal to its plane
9/12 . . . Two relatively-adjustable aperture-defining members moving as a unit
9/14 . . . Two separate members moving in opposite directions
9/16 . . . Two separate members moving in the same direction
9/18 . . . More than two members
9/20 . . . . each moving in a single direction first to open and then to reclose
9/22 . . . . each moving in one direction to open and then in opposite direction to close, e.g. iris type
9/24 . . . Adjusting size of aperture formed by members when fully open so as to constitute a virtual diaphragm that is adjustable
9/26 . . . incorporating cover blade or blades
9/28 . . Roller blind or flexible plate
9/30 . . . Single blind with multiple slots or other aperture
9/32 . . . Double blind
9/34 . . . . with adjustable slot; with mechanism controlling relative movement of blinds to form slot
9/36 . . Sliding rigid plate
9/38 . . . Single rigid plate with multiple slots or other apertures
9/40 . . . Double plate

9/42 . . . . with adjustable slot; with mechanism controlling relative movement of plates to form slot
9/44 . . . Curved track and plate
9/46 . . Flap shutters pivoting about axis in plane of flap
9/48 . . . Double flap
9/50 . . . Louvre type
9/52 . . Barrel shutters
9/54 . . Conical shutters; Rotating plate with axis of rotation inclined to optical axis of shutter
9/58 . Means for varying duration of "open" period of shutter
9/60 . . by varying speed of movement of obturating members
9/62 . . by varying interval of time between end of opening movement and beginning of closing movement
9/64 . Mechanism for delaying opening of shutter (separate from shutter G03B 17/38)
9/66 . Means for cocking shutter separate from means for releasing shutter
9/68 . . Cocking effected by movement of film
9/70 . with flash-synchronising contacts

11/00 Filters or other obturators specially adapted for photographic purposes (filters per se G02B)
11/02 . Sky masks
11/04 . Hoods or caps for eliminating unwanted light from lenses, viewfinders, or focusing aids
11/06 . . Lens caps for exposure making

13/00 Viewfinders; **Focusing aids for cameras**; **Means for focusing for cameras**; **Autofocus systems for cameras** (hoods, caps G03B 11/04; reflex camera arrangements G03B 19/12, G03B 19/14; rangefinders per se G01C 3/00; automatic focusing in general G02B 7/09; systems for automatic generation of focusing signals G02B 7/28) **[5]**
13/02 . Viewfinders
13/04 . . of direct-vision type, e.g. frame, sighting mark
13/06 . . with lenses with or without reflectors
13/08 . . . with reflected image of frame
13/10 . . adjusting viewfinder field
13/12 . . . to compensate for change of camera lens or size of picture
13/14 . . . to compensate for parallax due to short range
13/16 . . combined with focusing aids
13/18 . Focusing aids
13/20 . . Rangefinders coupled with focusing arrangements, e.g. adjustment of rangefinder automatically focusing camera
13/22 . . . coupling providing for compensation upon change of camera lens
13/24 . . Focusing screens
13/26 . . . with magnifiers for inspecting image formed on screen
13/28 . . . Image-splitting devices
13/30 . . indicating depth of field **[5]**
13/32 . Means for focusing **[5]**
13/34 . . Power focusing **[5]**
13/36 . . . Autofocus systems **[5]**

15/00 Special procedures for taking photographs; **Apparatus therefor**
15/02 . Illuminating scene
15/03 . . Combinations of cameras with lighting apparatus; Flash units
15/035 . . . Combinations of cameras with incandescent lamps
15/04 . . . Combinations of cameras with non-electronic flash apparatus; Non-electronic flash units (light sources using a charge of combustible material F21K 5/00; ignition circuits H05B 43/02)
15/05 . . . Combinations of cameras with electronic flash apparatus; Electronic flash units (discharge lamps per se H01J; circuit arrangements H05B 41/00)
15/06 . . Special arrangements of screening, diffusing, or reflecting devices, e.g. in studio
15/07 . . . Arrangements of lamps in studios
15/08 . Trick photography
15/10 . . using back-projection, i.e. blending artificial background with real foreground
15/12 . . using mirrors
15/14 . for taking photographs during medical operations
15/16 . for photographing the track of moving objects (high-speed photography G03B 39/00; recording tracks of nuclear particles G01T 5/00)

17/00 Details of cameras or camera bodies; **Accessories therefor** (lens hoods or caps G03B 11/04)
17/02 . Bodies
17/04 . . collapsible, foldable, or extensible, e.g. book type (bellows for instruments in general G12B)
17/06 . . with exposure meters or other indicators built into body but not connected to other camera members
17/08 . . Waterproof bodies or housings
17/10 . . Soundproof bodies
17/12 . . with means for supporting objectives, supplementary lenses, filters, masks, or turrets
17/14 . . . interchangeably
17/16 . . for containing both motion-picture camera and still-picture camera
17/17 . . with reflectors arranged in beam forming the photographic image, e.g. for reducing dimensions of camera
17/18 . Signals indicating condition of a camera member or suitability of light (indicating depth of field G03B 13/30)
17/20 . . visible in viewfinder
17/22 . with means for cutting-off film
17/24 . with means for separately producing marks on the film, e.g. title, time of exposure
17/26 . Holders for containing light-sensitive material and adapted to be inserted within the camera (holders for X-ray films G03B 42/04) **[2]**
17/28 . Locating light-sensitive material within camera
17/30 . . Locating spools or other rotatable holders of coiled film
17/32 . . Locating plates or cut films
17/34 . . . Changing plates or cut films
17/36 . Counting number of exposures (of film strips G03B 1/66; counting mechanisms in general G06M)
17/38 . Releasing-devices separate from shutter (integral with shutter G03B 9/08)
17/40 . . with delayed or timed action
17/42 . Interlocking between shutter operation and advance of film or change of plate or cut-film
17/44 . Means for exchanging focusing screen and light-sensitive material
17/46 . Means for exposing single frames in motion-picture camera

17/48 . adapted for combination with other photographic or optical apparatus (with microscopes, with telescopes G02B)
17/50 . . with both developing and finishing apparatus (processing apparatus G03D)
17/52 . . . of the Land type
17/53 . . . for automatically delivering a finished picture after a signal causing exposure has been given, e.g. by pushing a button, by inserting a coin
17/54 . . with projector
17/55 . with provision for heating or cooling, e.g. in aircraft
17/56 . Accessories (carrying-cases A45C)
17/58 . . Attachments for converting cameras into reflex cameras

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19/00 **Cameras** (details G03B 17/00)
19/02 . Still-picture cameras
19/04 . . Roll-film cameras
19/06 . . . adapted to be loaded with more than one film, e.g. with exposure of one or the other at will (G03B 19/07 takes precedence)
19/07 . . . having more than one objective
19/08 . . . with provision for alternative use with plates or cut-films
19/10 . . Plate or cut-film cameras (with provision for alternative use with roll film G03B 19/08)
19/12 . . Reflex cameras with single objective and a movable reflector or a partly-transmitting mirror
19/14 . . with paired lenses, one of which forms image on photographic material and the other forms a corresponding image on a focusing screen
19/16 . . Pin-hole cameras
19/18 . Motion-picture cameras (with non-intermittently running film G03B 41/02)
19/20 . . Reflex cameras
19/22 . . Double cameras
19/24 . . adapted to be loaded with more than one film, e.g. with exposure of one or the other at will
19/26 . . with fade-in and fade-out effects **[4]**

21/00 **Projectors or projection-type viewers**; **Accessories therefor** (devices for changing pictures G03B 23/00; zoetropes G03B 25/00; photographic printing apparatus G03B 27/00; devices or systems producing a varying lighting effect F21S 10/00; optical projection comparators G01B 9/08; projection microscopes G02B 21/36)
21/02 . Multiple-film apparatus
21/04 . . Picture "juke-boxes"
21/06 . affording only episcopic projection
21/08 . affording epidiascopic projection
21/10 . Projectors with built-in or built-on screen (projection screens in general G03B 21/56)
21/11 . . for microfilm reading
21/12 . adapted for projection of either still pictures or motion pictures (prolonged exhibition of single frame G03B 21/38)
21/13 . Projectors for producing special effects at the edges of picture, e.g. blurring
21/132 . Overhead projectors, i.e. capable of projecting hand-writing or drawing during action (epidiascopic projectors G03B 21/08)
21/134 . Projectors combined with typing apparatus or with printing apparatus
21/14 . Details
21/16 . . Cooling; Preventing overheating
21/18 . . Fire preventing or extinguishing
21/20 . . Lamp housings (condensers per se G02B)
21/22 . . Soundproof bodies
21/26 . . Projecting separately subsidiary matter simultaneously with main image (light pointers G02B 27/20)
21/28 . . Reflectors in projection beam
21/30 . . adapted to collapse or fold, e.g. for portability
21/32 . . Details specially adapted for motion-picture projection (with film moving continuously through the gate G03B 41/02)
21/34 . . . Change-over arrangements
21/36 . . . . Fades, dissolves, or wipes
21/38 . . . Prolonged exhibition of single frame
21/40 . . . Eliminating or reducing effect of flicker
21/42 . . . Preventing damage to film due to abnormal operation of projector
21/43 . . . Driving mechanisms
21/44 . . . . Mechanisms transmitting motion to film-strip feed; Mechanical linking of shutter and intermittent feed (film-strip feed per se G03B 1/00)
21/46 . . . . . affording adjustment for framing
21/48 . . . . . for altering frame speed; for regulating constancy of film speed
21/50 . . . Control devices operated by the film strip during the run (controlling or regulating speed G03B 21/48)
21/52 . . . . by prepared film
21/53 . . Means for automatic focusing, e.g. to compensate thermal effects (automatic focusing in general G02B 7/09; systems for automatic generation of focusing signals G02B 7/28) **[5]**
21/54 . Accessories
21/56 . . Projection screens
21/58 . . . collapsible, e.g. foldable; of variable area
21/60 . . . characterised by the nature of the surface, e.g. lenticular, fluid
21/62 . . . . translucent
21/64 . . Means for mounting individual pictures to be projected, e.g. frame for transparency

23/00 **Devices for changing pictures in viewing apparatus or projectors** (film-strip handling G03B 1/00; direct viewers G02B)

Note

In this group, the following term is used with the meaning indicated:
– "picture" means any flat representation, whether transparent or not, e.g. produced by photography, writing, or printing.

23/02 . in which a picture is removed from a stock and returned to the same stock or another one; Magazines therefor
23/04 . . with linear movement
23/06 . . with rotary movement
23/08 . in which pictures are attached to a movable carrier
23/10 . . drum or disc carrier
23/12 . . linear strip carrier
23/14 . Carriers operable to move pictures into, and out of, the projection or viewing position and carrying one or two pictures only in a removable manner (G03B 23/18 takes precedence) **[4]**
23/18 . with fade-in and fade-out effects **[4]**

25/00 **Viewers, other than projection viewers, giving motion-picture effects by persistence of vision, e.g. zoetrope** (high-speed photography G03B 39/00)

25/02 . with interposed lenticular or line screen

27/00 **Photographic printing apparatus** (film-strip handling G03B 1/00)

27/02 . Exposure apparatus for contact printing

27/04 . . Copying apparatus without a relative movement between the original and the light source during exposure, e.g. printing frame, printing box

27/06 . . . for automatic repeated copying of the same original

27/08 . . . for automatic copying of several originals one after the other, e.g. for copying cinematograph film

27/10 . . Copying apparatus with a relative movement between the original and the light source during exposure

27/12 . . . for automatic repeated copying of the same original

27/14 . . Details

27/16 . . . Illumination arrangements, e.g. positioning of lamps, positioning of reflectors (controlling the exposure G03B 27/72)

27/18 . . . Maintaining or producing contact pressure between original and light-sensitive material

27/20 . . . . by using a vacuum or fluid pressure

27/22 . . . . by stretching over a curved surface

27/24 . . . Separating the original from the print

27/26 . . . Cooling

27/28 . . . Edge-masking devices

27/30 . . . adapted to be combined with processing apparatus (processing apparatus per se G03D)

27/32 . Projection printing apparatus, e.g. enlarger, copying camera

27/34 . . Means for automatic focusing therefor (systems for automatic generation of focusing signals G02B 7/28; means for automatic focusing for photomechanical production G03F 7/207) **[4]**

27/36 . . . by mechanical connections, e.g. by cam, by linkage

27/38 . . . . embodying screws with non-uniform pitch

27/40 . . . . adapted for use with lenses of different focal length

27/42 . . for automatic sequential copying of the same original (G03B 27/34, G03B 27/53 take precedence) **[4]**

27/44 . . for multiple copying of the same original at the same time (G03B 27/34, G03B 27/53 take precedence) **[4]**

27/46 . . for automatic sequential copying of different originals, e.g. enlargers, roll film printers (G03B 27/34, G03B 27/50, G03B 27/53 take precedence) **[4]**

27/465 . . . at different positions of the same strip, e.g. microfilm **[4]**

27/47 . . . at different positions of the same sheet, e.g. microfiche **[4]**

27/475 . . . copying cinematographic film (G03B 27/48 takes precedence) **[4]**

27/48 . . . with original in the form of a film strip moving continuously and compensation for consequent image movement

27/50 . . with slit or like diaphragm moving over original for progressive exposure (G03B 27/34 takes precedence) **[4]**

27/52 . . Details

27/53 . . . Automatic registration or positioning of originals with respect to each other or the photosensitive layer (within photo-mechanical production of textured or patterned surfaces, e.g. of integrated circuits, G03F 9/00) **[4]**

27/54 . . . Lamp housings; Illuminating means (controlling the exposure G03B 27/72)

27/56 . . . Mounting enlarger head on column

27/58 . . . Baseboards, masking frames, or other holders for the sensitive material (G03B 27/53 takes precedence) **[4]**

27/60 . . . . using a vacuum or fluid pressure

27/62 . . . Holders for the original (G03B 27/53 takes precedence) **[4]**

27/64 . . . . using a vacuum or fluid pressure

27/66 . . . specially adapted for holding half-tone screens

27/68 . . . Introducing or correcting distortion, e.g. in connection with oblique projection

27/70 . . . Reflectors in printing beam

27/72 . Controlling or varying light intensity, spectral composition, or exposure time in photographic printing apparatus (exposure meters per se G01J; control of light intensity in general G05D 25/00)

27/73 . . Controlling exposure by variation of spectral composition, e.g. multicolor printers **[3]**

27/74 . . Positioning exposure meters in the apparatus

27/80 . . in dependence upon automatic analysis of the original (G03B 27/73 takes precedence) **[3]**

29/00 **Combinations of cameras, projectors, or photographic printing apparatus with non-photographic non-optical apparatus, e.g. clocks, weapons**; **Cameras having the shape of other objects** (combinations with flash apparatus G03B 15/03; combinations with instruments for medical examination of cavities or tubes of the body A61B 1/04; arrangements specially adapted for eye photography A61B 3/14; combinations with surveying instruments G01C; combinations with core or moderator structure of nuclear reactors G21C 17/08; structural combinations with electric discharge tubes H01J 5/16, H01J 29/89, H01J 37/22)

Special techniques

31/00 **Associated working of cameras or projectors with sound-recording or -reproducing means** (record carriers characterised by the selection of the material and comprising cinematographic film and magnetic track G11B 5/633)

31/02 . in which sound track is on a moving-picture film

31/04 . in which sound track is not on, but is synchronised with, a moving-picture film

31/06 . in which sound track is associated with successively-shown still pictures

31/08 . with fade-in and fade-out effects **[4]**

33/00 **Colour photography, other than mere exposure or projection of a colour film** (printing apparatus G03B 27/00; stereoscopic colour photography G03B 35/00)

33/02 . by two-colour separation records, e.g. red-aspect and white complete records; using Land effect

33/04 . by four or more separation records

33/06 . by additive-colour projection apparatus

33/08 . Sequential recording or projection (G03B 33/02, G03B 33/04, G03B 33/06 take precedence)

33/10 . Simultaneous recording or projection (G03B 33/02, G03B 33/04, G03B 33/06 take precedence)
33/12 . . using beam-splitting or beam-combining systems, e.g. dichroic mirrors
33/14 . . using lenticular screens (integral with film G03C)
33/16 . . using colour-pattern screens (integral with film G03C)

35/00 Stereoscopic photography (panoramic or wide-screen systems G03B 37/00; photogrammetry G01C)
35/02 . by sequential recording
35/04 . . with movement of beam-selecting members in a system defining two or more viewpoints
35/06 . . with axial movement of lens or gate between exposures
35/08 . by simultaneous recording
35/10 . . having single camera with stereoscopic-base-defining system
35/12 . . involving recording of different viewpoint images in different colours on a colour film
35/14 . Printing apparatus specially adapted for conversion between different types of record (G03B 42/08 takes precedence) **[4]**
35/16 . by sequential viewing
35/18 . by simultaneous viewing
35/20 . . using two or more projectors
35/22 . . using single projector with stereoscopic-base-defining system
35/24 . . using apertured or refractive resolving means on screen or between screen and eye
35/26 . . using polarised or coloured light for separating different viewpoint images

37/00 Panoramic or wide-screen photography; **Photographing extended surfaces, e.g. for surveying**; **Photographing internal surfaces, e.g. of pipe**
37/02 . with scanning movement of lens or camera
37/04 . with cameras or projectors providing touching or overlapping fields of view
37/06 . involving anamorphosis (G03B 37/02, G03B 37/04 take precedence)

39/00 High-speed photography
39/02 . using stationary plate or film (G03B 39/06 takes precedence)
39/04 . using moving plate or film (G03B 39/06 takes precedence)
39/06 . using light-guides for transferring image frame or elements thereof into different array, e.g. into a line

41/00 Special photographic techniques not covered by groups G03B 31/00 to G03B 39/00; **Apparatus therefor [2]**
41/02 . using non-intermittently-running film
41/04 . . with optical compensator
41/06 . . . with rotating reflecting member
41/08 . . . with rotating transmitting member
41/10 . . . with oscillating reflecting member
41/12 . . . with oscillating transmitting member
41/14 . . Overcoming image movement by brief flashes of light

42/00 Obtaining records using waves other than optical waves; **Visualisation of such records by using optical means** (investigating or analysing materials using electromagnetic or sonic waves G01N; using radar, sonar or analogous techniques G01S) **[4]**
42/02 . using X-rays (measurement of X-radiation G01T; X-ray apparatus, circuits therefor H05G 1/00) **[4]**
42/04 . . Holders for X-ray films **[4]**
42/06 . using ultrasonic, sonic or infrasonic waves (measurement of ultrasonic, sonic or infrasonic waves G01H) **[4]**
42/08 . Visualisation of records by optical means (optical systems using spatial filters G02B 27/46; optics for phase object visualisation G02B 27/50) **[4]**

43/00 Testing correct operation of photographic apparatus or parts thereof (measuring specific variables G01)
43/02 . Testing shutters (measuring time intervals G04F)

G03C PHOTOSENSITIVE MATERIALS FOR PHOTOGRAPHIC PURPOSES (for photomechanical purposes G03F); **PHOTOGRAPHIC PROCESSES, E.G. CINE, X-RAY, COLOUR, STEREO-PHOTOGRAPHIC PROCESSES**; **AUXILIARY PROCESSES IN PHOTOGRAPHY** (photographic processes characterised by the use or manipulation of apparatus classifiable per se in subclass G03B, see G03B; photomechanical production of textured or patterned surfaces G03F; electrography, electrophotography, magnetography G03G)

Note

In this subclass, the following expressions are used with the meanings indicated:
– "photosensitive compositions" covers photosensitive substances, e.g. silver halides, and, if applicable, binders or additives;
– "photosensitive materials" covers the photosensitive compositions, e.g. emulsions, the bases carrying them, and, if applicable, auxiliary layers. **[5]**

Subclass index

1/00 **Photosensitive materials** (photosensitive materials for multicolour processes G03C 7/00; for diffusion transfer processes G03C 8/00; photosensitive glass C03C 4/04) **[5]**

1/005 . Silver halide emulsions; Preparation thereof; Physical treatment thereof; Incorporation of additives therein (catalytic amounts of silver halide in dry silver systems G03C 1/498) **[5]**

1/015 . . Apparatus or processes for the preparation of emulsions (coating, drying G03C 1/74) **[5]**

1/025 . . Physical treatment of emulsions, e.g. by ultrasonics, refrigeration, pressure (coating, drying G03C 1/74) **[5]**

1/035 . . characterised by the crystal form or composition, e.g. mixed grain **[5]**

1/04 . . with macromolecular additives; with layer-forming substances **[5]**

1/043 . . . Polyalkylene oxides; Polyalkylene sulfides; Polyalkylene selenides; Polyalkylene tellurides **[5]**

1/047 . . . Proteins, e.g. gelatine derivatives; Hydrolysis or extraction products of proteins **[5]**

1/053 . . . Polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds, e.g. vinyl polymers **[5]**

1/06 . . with non-macromolecular additives (G03C 1/04 takes precedence) **[5]**

1/07 . . . Substances influencing grain growth during silver salt formation **[5]**

1/08 . . . Sensitivity-increasing substances **[5]**

1/09 . . . . Noble metals or mercury; Salts or compounds thereof; Sulfur, selenium or tellurium, or compounds thereof, e.g. for chemical sensitising (G03C 1/34, G03C 1/35 take precedence) **[5]**

1/10 . . . . Organic substances

1/12 . . . . . Methine or polymethine dyes

1/14 . . . . . with an odd number of CH groups

1/16 . . . . . with one CH group

1/18 . . . . . with three CH groups

1/20 . . . . . with more than three CH groups

1/22 . . . . . with an even number of CH groups

1/24 . . . . . Styryl dyes

1/26 . . . . . Polymethine chain forming part of a heterocyclic ring

1/28 . . . . together with supersensitising substances

1/29 . . . . . the supersensitising mixture being solely composed of dyes **[5]**

1/295 . . . Development accelerators **[5]**

1/30 . . . Hardeners

1/31 . . . Plasticisers **[2]**

1/32 . . . Matting agents

1/33 . . . Spot-preventing agents **[2]**

1/34 . . . Fog-inhibitors; Stabilisers; Agents inhibiting latent image regression **[5]**

1/35 . . . Antiplumming agents, i.e. antibronzing agents; Toners **[2,5]**

1/36 . . . Desensitisers (direct positive emulsions G03C 1/485) **[5]**

1/37 . . . Antiseptic agents **[2]**

1/38 . . . Dispersants; Agents facilitating spreading **[5]**

1/40 . . . Dyestuffs not covered by groups G03C 1/08 to G03C 1/38 or G03C 1/42 **[5]**

1/42 . . . Developers or their precursors **[5]**

1/43 . . . Processing agents or their precursors, not covered by groups G03C 1/07 to G03C 1/42 **[5]**

1/46 . . having more than one photosensitive layer

1/485 . . Direct positive emulsions **[2,5]**

1/49 . . Print-out and photodevelopable emulsions **[2,5]**

1/492 . . Photosoluble emulsions **[5]**

1/494 . Silver salt compositions other than silver halide emulsions; Photothermographic systems **[5]**

1/496 . . Binder-free compositions, e.g. evaporated **[5]**

1/498 . . Photothermographic systems, e.g. dry silver **[5]**

1/50 . Compositions containing noble metal salts other than silver salts, as photosensitive substances **[5]**

1/52 . Compositions containing diazo compounds as photosensitive substances (G03C 1/64 takes precedence) **[5]**

1/54 . . Diazonium salts or diazo anhydrides

1/56 . . Diazo sulfonates

1/58 . . Coupling substances therefor **[5]**

1/60 . . with macromolecular additives **[5]**

1/61 . . with non-macromolecular additives **[5]**

1/62 . . . Metal compounds reducible to metal

1/64 . Compositions containing iron compounds as photosensitive substances **[5]**

1/66 . Compositions containing chromates as photosensitive substances **[5]**

1/67 . Compositions containing cobalt compounds as photosensitive substances **[5]**

1/675 . Compositions containing polyhalogenated compounds as photosensitive substances (for photopolymerisable or photocrosslinkable compositions G03F 7/028, G03F 7/038) **[5]**

1/685 . Compositions containing spiro-condensed pyran compounds or derivatives thereof, as photosensitive substances **[5]**

1/695 . Compositions containing azides as photosensitive substances (for photopolymerisable or photocrosslinkable compositions G03F 7/008) **[5]**

1/705 . Compositions containing chalcogenides, metals or alloys thereof, as photosensitive substances, e.g. photodope systems (used as photoresists G03F 7/004) **[5]**

1/72 . Photosensitive compositions not covered by groups G03C 1/005 to G03C 1/705 **[5]**

1/725 . . containing inorganic compounds **[5]**

1/73 . . containing organic compounds **[5]**

1/735 . . . Organo-metallic compounds **[5]**

1/74 . Applying photosensitive compositions to the base; Drying processes therefor (G03C 1/496 takes precedence) **[2,5]**

1/76 . Photosensitive materials characterised by the base or auxiliary layers **[5]**

1/765 . . characterised by the shape of the base, e.g. arrangement of perforations, jags **[5]**

1/77 . . the base being of metal **[5]**

1/775 . . the base being of paper **[5]**

1/785 . . . translucent **[5]**

1/79 . . . Macromolecular coatings or impregnations therefor, e.g. varnishes **[5]**

1/795 . . the base being formed of macromolecular substances (G03C 1/775 takes precedence) **[5]**

1/805 . . characterised by stripping layers or stripping means **[5]**

1/81 . . characterised by anti-coiling means **[5]**

1/815 . . characterised by means for filtering or absorbing ultra-violet light, e.g. optical bleaching agents (for photoprinting G03C 5/10; for intensifying X-ray images G03C 5/17) **[5]**

1/825 . . characterised by antireflecting means or visible-light filtering means, e.g. anti-halation **[5]**
1/83 . . . Organic dyestuffs therefor **[5]**
1/835 . . . Macromolecular substances therefor, e.g. mordants **[5]**
1/85 . . characterised by antistatic additives or coatings **[5]**
1/89 . . . Macromolecular substances therefor **[5]**
1/91 . . characterised by subbing layers or subbing means **[5]**
1/93 . . . Macromolecular substances therefor **[5]**
1/95 . . rendered opaque or writable, e.g. with inert particulate additives (G03C 1/775 takes precedence) **[5]**

3/00 Packages of films for inserting into cameras, e.g. roll-films, film-packs; **Wrapping materials for light-sensitive plates, films, or papers, e.g. materials characterised by the use of special dyes, printing inks, adhesives** (wrapping materials in general B65D)
3/02 . Photographic roll-films with paper strips

5/00 Photographic processes or agents therefor; **Regeneration of such processing agents** (multicolour processes G03C 7/00; diffusion transfer processes G03C 8/00; stereo-photographic processes G03C 9/00; photomechanical processes G03F) **[4,5]**
5/02 . Sensitometric processes, e.g. determining sensitivity, colour sensitivity, gradation, graininess, density; Making sensitometric wedges
5/04 . Photo-taking processes
5/06 . . Travelling-mask processes
5/08 . Photoprinting (G03C 5/18 takes precedence); Processes or means for preventing photoprinting **[3,5]**
5/10 . . Reflex-printing; Photoprinting using fluorescent or phosphorescent means **[5]**
5/12 . Cinematographic processes of taking pictures or printing
5/14 . . combined with sound-recording (sound-recording in general G11B)
5/16 . X-ray, infra-red, or ultra-violet ray processes
5/17 . . using screens to intensify X-ray images (X-ray conversion screens G21K 4/00) **[2,4]**
5/18 . Diazo-type processes, e.g. thermal development, or agents therefor **[3,5]**
5/20 . . Reflex-printing
5/22 . Direct chromate processes, i.e. without preceding silver picture, or agents therefor **[5]**
5/26 . Processes using silver-salt-containing photosensitive materials or agents therefor (physical development G03C 5/58) **[5]**
5/28 . . Cinematographic-film processes **[5]**
5/29 . . Development processes or agents therefor (G03C 5/38, G03C 5/50 take precedence) **[5]**
5/30 . . . Developers
5/305 . . . Additives other than developers **[5]**
5/31 . . . Regeneration; Replenishers **[5]**
5/315 . . . Tanning development **[5]**
5/32 . . Latensification; Desensitising **[5]**
5/38 . . Fixing; Developing-fixing; Hardening-fixing (bleach-fixing G03C 5/44) **[5]**
5/39 . . . Stabilising, i.e. fixing without washing out **[2,5]**
5/395 . . Regeneration of photographic processing agents other than developers; Replenishers therefor **[4,5]**
5/40 . . Chemically transforming developed images (G03C 5/50 takes precedence) **[5]**
5/42 . . . Reducing; Intensifying **[5]**
5/44 . . . Bleaching; Bleach-fixing **[5]**
5/46 . . . Toning **[5]**
5/48 . . . Mordanting **[5]**
5/50 . . Reversal development; Contact processes (G03C 5/315, G03C 8/00 take precedence) **[5]**
5/56 . Processes using photosensitive compositions covered by groups G03C 1/64 to G03C 1/72 or agents therefor (G03C 5/58 takes precedence) **[5]**
5/58 . Processes for obtaining metallic images by vapour deposition or physical development (images obtained by photomechanical means, e.g. by etching, G03F) **[5]**
5/60 . Processes for obtaining vesicular images **[5]**

7/00 Multicolour photographic processes or agents therefor; **Regeneration of such processing agents**; **Photosensitive materials for multicolour processes** (diffusion transfer processes G03C 8/00) **[4,5]**
7/02 . Direct bleach-out processes; Materials therefor; Preparing or processing such materials **[5]**
7/04 . Additive processes using colour screens; Materials therefor; Preparing or processing such materials **[5]**
7/06 . . Manufacture of colour screens
7/08 . . . from diversely-coloured grains irregularly distributed
7/10 . . . with regular areas of colour, e.g. bands, lines, dots
7/12 . . . . by photo-exposure
7/14 . Additive processes using lenticular screens; Materials therefor; Preparing or processing such materials **[5]**
7/18 . Processes for the correction of the colour image in subtractive colour photography (using coloured colour-couplers G03C 7/333) **[5]**
7/20 . Subtractive colour processes using differently sensitised films, each coated on its own base, e.g. bipacks, tripacks **[5]**
7/22 . Subtractive cinematographic processes; Materials therefor; Preparing or processing such materials **[5]**
7/24 . . combined with sound-recording (sound-recording in general G11B)
7/25 . . Dye-imbibition processes; Materials therefor; Preparing or processing such materials **[5]**
7/26 . Silver halide emulsions for subtractive colour processes (G03C 7/28 to G03C 7/30 take precedence) **[5]**
7/28 . Silver dye bleach processes; Materials therefor; Preparing or processing such materials **[5]**
7/29 . . Azo dyes therefor **[5]**
7/30 . Colour processes using colour-coupling substances; Materials therefor; Preparing or processing such materials **[5]**
7/305 . . Substances liberating photographically active agents, e.g. development-inhibiting releasing couplers (G03C 7/388 takes precedence) **[5]**
7/32 . . Colour-coupling substances (G03C 7/305, G03C 7/388 take precedence) **[5]**
7/327 . . . Macromolecular coupling substances **[5]**
7/333 . . . Coloured coupling substances, e.g. for the correction of the coloured image **[5]**
7/34 . . . Couplers containing phenols (G03C 7/327, G03C 7/333 take precedence) **[5]**
7/36 . . . Couplers containing compounds with active methylene groups (G03C 7/327, G03C 7/333 take precedence) **[5]**
7/38 . . . . in rings **[5]**
7/384 . . . . . in pyrazolone rings **[5]**

7/388 . . Processes for the incorporation in the emulsion of substances liberating photographically active agents or colour-coupling substances; Solvents therefor **[5]**
7/392 . . Additives (G03C 7/305, G03C 7/32 take precedence) **[5]**
7/396 . . . Macromolecular additives **[5]**
7/407 . . Development processes or agents therefor **[5]**
7/413 . . . Developers **[5]**
7/42 . . Bleach-fixing or agents therefor **[3,5]**
7/44 . . Regeneration; Replenishers (G03C 7/42 takes precedence) **[5]**
7/46 . Subtractive colour processes not covered by group G03C 7/26; Materials therefor; Preparing or processing such materials **[5]**

8/00 Diffusion transfer processes or agents therefor; Photosensitive materials for such processes [5]
8/02 . Photosensitive materials characterised by the image-forming section **[5]**
8/04 . . the substances transferred by diffusion consisting of inorganic compounds or of organo-metallic compounds derived from photosensitive noble metals **[5]**
8/06 . . . Silver salt diffusion transfer **[5]**
8/08 . . the substances transferred by diffusion consisting of organic compounds (G03C 8/04 takes precedence) **[5]**
8/10 . . . of dyes or their precursors **[5]**
8/12 . . . . characterised by the release mechanism **[5]**
8/14 . . . . . Oxidation of the chromogenic substance **[5]**
8/16 . . . . . initially diffusable in alkaline environment **[5]**
8/18 . . . . . Dye developers **[5]**
8/20 . . . . . initially non-diffusable in alkaline environment **[5]**
8/22 . . . . . Reduction of the chromogenic substance **[5]**
8/24 . Photosensitive materials characterised by the image-receiving section **[5]**
8/26 . . Image-receiving layers (G03C 8/52 takes precedence) **[5]**
8/28 . . . containing development nuclei or compounds forming such nuclei **[5]**
8/30 . Additive processes using colour screens; Materials therefor; Preparing or processing such materials **[5]**
8/32 . Development processes or agents therefor (G03C 8/18 takes precedence) **[5]**
8/34 . . Containers for the agents (G03C 8/48, G03B 17/50 take precedence) **[5]**
8/36 . . Developers **[5]**
8/38 . . . containing viscosity increasing substances **[5]**
8/40 . . Development by heat **[5]**
8/42 . Structural details **[5]**
8/44 . . Integral units, i.e. the image-forming section not being separated from the image-receiving section **[5]**
8/46 . . . characterised by the trapping means or by gas releasing means **[5]**
8/48 . . . characterised by substances used for masking the image-forming section **[5]**
8/50 . . Peel-apart units, i.e. the image-forming section being separated from the image-receiving section **[5]**
8/52 . . Bases or auxiliary layers; Substances therefor **[5]**
8/54 . . . Timing layers **[5]**
8/56 . . . Mordant layers **[5]**

9/00 Stereo-photographic or similar processes
9/02 . Parallax-stereogram
9/04 . Vectographic-image
9/06 . Anaglyph
9/08 . producing three-dimensional images

11/00 Auxiliary processes in photography (characterised by apparatus used G03D 15/00)
11/02 . Marking or applying of text
11/04 . Retouching
11/06 . Smoothing; Renovating; Roughening; Matting; Cleaning; Lubricating; Flame retardant treatments **[5]**
11/08 . Varnishing, e.g. application of protective layers on finished photographic prints **[5]**
11/10 . . for protection from ultra-violet light
11/12 . Stripping or transferring intact photographic layers
11/14 . Pasting; Mounting
11/16 . Drying
11/18 . Colouring
11/20 . . with powdered or molten colours
11/22 . Preparing plates or films for the manufacture of photographic negatives by non-photographic processes
11/24 . Removing emulsion from waste photographic material; Recovery of photosensitive substances (electrolytic recovery of metals C25C 1/00) **[5]**

G03D APPARATUS FOR PROCESSING EXPOSED PHOTOGRAPHIC MATERIALS (apparatus specially adapted for photomechanical production of textured or patterned surfaces G03F); **ACCESSORIES THEREFOR** (photosensitive materials or processes for photographic purposes G03C; electrographic, electrophotographic, or magnetographic methods or apparatus G03G)

Subclass index

3/00 **Liquid processing apparatus involving immersion**; **Washing apparatus involving immersion** (G03D 9/00, G03D 11/00 take precedence)
3/02 . Details of liquid circulation
3/04 . . Liquid agitators (in general B01F)
3/06 . . Liquid supply; Liquid circulation outside tanks
3/08 . having progressive mechanical movement of exposed material
3/10 . . for plates, films, or prints held individually
3/12 . . for plates, films, or prints spread onto belt conveyers **[2]**
3/13 . . for long films or prints in the shape of strips, e.g. fed by roller assembly **[2]**
3/14 . . . with means for taking into account of elongation or contraction of films
3/16 . Treating exposed material in original holder

5/00 **Liquid processing apparatus in which no immersion is effected**; **Washing apparatus in which no immersion is effected** (G03D 9/00, G03D 11/00 take precedence; application of liquids in general B05)
5/02 . using rupturable ampoules of liquid
5/04 . using liquid sprays
5/06 . Applicator pads, rollers, or strips **[2]**

7/00 **Gas processing apparatus**

9/00 **Diffusion development apparatus**
9/02 . using rupturable ampoules of liquid

11/00 **Reversal processing apparatus**

13/00 **Processing apparatus or accessories therefor, not covered by groups G03D 3/00 to G03D 11/00**
13/02 . Containers; Holding-devices
13/04 . . Trays; Dishes; Tanks
13/06 . . . Light-tight tanks with provision for loading in daylight
13/08 . . Devices for holding exposed material; Devices for supporting exposed material
13/10 . . . Clips (G03D 13/14 takes precedence)
13/12 . . . Frames (G03D 13/14 takes precedence)
13/14 . . . for holding films in spaced convolutions

15/00 **Apparatus for treating processed material**
15/02 . Drying; Glazing (combined with processing apparatus G03D 3/00 to G03D 13/00; drying in general F26B)
15/04 . Cutting; Splicing
15/06 . Applying varnish or other coating
15/08 . Flattening prints
15/10 . Mounting, e.g. of processed material in a frame (frames specially adapted for projection G03B 21/64)

17/00 **Dark-room arrangements not provided for in the other groups of this subclass**; **Portable dark-rooms**

G03F **PHOTOMECHANICAL PRODUCTION OF TEXTURED OR PATTERNED SURFACES, E.G. FOR PRINTING, FOR PROCESSING OF SEMICONDUCTOR DEVICES**; **MATERIALS THEREFOR**; **ORIGINALS THEREFOR**; **APPARATUS SPECIALLY ADAPTED THEREFOR** (phototypographic composing devices B41B; photosensitive materials or processes for photographic purposes G03C; electrography, sensitive layers or processes G03G)

Note

In this subclass, the following terms or expressions are used with the meanings indicated:
– "photosensitive" means not only sensitive of electromagnetic radiation but also to corpuscular radiation;
– "photosensitive compositions" covers photosensitive substances, e.g. quinonediazides, and, if applicable, binders or additives;
– "photosensitive materials" covers the photosensitive compositions, e.g. photoresists, the bases carrying them and, if applicable, auxiliary layers. **[5]**

1/00 **Preparation of originals for the photomechanical production of textured or patterned surfaces** (photomechanical processes in general G03F 7/00) **[3]**
1/02 . by photographic processes for production of originals simulating relief
1/04 . by montage processes
1/06 . from printing surfaces **[5]**
1/08 . Originals having inorganic imaging layers, e.g. chrome masks (G03F 1/12 takes precedence) **[5]**
1/10 . by exposing and washing out pigmented or coloured organic layers; by colouring macromolecular patterns **[5]**
1/12 . by exposing silver-halide-containing photosensitive materials or diazo-type photosensitive materials **[5]**
1/14 . Originals characterised by structural details, e.g. supports, cover layers, pellicle rings **[5]**
1/16 . Originals having apertures, e.g. for corpuscular lithography **[5]**

3/00 **Colour separation**; **Correction of tonal value** (photographic copying apparatus in general G03B)
3/02 . by retouching
3/04 . by photographic means
3/06 . . by masking
3/08 . by photoelectric means
3/10 . Checking the colour or tonal value of separation negatives or positives

5/00 **Screening processes**; **Screens therefor**
5/02 . by projecting methods (cameras G03B)
5/04 . . changing the screen effect
5/06 . . changing the diaphragm effect
5/08 . . using line screens
5/10 . . using cross-line screens
5/12 . . using other screens, e.g. granulated screen
5/14 . by contact methods
5/16 . . using grey half-tone screens
5/18 . . using colour half-tone screens
5/20 . using screens for gravure printing
5/22 . combining several screens; Elimination of moire
5/24 . by multiple exposure, e.g. combined processes for line photo and screen

7/00 **Photomechanical, e.g. photolithographic, production of textured or patterned surfaces, e.g. printed surfaces**; **Materials therefor, e.g. comprising photoresists**; **Apparatus specially adapted therefor** (using photoresist structures for special production processes, see the relevant places, e.g. B44C, H01L, e.g. H01L 21/00, H05K) **[3,5]**

7/004 . Photosensitive materials (G03F 7/12, G03F 7/14 take precedence) **[5]**

7/008 . . Azides (G03F 7/075 takes precedence) **[5]**

7/012 . . . Macromolecular azides; Macromolecular additives, e.g. binders **[5]**

7/016 . . Diazonium salts or compounds (G03F 7/075 takes precedence) **[5]**

7/021 . . . Macromolecular diazonium compounds; Macromolecular additives, e.g. binders **[5]**

7/022 . . Quinonediazides (G03F 7/075 takes precedence) **[5]**

7/023 . . . Macromolecular quinonediazides; Macromolecular additives, e.g. binders **[5]**

7/025 . . Non-macromolecular photopolymerisable compounds having carbon-to-carbon triple bonds, e.g. acetylenic compounds (G03F 7/075 takes precedence) **[5]**

7/027 . . Non-macromolecular photopolymerisable compounds having carbon-to-carbon double bonds, e.g. ethylenic compounds (G03F 7/075 takes precedence) **[5]**

7/028 . . . with photosensitivity-increasing substances, e.g. photoinitiators **[5]**

7/029 . . . . Inorganic compounds; Onium compounds; Organic compounds having hetero atoms other than oxygen, nitrogen or sulfur **[5]**

7/031 . . . . Organic compounds not covered by group G03F 7/029 **[5]**

7/032 . . . with binders **[5]**

7/033 . . . . the binders being polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds, e.g. vinyl polymers **[5]**

7/035 . . . . the binders being polyurethanes **[5]**

7/037 . . . . the binders being polyamides or polyimides **[5]**

7/038 . . Macromolecular compounds which are rendered insoluble or differentially wettable (G03F 7/075 takes precedence; macromolecular azides G03F 7/012; macromolecular diazonium compounds G03F 7/021) **[5]**

7/039 . . Macromolecular compounds which are photodegradable, e.g. positive electron resists (G03F 7/075 takes precedence; macromolecular quinonediazides G03F 7/023) **[5]**

7/04 . . Chromates (G03F 7/075 takes precedence) **[5]**

7/06 . . Silver salts (G03F 7/075 takes precedence) **[5]**

7/07 . . . used for diffusion transfer **[5]**

7/075 . . Silicon-containing compounds **[5]**

7/085 . . Photosensitive compositions characterised by adhesion-promoting non-macromolecular additives (G03F 7/075 takes precedence) **[5]**

7/09 . . characterised by structural details, e.g. supports, auxiliary layers (supports for printing plates in general B41N) **[5]**

7/095 . . . having more than one photosensitive layer (G03F 7/075 takes precedence) **[5]**

7/105 . . . having substances, e.g. indicators, for forming visible images **[5]**

7/11 . . . having cover layers or intermediate layers, e.g. subbing layers **[5]**

7/115 . . . having supports or layers with means for obtaining a screen effect or for obtaining better contact in vacuum printing **[5]**

7/12 . Production of screen printing forms or similar printing forms, e.g. stencils

7/14 . Production of collotype printing forms

7/16 . Coating processes; Apparatus therefor (applying coatings to base materials in general B05; applying photosensitive compositions to the base for photographic purposes G03C 1/74)

7/18 . . Coating curved surfaces

7/20 . Exposure; Apparatus therefor (photographic printing apparatus for making copies G03B 27/00) **[4]**

7/207 . . Means for focusing, e.g. automatically (combination of positioning and focusing G03F 9/02; systems for automatic generation of focusing signals in general G02B 7/28; means for automatic focusing of projection printing apparatus G03B 27/34) **[4]**

7/213 . . Exposing with the same light pattern different positions of the same surface at the same time (G03F 7/207 takes precedence) **[4]**

7/22 . . Exposing sequentially with the same light pattern different positions of the same surface (G03F 7/207 takes precedence) **[4]**

7/23 . . . Automatic means therefor **[4]**

7/24 . . Curved surfaces

7/26 . Processing photosensitive materials; Apparatus therefor (G03F 7/12 to G03F 7/24 take precedence) **[3,5]**

7/28 . . for obtaining powder images (G03F 3/10 takes precedence) **[5]**

7/30 . . Imagewise removal using liquid means **[5]**

7/32 . . . Liquid compositions therefor, e.g. developers **[5]**

7/34 . . Imagewise removal by selective transfer, e.g. peeling away **[5]**

7/36 . . Imagewise removal not covered by groups G03F 7/30 to G03F 7/34, e.g. using gas streams, using plasma **[5]**

7/38 . . Treatment before imagewise removal, e.g. prebaking **[5]**

7/40 . . Treatment after imagewise removal, e.g. baking **[5]**

7/42 . . Stripping or agents therefor **[5]**

9/00 **Registration or positioning of originals, masks, frames, photographic sheets or textured or patterned surfaces, e.g. automatically** (G03F 7/22 takes precedence; preparation of photographic masks G03F 1/00; within photographic printing apparatus for making copies G03B 27/00) **[4]**

9/02 . combined with means for automatic focusing (automatic focusing in general G02B 7/09; systems for automatic generation of focusing signals G02B 7/28) **[4]**

G03G **ELECTROGRAPHY**; **ELECTROPHOTOGRAPHY**; **MAGNETOGRAPHY** (information storage based on relative movement between record carrier and transducer G11B; static stores with means for writing-in or reading-out information G11C; recording of television signals H04N 5/76)

(1) This subclass covers:
- the production of permanent directly-visible pictures in conformity with an original picture or document, using an intermediate imagewise distribution of an electric or magnetic quantity, such as a charge pattern, an electric conductivity pattern, or a magnetic pattern;
- the production of permanent directly-visible pictures using an intermediate imagewise distribution of an electric or magnetic quantity, when the origin and the way of generating said intermediate distribution are not relevant.

(2) This subclass does not cover:
- use of electric signals for the transmission of the picture information from the original to the reproduction, i.e. pictorial communication, which is covered by subclass H04N;
- production of pictures by heat patterns exclusively, not using an electrostatic or magnetic pattern, which is covered by group B41M 5/00;
- production of prints by transferring ink from a printing form to a printing surface, without physical contact and using the force of an electrostatic field, which is covered by subclass B41M;
- selective printing mechanisms characterised by the selective supply of electric current, or the selective application of magnetism or radiation, to a printing material or impression-transfer material, which are covered by groups B41J 2/385, B41J 2/435. **[5]**

Subclass index

5/00 **Recording-members for original recording by exposure e.g. to light, to heat, to electrons**; **Manufacture thereof**; **Selection of materials therefor** (recording surfaces for measuring apparatus G01D 15/34; photosensitive materials for photographic purposes G03C)

5/02 . Charge-receiving layers (G03G 5/153 takes precedence) **[5]**

5/022 . . Layers for surface-deformation imaging, e.g. frost imaging **[2]**

5/024 . . Photoelectret layers **[2]**

5/026 . . Layers in which during the irradiation a chemical reaction occurs whereby electrically conductive patterns are formed in the layers, e.g. for chemixerography **[2]**

5/028 . . Layers in which after being exposed to heat patterns electrically conductive patterns are formed in the layers, e.g. for thermoxerography **[2]**

5/04 . . Photoconductive layers; Charge-generation layers or charge-transporting layers; Additives therefor; Binders therefor **[2,5]**

5/043 . . . Photoconductive layers characterised by having two or more layers or characterised by their composite structure **[5]**

5/047 . . . . characterised by the charge-generation layers or charge-transporting layers **[5]**

5/05 . . . Organic bonding materials; Methods for coating a substrate with a photoconductive layer; Inert supplements for use in photoconductive layers **[2]**

5/06 . . . characterised by the photoconductive material being organic **[5]**

5/07 . . . . Polymeric photoconductive materials **[2]**

5/08 . . . characterised by the photoconductive material being inorganic **[2,5]**

5/082 . . . . and not being incorporated in a bonding material, e.g. vacuum deposited **[2]**

5/085 . . . . and being incorporated in an inorganic bonding material, e.g. glass-like layers **[2]**

5/087 . . . . and being incorporated in an organic bonding material **[2]**

5/09 . . . Sensitisers or activators, e.g. dyestuffs (G03G 5/12 takes precedence) **[2]**

5/10 . Bases for charge-receiving or other layers

5/12 . Recording members for multicolour processes **[2]**

5/14 . Inert intermediate or cover layers for charge-receiving layers (G03G 5/04 takes precedence) **[2,5]**

5/147 . . Cover layers **[5]**

5/153 . Charge-receiving layers combined with additional photo- or thermo-sensitive, but not photoconductive, layers, e.g. silver-salt layers **[5]**

5/16 . Layers for recording by changing the magnetic properties, e.g. for Curie-point-writing **[3]**

7/00 **Selection of materials for use in image-receiving members, i.e. for reversal by physical contact**; **Manufacture thereof** (photosensitive materials for photographic purposes G03C)

8/00 **Layers covering the final reproduction, e.g. for protecting, for writing thereon [2]**

9/00 **Developers [5]**

9/06 . the developer being electrolytic

9/08 . with toner particles **[2]**

Note

In groups G03G 9/083 to G03G 9/12, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

9/083 . . Magnetic toner particles **[5]**
9/087 . . Binders for toner particles **[5]**
9/09 . . Colouring agents for toner particles **[5]**
9/093 . . Encapsulated toner particles **[5]**
9/097 . . Plasticisers; Charge controlling agents **[5]**
9/10 . . characterised by carrier particles **[2,5]**
9/107 . . . having magnetic components **[5]**
9/113 . . . having coatings applied thereto **[5]**
9/12 . . in liquid developer mixtures **[2]**
9/125 . . . characterised by the liquid **[5]**
9/13 . . . characterised by polymer components **[5]**
9/135 . . . characterised by stabiliser or charge-controlling agents **[5]**
9/16 . Developers not provided for in groups G03G 9/06 to G03G 9/135, e.g. solutions, aerosols **[2]**
9/18 . . Differentially-wetting liquid developers **[2]**

11/00 Selection of substances for use as fixing agents

13/00 Electrographic processes using a charge pattern (G03G 15/00, G03G 16/00, G03G 17/00 take precedence) **[2,5]**

13/01 . for multicoloured copies **[2]**
13/02 . Sensitising, i.e. laying-down a uniform charge (devices for corona discharge per se H01T 19/00)
13/04 . Exposing, i.e. imagewise exposure by optically projecting the original image on a photoconductive recording material **[6]**
13/045 . . Charging or discharging distinct portions of the charge pattern on the recording material, e.g. discharging non-image areas, contrast enhancement (G03G 13/34, G03G 15/36, G03G 21/06 take precedence) **[6]**
13/05 . Imagewise charging, i.e. laying-down a charge in the configuration of an original image using a modulated stream of charged particles, e.g. of corona ions, modulated by a photoconductive control screen bearing a charge pattern or by optically activated charging means (using charging means controlled by electric image signals B41J) **[6]**
13/054 . using X-rays, e.g. electroradiography **[6]**
13/056 . using internal polarisation **[2,6]**
13/06 . Developing
13/08 . . using a solid developer, e.g. powder developer
13/09 . . . using magnetic brush **[2]**
13/095 . . . Removing excess solid developer **[6]**
13/10 . . using a liquid developer
13/11 . . . Removing excess liquid developer, e.g. by heat **[6]**
13/14 . Transferring a pattern to a second base
13/16 . . of a toner pattern, e.g. a powder pattern
13/18 . . of a charge pattern
13/20 . Fixing, e.g. by using heat
13/22 . Processes involving the combination of more than one step according to groups G03G 13/02 to G03G 13/20 (G03G 13/01 takes precedence) **[2]**
13/23 . . specially adapted for copying both sides of an original or for copying on both sides of a recording or image-receiving material **[6]**
13/24 . . whereby at least two steps are performed simultaneously **[2]**
13/26 . for the production of printing plates for non-xerographic printing processes **[2]**
13/28 . . Planographic printing plates **[2]**
13/30 . . Hectographic masters **[2]**
13/32 . . Relief printing plates **[2]**
13/34 . Editing, i.e. producing a composite image by copying one or more original images or parts thereof **[6]**

15/00 Apparatus for electrographic processes using a charge pattern (G03G 16/00, G03G 17/00 take precedence) **[2,5]**

Note

This group covers also processes in so far as they are characterised by the use or manipulation of apparatus classifiable per se in this group.

15/01 . for producing multicoloured copies **[2]**
15/02 . for laying down a uniform charge, e.g. for sensitising; Corona discharge devices (G03G 15/14 takes precedence) **[6]**
15/04 . for exposing, i.e. imagewise exposure by optically projecting the original image on a photoconductive recording material **[6]**
15/041 . . with variable magnification **[6]**
15/043 . . with means for controlling illumination or exposure (G03G 15/041 takes precedence) **[6]**
15/045 . . with means for charging or discharging distinct portions of the charge pattern on the recording material, e.g. for contrast enhancement or discharging non-image areas (G03G 15/36, G03G 21/06 take precedence) **[6]**
15/047 . . . for discharging non-image areas **[6]**
15/05 . for imagewise charging, e.g. photoconductive control screen, optically activated charging means (charging means controlled by electric image signals B41J) **[6]**
15/054 . using X-rays, e.g. electroradiography **[6]**
15/056 . using internal polarisation **[2,6]**
15/06 . for developing
15/08 . . using a solid developer, e.g. powder developer
15/09 . . . using magnetic brush **[2]**
15/095 . . . Removing excess solid developer **[6]**
15/10 . . using a liquid developer
15/11 . . . Removing excess liquid developer e.g. by heat **[6]**
15/14 . for transferring a pattern to a second base
15/16 . . of a toner pattern, e.g. a powder pattern
15/18 . . of a charge pattern
15/20 . for fixing, e.g. by using heat
15/22 . involving the combination of more than one step according to groups G03G 13/02 to G03G 13/20 (G03G 15/01 takes precedence) **[2]**
15/23 . . specially adapted for copying both sides of an original or for copying on both sides of a recording or image-receiving material **[6]**
15/24 . . whereby at least two steps are performed simultaneously **[2]**
15/26 . . in which the charge pattern is obtained by projection of the entire image, i.e. whole-frame projection (G03G 15/04 takes precedence) **[2,6]**
15/28 . . in which projection is obtained by line scanning (G03G 15/04 takes precedence) **[2,6]**
15/30 . . . in which projection is formed on a drum **[2]**
15/32 . . in which the charge pattern is formed dotwise (G03G 15/04, G03G 15/05, G03G 15/34 take precedence) **[2,6]**

15/34 . . in which the powder image is formed directly on the recording material **[6]**

15/36 . Editing, i.e. producing a composite image by copying one or more original images or parts thereof **[6]**

16/00 Electrographic processes using deformation of thermoplastic layers (layers for surface-deformation imaging G03G 5/022); **Apparatus therefor [2,6]**

17/00 Electrographic processes using patterns other than charge patterns, e.g. an electric conductivity pattern; **Processes involving a migration**; **e.g. photoelectrophoresis, photoelectrosolography**; **Processes involving a selective transfer, e.g. electrophoto-adhesive processes**; **Apparatus essentially involving a single such process [5]**

17/02 . with electrolytic development **[2]**

17/04 . using photoelectrophoresis **[2]**

17/06 . . Apparatus therefor **[5]**

17/08 . using an electrophoto-adhesive process, e.g. manifold imaging **[5]**

17/10 . using migration imaging, e.g. photoelectrosolography (G03G 17/04 takes precedence) **[5]**

19/00 Processes using magnetic patterns; **Apparatus therefor**

21/00 Arrangements not provided for by groups G03G 13/00 to G03G 19/00, e.g. cleaning, elimination of residual charge [2]

21/02 . Counting the number of copies; Billing **[6]**

21/04 . Preventing copies being made of an original **[6]**

21/06 . Eliminating residual charges from a reusable imaging member **[6]**

21/08 . . using optical radiation **[6]**

21/10 . Collecting or recycling waste developer **[6]**

21/12 . . Toner waste containers **[6]**

21/14 . Electronic sequencing control **[6]**

21/16 . Mechanical means for facilitating the maintenance of the apparatus, e.g. modular arrangements **[6]**

21/18 . . using a processing cartridge **[6]**

21/20 . Humidity or temperature control **[6]**

G03H HOLOGRAPHIC PROCESSES OR APPARATUS (holograms, e.g. point holograms, used as ordinary optical elements G02B 5/32; producing stereoscopic or other three-dimensional effects G02B 27/22; diffraction-grating systems G02B 27/44; systems using moire fringes G02B 27/60; optical logic elements G02F 3/00; stereo-photography G03B 35/00; photosensitive materials or processes for photographic purposes G03C; apparatus for processing exposed photographic materials G03D; analogue computers performing mathematical operations with the aid of optical elements G06E 3/00; authentication, by radiation, of concealed information carried by holograms or diffraction gratings G06K 19/16; holographic storage G11B 7/0065, G11C 13/04) **[2]**

Note

This subclass covers means for producing a record of the phase and amplitude information of a wave-front, which information can be used to reconstruct the original wave-front, or means to reconstruct the original wave-front from a record containing the phase and amplitude information of the wave-front. **[2]**

1/00 Holographic processes or apparatus using light, infra-red, or ultra-violet waves for obtaining holograms or for obtaining an image from them; **Details peculiar thereto [2]**

1/02 . Details **[2]**

1/04 . Processes or apparatus for producing holograms (G03H 1/26 takes precedence) **[2]**

1/06 . . using incoherent light **[2]**

1/08 . . Synthesising holograms (using electric digital computers G06F, G06T) **[2]**

1/10 . . using modulated reference beam **[2]**

1/12 . . . Spatial modulation, e.g. ghost imaging **[2]**

1/14 . . . Temporal modulation, e.g. extending depth of field or phase compensation for object motion **[2]**

1/16 . . using Fourier transform (G03H 1/12, G03H 1/14 take precedence; analogue computers G06G, e.g. G06G 7/19) **[2]**

1/18 . . Particular processing of hologram record carriers, e.g. for obtaining blazed holograms **[2]**

1/20 . . Copying holograms by holographic means **[2]**

1/22 . Processes or apparatus for obtaining an optical image from holograms (G03H 1/26 to G03H 1/34 take precedence) **[2]**

1/24 . . using white light **[2]**

1/26 . Processes or apparatus specially adapted to produce multiple holograms or to obtain images from them, e.g. multicolour technique **[2]**

1/28 . . superimposed holograms only **[2]**

1/30 . . discrete holograms only **[2]**

1/32 . Systems for obtaining speckle elimination **[2]**

1/34 . Systems for reducing the space-spatial bandwidth product **[2]**

3/00 Holographic processes or apparatus using ultrasonic, sonic, or infrasonic waves for obtaining holograms; **Processes or apparatus for obtaining an optical image from them** (G03H 1/22 takes precedence) **[2]**

5/00 Holographic processes or apparatus using particles or using waves other than those covered by groups G03H 1/00 or G03H 3/00 for obtaining holograms; **Processes or apparatus for obtaining an optical image from them** (G03H 1/22 takes precedence; construction of electron microscopes H01J 37/26) **[2]**

G04 HOROLOGY

G04B **MECHANICALLY-DRIVEN CLOCKS OR WATCHES**; **MECHANICAL PARTS OF CLOCKS OR WATCHES IN GENERAL**; **TIME-PIECES USING THE POSITION OF THE SUN, MOON, OR STARS** (spring- or weight-driven mechanisms in general F03G; electromechanical clocks or watches G04C; electromechanical clocks with attached or built-in means operating any device at preselected times or after predetermined time intervals G04C 23/00; clocks or watches with stop devices G04F 7/08; structural details or housings specially adapted for electronic time-pieces with no moving parts G04G 17/00)

Note

This subclass covers mechanically-driven calendar clocks or clockwork calendars, and the mechanical part of such clocks or calendars.

Subclass index

Driving mechanisms

1/00 **Driving mechanisms**

1/02 . with driving weight

1/04 . . Mechanisms in which the clockwork acts as the driving weight

1/06 . . with several weights

1/08 . . Driving weights; Chains; Chain wheels; Arbors for chain wheels

1/10 . with mainspring

1/12 . . with several mainsprings

1/14 . . Mainsprings; Bridles therefor (mainsprings with bridles G04B 1/18; alloys C22C; springs in general F16F)

1/16 . . Barrels; Arbors; Barrel axles (arrangements facilitating the removal of the mainspring G04B 33/14)

1/18 . . Constructions for connecting the ends of mainsprings with the barrel or the arbor

1/20 . . . Protecting arrangements against rupture or overwinding of the mainspring located in the barrel or attached to the barrel (in connection with keys or the like G04B 3/06, G04B 3/10; in connection with automatic winding devices G04B 5/24)

1/22 . . Compensation of changes in the motive power of the mainspring (by mechanical shaping of the mainspring G04B 1/14)

1/24 . with both mainsprings and driving weights

1/26 . driven by liquids or gases; Liquid or gaseous drives for mechanically-controlled secondary clocks

Winding

3/00 **Normal winding of clockworks by hand or mechanically**; **Winding-up several mainsprings or driving weights simultaneously**

3/02 . Removably-mounted keys or the like

3/04 . Rigidly-mounted keys, knobs, or crowns (divided winding stems G04B 37/06)

3/06 . Keys or the like with means preventing overwinding (protecting devices arranged in, or attached to, the barrel G04B 1/20; in connection with automatic winding devices G04B 5/24)

3/08 . by parts of the cases

3/10 . . Protecting means preventing overwinding (arranged in, or attached to, the barrel G04B 1/20; in connection with keys G04B 3/06; in connection with automatic winding devices G04B 5/24)

3/12 . by mechanical means, e.g. pneumatic motor (winding-up with electric or electromechanical means G04C)

5/00 **Automatic winding-up**

5/02 . by self-winding caused by movement of the watch

5/04 . . by oscillating weights the movement of which is limited

5/06 . . . acting in one direction only

5/08 . . . acting in both directions

5/10 . . by oscillating weights the movement of which is not limited

5/12 . . . acting in one direction only

5/14 . . . acting in both directions

5/16 . . Construction of the weights

5/18 . . Supports, suspensions, or guide arrangements, for oscillating weights

5/19 . . . Suspension of the oscillating weight at its centre of rotation **[3]**

5/20 . by movements of other objects, e.g. by opening hand-bag, by opening case, by opening door; Winding-up by wind power

5/22 . by thermometric, barometric, or like effects or alterations

5/24 . Protecting means preventing overwinding (arranged in, or attached to, the barrel G04B 1/20; in connection with keys or the like G04B 3/06; in connection with parts of the cases G04B 3/10)

7/00 Combined normal and automatic winding-up

9/00 Supervision of the state of winding, e.g. indicating the amount of winding

9/02 . Devices controlled by such state, e.g. device affording protection against overwinding (protecting means preventing overwinding arranged in or on the barrel G04B 1/20; protecting means in connection with keys or the like G04B 3/06; in connection with parts of the cases G04B 3/10; in connection with automatic winding devices G04B 5/24)

11/00 Click devices, stop clicks or clutches for winding

11/02 . Devices allowing the motion of a rotatable part in only one direction **[3]**

11/04 . . Pawl constructions therefor, e.g. pawl secured to an oscillating member actuating a ratchet **[3]**

13/00 Gearwork

13/02 . Wheels; Pinions; Spindles; Pivots (bearings G04B 31/00)

15/00 Escapements (electric or magnetic means for converting oscillatory to rotary motion in electromechanical time-pieces G04C 5/00)

15/02 . permanently in contact with the regulating mechanism

15/04 . . Cylinder escapements

15/06 . Free escapements

15/08 . . Lever escapements

15/10 . with constant impulses for the regulating mechanism

15/12 . Adjusting (tools therefor G04D 1/02); Restricting the amplitude of the lever or the like

15/14 . Component parts or constructional details, e.g. construction of the lever or the escape wheel

17/00 Mechanisms for stabilising frequency [3]

17/02 . Oscillators acting by gravity, e.g. pendulum swinging in a plane

17/04 . Oscillators acting by spring tension

17/06 . . Oscillators with hairsprings, e.g. balance

17/08 . . Oscillators with coil springs stretched and unstretched axially

17/10 . . Oscillators with torsion strips or with springs acting in the same manner as torsion strips, e.g. weight oscillating in a horizontal plane

17/20 . Compensation of mechanisms for stabilizing frequency

17/22 . . for the effect of variations of temperature (alloys independent of variations of temperature C22C)

17/24 . . for the effect of variations of atmospheric pressure

17/26 . . for the effect of variations of the impulses

17/28 . . for the effect of unbalance of the weights, e.g. tourbillon

17/30 . Rotating governors, e.g. centrifugal governors, fan governors (for striking mechanism G04B 21/06)

17/32 . Component parts or constructional details, e.g. collet, stud

17/34 . . for fastening the hairspring onto the balance **[3]**

18/00 Mechanisms for setting frequency [3]

18/02 . Regulator devices; Indexing devices **[3]**

18/04 . Adjusting the beat of the pendulum, balance, or the like, e.g. putting into beat **[3]**

18/06 . . by setting the collet or the stud of a hairspring **[3]**

18/08 . Component parts or constructional details **[3]**

Time indicating

19/00 Indicating the time by visual means (by electric lamps G04C 17/02; display arrangements in general G09)

19/02 . Back-gearing arrangements between gear train and hands

19/04 . Hands; Discs with a single mark or the like

19/06 . Dials (for time-pieces without clockwork G04B 49/04)

19/08 . . Geometrical arrangement of the graduations

19/10 . . Ornamental shape of the graduations or the surface of the dial; Attachment of graduations to the dial

19/12 . . Selection of materials for dials or graduations

19/14 . . Fastening the dials to the clock or the watch plates

19/16 . . Shiftable dials, e.g. indicating alternately from 1 to 12 and from 13 to 24

19/18 . . Graduations on the crystal or glass, on the bezel, or on the rim

19/20 . Indicating by numbered bands, drums, discs, or sheets

19/21 . . Drums **[3]**

19/22 . Arrangements for indicating different local apparent times; Universal time-pieces

19/23 . . by means of additional hands or additional pairs of hands **[3]**

19/24 . Clocks or watches with date indicators; Clockwork calendars

19/243 . . characterised by the shape of the date indicator **[3]**

19/247 . . . disc-shaped **[3]**

19/25 . . . . Devices for setting the date indicators manually **[3]**

19/253 . . . . Driving or releasing mechanisms **[3]**

19/257 . . . drum-shaped **[3]**

19/26 . Clocks or watches with indicators for tides, for the phases of the moon, or the like

19/28 . Adjustable guide marks or pointers for indicating determined points of time

19/30 . Illumination of dials or hands

19/32 . . by luminescent substances

19/34 . Position of the hands projected optically

21/00 Indicating the time by acoustic means (at preselected times G04B 23/00; by electro-acoustic means G04C 21/04; sound-producing apparatus per se G10)

21/02 . Regular striking mechanisms giving the full hour, half hour, or quarter hour

21/04 . . Hour wheels; Racks or rakes; Snails or similar control mechanisms

21/06 . . Details of striking mechanisms, e.g. hammer, fan governor

21/08 . . Sounding bodies; Whistles; Musical apparatus (with electro-acoustic transmitters G04C 21/00)

21/10 . . Releasing or locking the regular stroke, e.g. for silence during the night

21/12 . . Reiterating watches or clocks
21/14 . . Winding-up the striking mechanism by the clockwork; Winding-up the clockwork by the striking mechanism

23/00 Arrangements producing acoustic signals at preselected times (electrically-released alarm signals G04C 21/00; metronomes G04F 5/02; sound-producing apparatus per se G10)
23/02 . Alarm clocks
23/03 . . Alarm signal stop arrangements **[3]**
23/04 . . with coarse and fine setting of the preselected time
23/06 . . adjustable for several preselected times with automatic stopping of the signal
23/08 . . operating on successive days without resetting; operating only once in each 24 hours
23/10 . . with presignal; with repeated signal; with changeable intensity of sound
23/12 . . Alarm watches to be worn in pockets or on the wrist (giving signals by stimulating the skin G04B 25/04)

25/00 Indicating the time by other means or by combined means (electric or electromechanical indicating G04C)
25/02 . by feeling; Clocks or watches for blind persons
25/04 . . Alarm clocks or watches with devices stimulating the skin
25/06 . by moving figures, e.g. cuckoo-clock, trumpet clock

27/00 Mechanical devices for setting the time-indicating means
27/02 . by making use of the winding means
27/04 . . with clutch wheel
27/06 . . with rocking bar
27/08 . by using parts of the case

Frameworks, supports, or arrangements of the clockwork parts in relation to each other, so-called "calibers"

29/00 Frameworks
29/02 . Plates; Bridges; Cocks
29/04 . Connecting or supporting parts

31/00 Bearings; **Point suspensions or counter-point suspensions**; **Pivot bearings**; **Single parts therefor** (bearings in general F16C)
31/004 . characterised by the material used **[3]**
31/008 . . Jewel bearings (G04B 31/04 takes precedence) **[3]**
31/012 . . Metallic bearings **[3]**
31/016 . . Plastic bearings **[3]**
31/02 . Shock-damping bearings
31/04 . . with jewel hole and cap jewel **[3]**
31/06 . Manufacture or mounting processes **[3]**
31/08 . Lubrication **[3]**

33/00 Calibers
33/02 . Circular calibers
33/04 . Non-circular calibers
33/06 . of extremely flat shape
33/08 . in which the gear train is arranged in different planes, e.g. parallel or inclined to each other (G04B 33/10 takes precedence)
33/10 . with seconds hand arranged in the centre of the dial
33/12 . for extremely-long running times
33/14 . Calibers of which the mainsprings or barrels are easily removable (mainsprings G04B 1/14; barrels, arbors G04B 1/16)
33/16 . with arrangements affording protection of the clockwork against damage as a consequence of a rupture of the mainspring

35/00 Adjusting the gear train, e.g. the backlash of the arbors, depth of meshing of the gears

Protection of the clockwork against damage from outside

37/00 Cases
37/02 . Evacuated cases; Cases filled with gases or liquids; Cases containing substances for absorbing or binding moisture or dust
37/04 . Mounting the clockwork in the case; Shock-absorbing mountings
37/05 . . Fixed mountings for pocket or wrist watches **[3]**
37/06 . Forming the passage for the winding stem through the case; Divided winding stems
37/08 . Hermetic sealing of openings, joints, passages, or slits
37/10 . . of winding stems
37/11 . . of the back cover of pocket or wrist watches **[3]**
37/12 . Cases for special purposes, e.g. watch combined with ring, watch combined with button (watch guards or protectors A45C 11/10, A45C 11/12; watches combined with cosmetic powder containers A45D 33/30)
37/14 . Suspending devices, supports, or stands for time-pieces in so far as they form part of the case (wrist-watch straps, fastening means therefor A44C 5/00)
37/16 . . Fastening the case to the bracelet **[3]**
37/18 . for pocket or wrist watches (G04B 37/02 to G04B 37/16 takes precedence) **[3]**
37/20 . . with hinged covers or backs **[3]**
37/22 . Materials or processes of manufacturing pocket watch or wrist watch cases **[3]**

39/00 Watch crystals; **Fastening or sealing crystals**; **Clock glasses**
39/02 . Sealing crystals or glasses **[3]**

41/00 Locking or holding devices for pendulums, chimes, or the like, for use during transport

43/00 Protecting clockworks by shields or other means against external influences, e.g. magnetic fields

Clocks with unusual features

45/00 Time-pieces of which the indicating means or cases provoke special effects, e.g. aesthetic effect (ornamental shaping of dials G04B 19/10)
45/02 . Time-pieces of which the clockwork is visible partly or wholly
45/04 . Time-pieces with invisible drive, e.g. with hands attached to rotating glass disc

47/00 Time-pieces combined with other articles which do not interfere with the running or the time-keeping of the time-piece (G04B 37/12 takes precedence; writing or drawing implements with devices for indicating time B43K 29/087; combinations with vehicle mirror assemblies B60R 1/12; combined with cameras, projectors, or photographic printing apparatus G03B 29/00)
47/02 . Installations within mirrors, pictures, furniture, or other household articles

47/04 . with attached ornaments or amusement apparatus
47/06 . with attached measuring instruments, e.g. pedometer, barometer, thermometer, compass

49/00 Time-pieces using the position of the sun, moon, or stars
49/02 . Sundials
49/04 . . Graduation or shaping of dials

99/00 Subject matter not provided for in other groups of this subclass [8]

G04C ELECTROMECHANICAL CLOCKS OR WATCHES (mechanical parts of clocks or watches in general G04B; electronic time-pieces with no moving parts, electronic circuitry for producing timing pulses G04G)

Note

This subclass covers electric features of mechanically-driven clocks or watches, such as electric winding of such clocks or the provision of electric contacts thereon.

Subclass index

Electric winding of mechanical clocks; **Independent electric clocks or watches**

1/00 Winding mechanical clocks electrically (winding mechanically G04B 3/00)
1/02 . by electromagnets
1/04 . by electric motors with rotating or with reciprocating movement
1/06 . . winding-up springs
1/08 . . raising weights
1/10 . Protection against overwinding (in mechanical clocks or watches G04B 1/20, G04B 3/06, G04B 3/10)
1/12 . . of the spring
1/14 . . of the weights

3/00 Electromechanical clocks or watches independent of other time-pieces and in which the movement is maintained by electric means (clocks driven by synchronous motors G04C 15/00)
3/02 . wherein movement is regulated by a pendulum
3/027 . . using electromagnetic coupling between electric power source and pendulum (G04C 3/033 takes precedence) **[3]**
3/033 . . using torsion pendulums; using conical pendulums (construction thereof G04B 17/00) **[3]**
3/04 . wherein movement is regulated by a balance
3/06 . . using electromagnetic coupling between electric power source and balance **[3]**
3/08 . wherein movement is regulated by a mechanical oscillator other than a pendulum or balance, e.g. by a tuning fork **[3]**
3/10 . . driven by electromagnetic means **[3]**
3/12 . . driven by piezo-electric means; driven by magneto-strictive means **[3]**
3/14 . incorporating a stepping motor (G04C 3/02 to G04C 3/12 take precedence) **[3]**
3/16 . incorporating an electro-dynamic continuously rotating motor (G04C 3/02 to G04C 3/12 take precedence) **[3]**
3/18 . incorporating electro-thermal or electro-pneumatic driving means **[3]**

5/00 Electric or magnetic means for converting oscillatory to rotary motion in time-pieces, i.e. electric or magnetic escapements (regulators G04C 3/00) **[3]**

9/00 Electrically-actuated devices for setting the time-indicating means (of slave clocks G04C 13/03; mechanical setting devices G04B 27/00) **[3]**
9/02 . brought into action by radio transmission
9/04 . by blocking the driving means **[3]**
9/06 . by decoupling the driving means (combined with blocking means G04C 9/04) **[3]**
9/08 . by electric drive **[3]**

10/00 Arrangements of electric power supplies in time-pieces [3]
10/02 . the power supply being a radioactive source **[3]**
10/04 . with means for indicating the condition of the power supply **[3]**

Electric clock installations; **Master-and-slave clock systems**; **Synchronous-motor clocks**

11/00 Synchronisation of independently-driven clocks
11/02 . by radio
11/04 . over a line (transmitting time signals over telephone networks H04M 11/06)
11/06 . with direct mechanical action on the time-indicating means **[3]**
11/08 . using an electric magnet or motor **[3]**

13/00 Driving mechanisms for clocks by master clocks
13/02 . Circuit arrangements; Electric clock installations

13/03 . . Pulse transmission systems with additional means for setting the time indication of slave clocks **[3]**
13/04 . . Master clocks
13/06 . . . Contact devices (for simultaneously winding several clocks G04C 1/00)
13/08 . Slave clocks actuated intermittently
13/10 . . by electromechanical step-advancing mechanisms
13/11 . . . with rotating armature **[3]**
13/12 . . by continuously-rotating electric motors **[3]**
13/14 . . by electrically-released mechanical driving mechanisms

15/00 Clocks driven by synchronous motors

Indicating the time or producing time signals electrically

17/00 Indicating the time optically by electric means (G04C 19/00 takes precedence; liquid crystal materials C09K 19/00; by mechanical means G04B 19/00, G04B 19/20) **[3]**
17/02 . by electric lamps

19/00 Producing optical time signals at prefixed times by electric means
19/02 . by electric lamps
19/04 . by indicating members moved electrically, e.g. flap, band

21/00 Producing acoustic time signals by electrical means
21/02 . Constructional details (G04C 21/04, G04C 21/16 take precedence)
21/04 . Indicating the time of the day (acoustic indication of time G04B 21/00)
21/06 . . by striking mechanism
21/08 . . . with snail
21/10 . . . with locking plate
21/12 . . by electro-acoustic means
21/14 . . . Electro-acoustic time announcement, i.e. spoken
21/16 . producing the signals at adjustable fixed times
21/18 . . by mechanically unlocking an electromechanical vibrator, e.g. actuated by the leakage flux of the electric driving means
21/20 . . by closing a contact to ring an electromechanical alarm
21/22 . . . put into action by the arbor of a mechanical alarm work
21/24 . . . put into action by the spring of a mechanical alarm work
21/26 . . . put into action by the vibrations caused by the operation of a mechanical alarm work
21/28 . . by closing a contact to put into action electro-acoustic means, e.g. awakening by music
21/30 . . with provision for a number of operations at different times, e.g. ringing the bells in a school
21/32 . . . giving indications at a number of places, each at a different time, e.g. system of alarms in a hotel
21/34 . . Devices on watches or similar portable time-pieces
21/36 . . Signal-repeating devices
21/38 . . Adjusting the duration of signals

23/00 Clocks with attached or built-in means operating any device at preselected times or after preselected time-intervals (if restricted to producing acoustic time signals by electrical means G04C 21/00; mechanical alarm clocks G04B 23/02; apparatus which can be set and started to measure-off predetermined intervals G04F 3/06; time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)
23/02 . Constructional details
23/04 . . Housings, supports, shielding, or similar stationary parts
23/06 . . Driving or regulating means
23/08 . . Programming means
23/10 . . for actuating any element which operates, or initiates the operation of, the device concerned
23/12 . . Electric circuitry
23/14 . Mechanisms continuously running to relate the operation(s) to the time of day
23/16 . . acting only at one preselected time or during one adjustable time interval
23/18 . . for operating one device at a number of different times
23/20 . . . with contacts operated, or formed, by clock hands or elements of similar form
23/22 . . . with the actuating element carried by a disc
23/24 . . . . the actuating element controlling another element mechanically
23/26 . . for operating a number of devices at different times
23/28 . . . with contacts operated, or formed, by clock hands or elements of similar form
23/30 . . . with the actuating element carried by a disc
23/32 . . . . the actuating element controlling another element mechanically
23/34 . . with provision for automatic modification of the programme, e.g. on Sunday
23/36 . . . by external influences
23/38 . Mechanisms measuring a chosen time interval independently of the time of day at which the interval starts
23/40 . . using continuously-running mechanism
23/42 . . acting only at the end of a single time interval
23/44 . . . with provision for selection from a number of preset intervals
23/46 . . . with provision for adjustment of the interval (G04C 23/44 takes precedence)
23/48 . . acting at the ends of successive time intervals
23/50 . . with provision for modification of the interval(s) by external influences

99/00 Subject matter not provided for in other groups of this subclass [8]

G04D APPARATUS OR TOOLS SPECIALLY DESIGNED FOR MAKING OR MAINTAINING CLOCKS OR WATCHES (machine tools in general B23, B24; hand tools in general B25)

Subclass index

1/00 Gripping, holding, or supporting devices
1/02 . Tweezers; Vice clamps or other special hand tools for watchmakers
1/04 . Tools for setting springs
1/06 . Supporting devices for clockworks or parts of time-pieces
1/08 . Tools for setting or removing hands
1/10 . Devices for opening or closing watch bottoms or covers

3/00 Watchmakers' or watch-repairers' machines or tools for working materials
3/02 . Lathes, with one or more supports; Burnishing machines, with one or more supports
3/04 . Devices for placing bearing jewels, bearing sleeves, or the like in position
3/06 . Devices for shaping or setting watch glasses
3/08 . Machines or apparatus for cleaning

5/00 Oiling devices; **Special lubricant containers for watchmakers**

7/00 Measuring, counting, calibrating, testing, or regulating apparatus
7/02 . for mainsprings
7/04 . for gearwork
7/06 . for escapements
7/08 . for balance wheels
7/10 . for hairsprings
7/12 . Timing devices for clocks or watches for comparing the rate of the oscillating member with a standard

9/00 Demagnetising devices (demagnetising in general H01F 13/00)

99/00 Subject matter not provided for in other groups of this subclass [8]

G04F TIME-INTERVAL MEASURING (measuring pulse characteristics G01R, e.g. G01R 29/02; in radar or like systems G01S; masers H01S 1/00; generation of oscillations H03B; generation or counting of pulses, frequency dividing H03K; analogue/digital conversion in general H03M 1/00) **[2]**

Note

This subclass covers:
– apparatus for measuring-off predetermined time intervals; **[2]**
– apparatus for producing such intervals as timing standards, e.g. metronomes; **[2]**
– apparatus for measuring unknown intervals, e.g. precision systems for short-time-interval measurement. **[2]**

Subclass index

1/00 Apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals without driving mechanisms, e.g. egg timer (time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)
1/02 . by consuming prefixed quantities of materials, e.g. by burning candle
1/04 . by movement or acceleration due to gravity
1/06 . . by flowing-away of a prefixed quantity of fine-granular or liquid materials, e.g. sand-glass, water-clock
1/08 . . by a body falling a prefixed distance in air or in a viscous material

3/00 Apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals with driving mechanisms, e.g. dosimeter with clockwork (time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)
3/02 . with mechanical driving mechanisms
3/04 . . Additional arrangements in connection with ordinary non-electric clocks for this purpose
3/06 . with electric driving mechanisms
3/08 . . Additional arrangements in connection with ordinary electric clocks for this purpose

5/00 **Apparatus for producing preselected time intervals for use as timing standards** (generating clock signals for electric digital computers G06F 1/04; automatic frequency control or stabilisation of generators in general H03L)
5/02 . Metronomes
5/04 . using oscillators with electromechanical resonators **[2]**
5/06 . . using piezo-electric resonators **[2]**
5/08 . . using magnetostrictive resonators **[2]**
5/10 . using electric or electronic resonators (G04F 5/14 takes precedence) **[2]**
5/12 . using fluidic devices **[2]**
5/14 . using atomic clocks **[2]**
5/16 . using pulses produced by radio-isotopes **[2]**

7/00 **Apparatus for measuring unknown time intervals by non-electric means** (G04F 13/06 takes precedence) **[2]**
7/02 . by measuring the distance of fall or the final velocity of a falling body
7/04 . using a mechanical oscillator **[2]**
7/06 . . running only during the time interval to be measured, e.g. stop-watch
7/08 . . Watches or clocks with stop devices, e.g. chronograph
7/10 . Means used apart from the time-piece for starting or stopping same **[2]**

8/00 **Apparatus for measuring unknown time intervals by electromechanical means [2]**
8/02 . using an electromechanical oscillator **[2]**
8/04 . . using a piezo-electric oscillator **[2]**
8/06 . . using a magnetostrictive oscillator **[2]**
8/08 . Means used apart from the time-piece for starting or stopping same **[2]**

10/00 **Apparatus for measuring unknown time intervals by electric means [2]**
10/02 . using oscillators with passive electric resonator, e.g. lumped LC **[2]**
10/04 . by counting pulses or half-cycles of an ac **[2]**
10/06 . by measuring phase **[2]**
10/08 . using pulses produced by radio-isotopes **[2]**
10/10 . by measuring electric or magnetic quantities changing in proportion to time **[2]**

13/00 **Apparatus for measuring unknown time intervals by means not provided for in groups G04F 5/00 to G04F 10/00 [2]**
13/02 . using optical means **[2]**
13/04 . using electrochemical means **[2]**
13/06 . using fluidic means **[2]**

G04G ELECTRONIC TIME-PIECES [3]

(1) This subclass covers:
– electronic time-pieces with no moving parts; **[3]**
– electronic circuitry for producing timing pulses irrespective of the nature of the time-indicating means utilised. **[3]**
(2) This subclass does not cover electronic time-pieces with moving parts, which are covered by subclass G04C. **[3]**

Subclass index

3/00 **Producing timing pulses** (driving circuits for stepping motors G04C 3/14; producing preselected time intervals for use as timing standards G04F 5/00; pulse technique in general H03K; control, synchronisation, or stabilisation of generators in general H03L) **[3]**
3/02 . Circuits for deriving low frequency timing pulses from pulses of higher frequency (pulse frequency dividers in general H03K 23/00 to H03K 29/00) **[3]**
3/04 . Temperature-compensating arrangements **[7]**

5/00 **Setting, i.e. correcting or changing, the time-indication [3]**
5/02 . by temporarily changing the number of pulses per unit time, e.g. quick-feed method **[3]**
5/04 . by setting each of the displayed values, e.g. date, hour, independently **[3]**

7/00 **Synchronisation [3]**
7/02 . by radio **[3]**

9/00 **Visual time or date indication means [3]**
9/02 . by selecting desired characters out of a number of characters or by selecting indicating elements the position of which represent the time, e.g. by using multiplexing techniques **[3]**
9/04 . . by controlling light sources, e.g. electroluminescent diodes **[3]**
9/06 . . using light valves, e.g. liquid crystals **[3]**
9/08 . by building-up characters using a combination of indicating elements, e.g. by using multiplexing techniques **[3]**
9/10 . . by controlling light sources, e.g. electroluminescent diodes **[3]**
9/12 . . using light valves, e.g. liquid crystals **[3]**

11/00 Producing optical signals at preselected times [3]

13/00 Producing acoustic time signals [3]

13/02 . at preselected times, e.g. alarm clocks **[3]**

15/00 Time-pieces comprising means to be operated at preselected times or after preselected time intervals (G04G 11/00, G04G 13/00 take precedence; pulse delay circuits H03K 5/13; electronic time-delay switches H03K 17/28; electronic time-programme switches which automatically terminate their operation after the programme is completed H03K 17/296; time programming for television signal recording H04N 5/761) **[3]**

17/00 Structural details; **Housings [7]**

17/02 . Component assemblies **[7]**

17/04 . . Mounting of electronic components **[7]**

17/06 . . Electric connectors, e.g. conductive elastomers **[7]**

17/08 . Housings **[7]**

19/00 Electric power supply circuits specially adapted for use in electronic time-pieces [7]

19/02 . Conversion or regulation of current or voltage **[7]**

19/04 . . Capacitive voltage division or multiplication **[7]**

19/06 . . Regulation **[7]**

19/08 . Arrangements for preventing voltage drop due to overloading the power supply **[7]**

19/10 . Arrangements for supplying back-up power **[7]**

19/12 . Arrangements for reducing power consumption during storage **[7]**

21/00 Input or output devices integrated in time-pieces [2010.01]

21/02 . Detectors of external physical values, e.g. temperature **[2010.01]**

21/04 . using radio waves **[2010.01]**

21/06 . using voice **[2010.01]**

21/08 . Touch switches specially adapted for time-pieces **[2010.01]**

99/00 Subject matter not provided for in other groups of this subclass [2010.01]

G05 CONTROLLING; REGULATING

(1) This class covers methods, systems, and apparatus for controlling, in general.
(2) In this class, the following terms or expressions are used with the meanings indicated:
- "controlling" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation;
- "regulation" means maintaining a variable automatically at a desired value or within a desired range of values. The desired value or range may be fixed, or manually varied, or may vary with time according to a predetermined "programme" or according to variation of another variable. Regulation is a form of control;
- "automatic control" is often used in the art as a synonym for "regulation".

(3) Attention is drawn to the Notes following the title of section G, especially as regards the definition of the term "variable".

G05B CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; characterised by mechanical features only G05G; sensitive elements, see the appropriate subclasses, e.g. G12B, subclasses of G01, H01; correcting units, see the appropriate subclasses, e.g. H02K)

(1) This subclass covers features of control systems or elements for regulating specific variables, which are clearly more generally applicable.
(2) This subclass does not cover : **[7]**
(a) systems for controlling or regulating non-electric variables in general, which are covered by subclass G05D; **[7]**
(b) systems for regulating electric or magnetic variables in general, which are covered by subclass G05F; **[7]**
(c) systems specially adapted for the control of particular machines or apparatus provided for in a single other subclass, which are classified in the relevant subclass for such machines or apparatus, provided that there is specific provision for control or regulation relevant to the special adaptation (see Note (5), below). Otherwise, classification is made in the most appropriate place in this subclass. **[7]**
(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "automatic controller" means a system, circuit, or device in which a signal from the detecting element is compared with a signal representing the desired value and which operates in such a way as to reduce the deviation. The automatic controller generally does not include the sensitive element, i.e. that element which measures the value of the condition to be corrected, or the correcting element, i.e. that element which adjusts the condition to be corrected;
- "electric" includes "electromechanical", "electrohydraulic" or "electropneumatic".

(4) In this subclass, details of specific control systems are classified in the group relevant to the system, if not otherwise provided for.
(5) This Note lists places in the IPC where there is specific provision of the kind referred to in Note (2)(c), above; where such provision is at a general level, the places are listed under the heading "General references"; where the provision is related to programme control, the places are listed under the heading "Places related to group G05B 19/00". **[7]**

General references **[7]**

A01K	73/04	Spreading or positioning of drawn nets for fishing
A61G	13/02	
A61G	15/02	Adjustable operating tables, operating chairs, or dental chairs
B01D	3/42	Distillation
B01D	24/48	
B01D	29/60	
B01D	37/04	
B01D	46/44	Filtration
B01D	53/30	Separation of gases or vapours by gas-analysis apparatus
B01D	61/00	Separation using semi-permeable membranes
B01J	4/00	Feed or outlet in chemical or physical processes
B01J	38/14	Oxygen content in oxidation gas for regeneration or reactivation of catalysts
B01J	47/14	Ion-exchange processes
B05B	12/02	Delivery in spraying systems
B21B	37/00	
B21B	39/00	Metal-rolling mills
B21K	31/00	Positioning tool carriers for forging, pressing or hammering
B22D	11/16	Continuous casting of metals
B22D	13/12	Centrifugal casting of metals
B22D	17/32	Pressure or injection die casting of metals
B22D	18/08	Pressure or vacuum casting of metals
B22D	46/00	Casting of metals in general
B23B	39/26	Tool or work positioning for boring or drilling
B23D	36/00	Machines for shearing or similar cutting stock travelling otherwise than in the direction of the cut
B23Q	5/00	Driving or feeding mechanisms of machine tools
B23Q	15/00	Feed movement, cutting velocity or position of machine tools
B23Q	35/00	Copying from a pattern or master model for machine tools

B24B	47/22	Position of grinding tool or work
B25J	13/00	Manipulators
B26D	5/02	Position of cutters in cutting machines
B29C	39/00	
B29C	51/00	Shaping techniques for plastic substances
B30B	15/14	
B30B	15/16	Presses
B41B	27/00	Composing machines
B41F	33/00	Printing machines or presses
B41J	11/42	Feeding sheets or webs in typewriters
B41L	39/00	Apparatus or devices for manifolding, duplicating or printing for commercial purposes
B41L	47/56	Addressing machines
B60G	17/00	
B60G	21/00	Vehicle suspension
B60T	7/00	
B60T	15/00	Vehicle brakes
B65B	57/00	Machines for packaging
B65G	43/00	Conveyers
E02F	3/43	Sequence of drive operations for dredging or soil-shifting
E21B	44/00	Earth drilling operations
F01K	1/12	
F01K	1/16	Steam accumulators
F01K	3/00	
F01K	7/00	
F01K	13/02	Steam engine plants
F02C	7/05	Air intakes for gas-turbine or jet-propulsion plants
F02C	9/00	Gas-turbine plants; Fuel supply in air-breathing jet-propulsion plants
F02D		Combustion engines
F02K	1/15	
F02K	1/76	Jet pipes or nozzles in jet-propulsion plants
F02K	7/00	
F02K	9/00	Jet-propulsion plants
F04B	1/00	
F04B	27/00	
F04B	49/00	Positive-displacement machines
F04D	15/00	
F04D	27/00	Non-positive-displacement pumps, pumping installations, or systems
F16D	43/00	
F16D	48/00	Clutches
F16F	15/02	Suppression of vibrations using fluid means
F16H	59/00	
F16H	63/00	Gearings
F22B	35/00	Steam boilers
F23G	5/50	Incineration of waste
F23N		Combustion in combustion apparatus
F24B	1/18	Combustion in open fires using solid fuel
F24J	2/40	Solar heating
F26B	25/22	Drying processes of solid materials or objects
F28B	11/00	Steam or vapour condensers
F28D	15/06	Heat-exchange apparatus with intermediate heat-transfer medium in closed tubes passing into or through conduit walls, in which the medium condenses and evaporates
F28F	27/00	Heat-exchanges or heat-transfer apparatus in general
G06F	11/00	Computers
G08G		Traffic
G09G		Indicating devices using static means to present variable information
G11B	15/00	
G11B	19/00	Driving, starting or stopping of record carriers
G21C	7/00	Nuclear reaction
G21D	3/00	Nuclear power plant
H01J	37/30	Electron-beam or ion-beam tubes used for localised treatment of objects
H02P		Electric motors, generators, or dynamo-electric converters

Places related to group G05B 19/00 (programme-control systems) **[7]**

A61J	7/04	Programmed medicine dispensers
A61L	2/24	Disinfection or sterilising
A61N	1/36	Heart pace-makers
A63H	17/39	Steering-mechanisms for toy vehicles
B04B	13/00	Centrifuges
B21B	37/24	Thickness of work produced by metal-rolling mills
B21D	7/12	Bending metal rods, profiles, or tubes
B23B	39/08	
B23B	39/24	Boring or drilling machines

B23H	7/20	Electrical discharge or electrochemical machining
B23P	21/00	Assembling of parts to compose units
B24B	51/00	Series of individual steps in grinding a workpiece
B25J	9/00	Manipulators
B30B	15/26	Presses
B41F	33/16	Sequence of operations in printing machines or presses
B41J	11/44	Feeding sheets or webs in typewriters
B41L	39/16	Sequence of operations in apparatus or devices for manifolding, duplicating or printing for commercial purposes
B41L	47/64	Selecting text or image to be printed in addressing machines
B60L	15/20	Traction-motor speed of electrically-propelled vehicles
B65H	31/24	Piling articles
B66C	13/48	
B66C	23/58	Crane drives
B67D	7/14	Dispensing, delivering or transferring liquids
D05B	19/00	
D05B	21/00	Sewing machines
D05C	5/04	Embroidering machines
D06F	33/00	Operations in washing machines
F02D	27/02	
F02D	28/00	Combustion engines
F02D	41/26	Supply of combustible mixture or its constituents to combustion engines
F15B	21/02	Fluid-pressure actuator systems
F23N	5/20	
F23N	5/22	Combustion in combustion apparatus
G01G	19/38	Weighing apparatus
G04C	23/08	
G04C	23/34	Electromechanical clocks or watches
G06C	21/00	Mechanically operating digital computers
G06F	9/00	Control units for electric digital data processing
G06F	13/10	Peripheral devices for electric digital data processing
G06F	15/00	Electrically operating digital computers
G06G	7/06	Electrically or magnetically operating analogue computers
G09B	7/04	
G09B	7/08	
G09B	7/12	Electrically-operated teaching apparatus or devices
H01H	43/00	Electric switches
H01J	37/30	Electron-beam or ion-beam tubes used for localised treatment of objects
H03K	17/296	Electronic switching or gating
H04Q	3/54	Selecting arrangements in electric communication technique

Subclass index

1/00 Comparing elements, i.e. elements for effecting comparison directly or indirectly between a desired value and existing or anticipated values (comparing phase or frequency of two electric signals H03D 13/00)

1/01 . electric **[2]**
1/02 . . for comparing analogue signals **[2]**
1/03 . . for comparing digital signals **[2]**
1/04 . . with sensing of the position of the pointer of a measuring instrument
1/06 . . . continuous sensing
1/08 . . . stepwise sensing
1/11 . fluidic **[2]**

5/00 Anti-hunting arrangements

5/01 . electric
5/04 . fluidic **[2]**

6/00 Internal feedback arrangements for obtaining particular characteristics, e.g. proportional, integral, differential (in automatic controllers G05B 11/00)

6/02 . electric
6/05 . fluidic **[2]**

7/00 **Arrangements for obtaining smooth engagement or disengagement of automatic control**

7/02 . electric **[2]**

7/04 . fluidic **[2]**

9/00 **Safety arrangements** (G05B 7/00 takes precedence; safety arrangements in programme-control systems G05B 19/048, G05B 19/406; safety valves F16K 17/00; emergency protective circuit arrangements in general H02H)

9/02 . electric

9/03 . . with multiple-channel loop, i.e. redundant control systems **[2]**

9/05 . fluidic **[2]**

11/00 **Automatic controllers** (G05B 13/00 takes precedence)

11/01 . electric

11/06 . . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers (G05B 11/26 takes precedence)

11/10 . . . the signal transmitted being dc

11/12 . . . the signal transmitted being modulated on an ac carrier

11/14 . . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers (G05B 11/26 takes precedence)

11/16 . . . Two-step controllers, e.g. with on/off action

11/18 . . . Multi-step controllers

11/26 . . in which the output signal is a pulse-train

11/28 . . . using pulse-height modulation; using pulse-width modulation

11/30 . . . using pulse-frequency modulation

11/32 . . with inputs from more than one sensing element; with outputs to more than one correcting element

11/36 . . with provision for obtaining particular characteristics, e.g. proportional, integral, differential

11/38 . . . for obtaining a proportional characteristic

11/40 . . . for obtaining an integral characteristic

11/42 . . . for obtaining a characteristic which is both proportional and time-dependent, e.g. P. I., P. I. D.

11/44 . pneumatic only

11/46 . . without auxiliary power

11/48 . . with auxiliary power

11/50 . . . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers

11/52 . . . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers

11/54 . . . . Two-step controllers, e.g. with on/off action

11/56 . . . . Multi-step controllers

11/58 . . with inputs from more than one sensing element; with outputs to more than one correcting element

11/60 . hydraulic only

13/00 **Adaptive control systems, i.e. systems automatically adjusting themselves to have a performance which is optimum according to some preassigned criterion** (G05B 19/00 takes precedence; details of the computer G06F 15/18) **[3]**

13/02 . electric

13/04 . . involving the use of models or simulators **[3]**

15/00 **Systems controlled by a computer** (G05B 13/00, G05B 19/00 take precedence; automatic controllers with particular characteristics G05B 11/00; computers per se G06) **[3]**

15/02 . electric

17/00 **Systems involving the use of models or simulators of said systems** (G05B 13/00, G05B 15/00, G05B 19/00 take precedence; analogue computers for specific processes, systems or devices, e.g. simulators, G06G 7/48) **[3]**

17/02 . electric

19/00 **Programme-control systems** (specific applications, see the relevant places, e.g. A47L 15/46; clocks with attached or built-in means operating any device at a preselected time interval G04C 23/00; marking or sensing record carriers with digital information G06K; information storage G11; time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)

19/02 . electric

19/04 . . Programme control other than numerical control, i.e. in sequence controllers or logic controllers (G05B 19/418 takes precedence; numerical control G05B 19/18)

19/042 . . . using digital processors (G05B 19/05 takes precedence) **[6]**

19/045 . . . using logic state machines, consisting only of a memory or a programmable logic device containing the logic for the controlled machine and in which the state of its outputs is dependent on the state of its inputs or part of its own output states, e.g. binary decision controllers, finite state controllers **[6]**

19/048 . . . Monitoring; Safety **[6]**

19/05 . . . Programmable logic controllers, e.g. simulating logic interconnections of signals according to ladder diagrams or function charts **[5]**

19/06 . . . using cams, discs, rods, drums, or the like (mechanical programme-control apparatus G05G 21/00)

19/07 . . . where the programme is defined in the fixed connection of electrical elements, e.g. potentiometers, counters, transistors **[6]**

19/08 . . . using plugboards, cross-bar distributors, matrix switches, or the like

19/10 . . . using selector switches

19/12 . . . using record carriers

19/14 . . . . using punched cards or tapes

19/16 . . . . using magnetic record carriers

19/18 . . Numerical control (NC), i.e. automatically operating machines, in particular machine tools, e.g. in a manufacturing environment, so as to execute positioning, movement or co-ordinated operations by means of programme data in numerical form (G05B 19/418 takes precedence) **[6]**

19/19 . . . characterised by positioning or contouring control systems, e.g. to control position from one programmed point to another or to control movement along a programmed continuous path **[3,6]**

Note

In this group, the measuring system for an axis is used to measure the displacement along that axis. This measurement is used as position-feedback in the servo-control system. **[6]**

19/21 . . . . using an incremental digital measuring device **[3]**
19/23 . . . . . for point-to-point control **[3]**
19/25 . . . . . for continuous-path control **[3]**
19/27 . . . . using an absolute digital measuring device **[3]**
19/29 . . . . . for point-to-point control **[3]**
19/31 . . . . . for continuous-path control **[3]**
19/33 . . . . using an analogue measuring device **[3]**
19/35 . . . . . for point-to-point control **[3]**
19/37 . . . . . for continuous-path control **[3]**
19/39 . . . . using a combination of the means covered by at least two of the preceding groups G05B 19/21, G05B 19/27 and G05B 19/33 **[3]**
19/40 . . . . Open loop systems, e.g. using stepping motor **[3]**
19/401 . . . characterised by control arrangements for measuring, e.g. calibration and initialisation, measuring workpiece for machining purposes (G05B 19/19 takes precedence) **[6]**
19/402 . . . characterised by control arrangements for positioning, e.g. centring a tool relative to a hole in the workpiece, additional detection means to correct position (G05B 19/19 takes precedence) **[6]**
19/404 . . . characterised by control arrangements for compensation, e.g. for backlash, overshoot, tool offset, tool wear, temperature, machine construction errors, load, inertia (G05B 19/19, G05B 19/41 take precedence) **[6]**
19/406 . . . characterised by monitoring or safety (G05B 19/19 takes precedence) **[6]**
19/4061 . . . . Avoiding collision or forbidden zones **[6]**
19/4062 . . . . Monitoring servoloop, e.g. overload of servomotor, loss of feedback or reference **[6]**
19/4063 . . . . Monitoring general control system (G05B 19/4062 takes precedence) **[6]**
19/4065 . . . . Monitoring tool breakage, life or condition **[6]**
19/4067 . . . . Restoring data or position after power failure or other interruption **[6]**
19/4068 . . . . Verifying part programme on screen, by drawing or other means **[6]**
19/4069 . . . . Simulating machining process on screen (G05B 19/4068 takes precedence) **[6]**
19/408 . . . characterised by data handling or data format, e.g. reading, buffering or conversion of data **[6]**
19/409 . . . characterised by using manual data input (MDI) or by using control panel, e.g. controlling functions with the panel; characterised by control panel details, by setting parameters (G05B 19/408, G05B 19/4093 take precedence) **[6]**
19/4093 . . . characterised by part programming, e.g. entry of geometrical information as taken from a technical drawing, combining this with machining and material information to obtain control information, named part programme, for the NC machine **[6]**
19/4097 . . . characterised by using design data to control NC machines, e.g. CAD/CAM (G05B 19/4093 takes precedence; CAD in general G06F 17/50) **[6]**
19/4099 . . . . Surface or curve machining, making 3D objects, e.g. desktop manufacturing **[6]**
19/41 . . . characterised by interpolation, e.g. the computation of intermediate points between programmed end points to define the path to be followed and the rate of travel along that path (G05B 19/25, G05B 19/31, G05B 19/37, G05B 19/39, G05B 19/40 take precedence) **[3,6]**
19/4103 . . . . Digital interpolation **[6]**
19/4105 . . . . Analog interpolation **[6]**
19/414 . . . Structure of the control system, e.g. common controller or multiprocessor systems, interface to servo, programmable interface controller **[6]**
19/4155 . . . characterised by programme execution, i.e. part programme or machine function execution, e.g. selection of a programme **[6]**
19/416 . . . characterised by control of velocity, acceleration or deceleration (G05B 19/19 takes precedence) **[6]**
19/418 . . Total factory control, i.e. centrally controlling a plurality of machines, e.g. direct or distributed numerical control (DNC), flexible manufacturing systems (FMS), integrated manufacturing systems (IMS), computer integrated manufacturing (CIM) **[6]**
19/42 . . Recording and playback systems, i.e. in which the programme is recorded from a cycle of operations, e.g. the cycle of operations being manually controlled, after which this record is played back on the same machine
19/421 . . . Teaching successive positions by mechanical means, e.g. by mechanically-coupled handwheels to position tool head or end effector (G05B 19/423 takes precedence) **[6]**
19/423 . . . Teaching successive positions by walk-through, i.e. the tool head or end effector being grasped and guided directly, with or without servo-assistance, to follow a path **[6]**
19/425 . . . Teaching successive positions by numerical control, i.e. commands being entered to control the positioning servo of the tool head or end effector **[6]**
19/427 . . . Teaching successive positions by tracking the position of a joystick or handle to control the positioning servo of the tool head, master-slave control (G05B 19/423 takes precedence) **[6]**
19/43 . fluidic **[3]**
19/44 . . pneumatic **[3]**
19/46 . . hydraulic **[3]**

21/00 **Systems involving sampling of the variable controlled** (G05B 13/00 to G05B 19/00 take precedence; transmission systems for measured values G08C; electronic switching or gating H03K 17/00)
21/02 . electric

23/00 **Testing or monitoring of control systems or parts thereof** (monitoring of programme-control systems G05B 19/048, G05B 19/406)

23/02 . Electric testing or monitoring

24/00 **Open-loop automatic control systems not otherwise provided for [2]**

24/02 . electric **[2]**

24/04 . fluidic **[2]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

G05D **SYSTEMS FOR CONTROLLING OR REGULATING NON-ELECTRIC VARIABLES** (for continuous casting of metals B22D 11/16; valves per se F16K; sensing non-electric variables, see the relevant subclasses of G01; for regulating electric or magnetic variables G05F)

(1) This subclass does not cover features of general applicability to regulating systems, e.g. anti-hunting arrangements, which are covered by subclass G05B.

(2) In this subclass, the following term is used with the meaning indicated:
– "systems" includes self-contained devices such as speed governors, pressure regulators.

(3) Control systems specially adapted for particular apparatus, machines or processes are classified in the subclasses for the apparatus, machines or processes, provided that there is specific provision for control or regulation relevant to the special adaptation, either at a detailed level (e.g. A21B 1/40: "for regulating temperature in bakers' ovens") or at a general level (e.g. B23K 9/095: "for automatic control of welding parameters in arc welding"). Otherwise, classification is made in the most appropriate place in this subclass.
The following are lists of places where there is specific provision of the kind referred to above. Where such provision is at a detailed level, the places have been grouped according to the main groups of this subclass. Where the provision is at a general level (e.g. of a kind appropriate to more than one of the main groups specified in the lists, or to main groups G05D 27/00or G05D 29/00), the places are listed under the title "General References".

Places related to G05D 1/00

A01B	69/00	Agricultural machines or implements
A63H	17/36	Toy vehicles
B60V	1/11	Air-cushion vehicles
B60W	30/10	Road vehicle path control
B62D	1/00	Steering controls of motor vehicles or trailers, i.e. means for initiating a change of direction
B62D	6/00	Arrangements for automatically controlling the steering depending on driving conditions
B62D	55/116	Chassis of endless-tracked vehicles
B63H	25/00	Marine steering; control of waterborne vessels
B64C	13/00	Controlling aircraft
B64C	15/00	
B64D	25/11	Controlling attitude or direction of aircraft ejector seats
B64G	1/24	Cosmonautic vehicles
F41G	7/00	Self-propelled missiles
F42B	15/01	Guided missiles
F42B	19/01	Marine torpedoes

Places related to G05D 3/00

A43D	119/00	Footwear manufacture
B21K	31/00	Tool carriers in forging or pressing
B23B	39/26	Pattern-controlled boring or drilling tools
B23D	1/30,	Planing or slotting machines controlled by copying device
B23D	3/06,	
B23D	5/04	
B23H	7/18	Electrode to workpiece spacing in electric discharge and electrochemical machining
B23K	26/02	Workpiece in laser welding or cutting
B23K	37/04	Workpiece in welding
B23K	37/06	Molten metal in welding
B23Q	5/20	Spindles in machine tools
B23Q	15/00,	Tool or work position in machine tools
B23Q	16/00	
B23Q	35/00	Tools controlled by pattern or master model
B24B	17/00	Grinding controlled by patterns, drawings, magnetic tape or the like
B24B	47/22	Starting position in grinding
B30B	15/24	Actuating members in presses
B62D	55/116	Chassis of tracked vehicles
B65H	23/18	Web-advancing mechanisms
E02F	3/43	Dippers or buckets in dredgers
F15B	9/00	Fluid-pressure servomotors with follow-up action
F24J	2/38	Tracking of solar heat collectors
G03F	9/00	Photomechanical production of patterned or textured surfaces
G11B	5/588	Rotating heads in information storage systems
G21C	7/12	Movement of control elements in nuclear reactors

Places related to G05D 5/00

A24B	7/14	Tobacco cutting
B05C	11/02	Thickness of coating of fluent material on surface
B21B	37/16	Thickness, width, diameter or other transverse dimensions of the products of metal-rolling mills
C03B	18/04	Dimension of glass ribbon
D21F	7/06	Thickness of layer in paper making

Places related to G05D 7/00

A45D	20/26	Air in hair drying helmets
A61M	5/168	Flow of media to the human body
B03C	3/36	Gases or vapour in electrostatic separators
B05C	11/10	Fluent material in coating devices
B67D	1/12	Dispensing beverages on draught
B67D	7/28	Transferring liquids
C10K	1/28	Gas purifiers
E21B	21/08	Flushing boreholes
E21B	43/12	Obtaining liquids from wells
F01D	17/00	Flow in non-positive-displacement machines or systems
F01M	1/16	Lubrication arrangements
F01P	7/00	Coolant flow in cooling devices
F02C	9/16,	Gas-turbine working fluid
F02C	9/50	
F16L	55/027	Throttle passages in pipes
F24F	11/00	Air-flow or supply of heating or cooling fluids in air treatment arrangements
F26B	21/12	Air or gas flow in dryers
G01G	11/08	Continuous flow weighing apparatus
G21D	3/14	Coolant in nuclear power plant

Places related to G05D 9/00

B01D	21/34	Liquid level in sedimentation arrangements
B41L	27/04	Ink level in printing, manifolding or duplicating arrangements
F22D	5/00	Feed water for boilers
H01J	1/10,	Liquid pool electrodes in electric discharge tubes or lamps
H01J	13/14	

Places related to G05D 11/00

B01D	21/32	Density in sedimentation arrangements
B01F	15/04	Mixers
B24C	7/00	Abrasive blasts
B28C	7/00	Mixtures of clays or cements
B65G	53/66	Bulk material conveyers
F02K	3/075	Flow ratio in jet-propulsion plants

Places related to G05D 13/00

B21C	1/12	Drum speed in metal drawing
B23Q	15/00	Cutting velocity of tool or work
B30B	15/20	Ram speed in presses
B60K	31/00	Setting or limiting speed of vehicles
B60L	15/00	Electrically-propelled vehicles
B60W	30/14	Road vehicle cruise control
B64D	31/08	Cruising speed of aircraft
D01D	1/09	Feed rate in manufacture of artificial filaments, threads, fibres, bristles or ribbons
D01G	15/36	Carding machines
D02H	13/14	Warping, beaming or leasing machines
D03D	51/16	Cyclically varying speed of looms
G01N	30/32	Speed of fluid carrier in chemical analysis
G11B	15/46	Filamentary or web record carriers or heads for such carriers in information storage systems
G11B	19/28	Non-filamentary, non-web record carriers, or heads for such carriers in information storage systems

Places related to G05D 15/00

B25D	9/26	Portable percussive tools
B30B	15/22	Ram pressure in presses
B65H	59/00	Tension in filamentary material
B65H	77/00	Tension in webs, tapes, filamentary material
B66D	1/50	Rope, cable or chain tension
D03D	49/04	Tension in looms
D05B	47/04	Tension in sewing machines
D21F	3/06	Pressure in paper-making machines
F26B	13/12	Drying fabrics
F26B	21/10	Pressure in dryers
G11B	15/43	Record carrier tension in information storage arrangements

Places related to G05D 16/00

B60C	23/00	Tyre pressure
B63C	11/08	Air within diving suit
B64D	13/00	Aircraft air-pressure
B65G	53/66	Bulk material conveyers

D01D	1/09	Manufacture of artificial filaments, threads, fibres, bristles or ribbons
E21B	21/08	Flushing boreholes
F01M	1/16	Lubrication arrangements
G01N	30/32	Pressure of fluid carrier in chemical analysis
H01J	7/14	Pressure in electric discharge tubes or lamps
H01K	1/52	Pressure in electric incandescent lamps

Places related to G05D 19/00

B25D	9/26	Portable percussion tools
B65G	27/32	Jigging conveyers

Places related to G05D 21/00

B01D	21/32	Density in sedimentation arrangements
B01D	53/30	Treating gases or vapours
G01N	30/34	Composition of fluid carrier in chemical analysis

Places related to G05D 22/00

A01G	25/16	Watering gardens, fields, sports grounds or the like
A01K	41/04	Poultry incubators
A24B	9/00	Tobacco products
F24F	11/00	Air conditioning
F26B	21/08	Dryers

Places related to G05D 23/00

A21B	1/40	Bakers' ovens
A45D	6/20	Hair curlers
B21C	31/00	Metal extruding
B60C	23/00	Tyre temperature
B64G	1/50	Cosmonautic vehicles
C03B	18/18,	Float baths in glass making
C03B	18/22	
D01D	1/09	Manufacture of artificial filaments, threads, fibres, bristles or ribbons
D04B	35/30	Knitting machines
D06F	75/26	Hand irons
D21F	5/06	Paper-making machines
F01M	5/00	Lubricant in lubrication arrangements
F16N	7/08	Arrangements for supplying oil or unspecified lubricant from a reservoir
F22G	5/00	Steam superheat
F26B	21/10	Dryers
G01N	30/30	Temperature of fluid carrier in chemical analysis
H01M	10/50	Electric storage cells
H05B	6/06,	Dielectric, induction or microwave heating
H05B	6/50,	
H05B	6/68	
H05G	1/36	Anode of X-ray tube

Places related to G05D 25/00

B41B	21/08	Photographic composing machines
H01S	3/10,	Lasers and other light sources
H05B	33/08,	
H05B	35/00	
H05B	43/00	

General references

A01D	41/127	Combines
A01J	5/007	Milking machines
B23K	9/095	Welding parameters
B23Q	35/00	Copying
B24B	17/00,	Grinding or polishing
B24B	49/00	
B24C	7/00	Abrasive blasts
B67D	1/12	Dispensing beverages on draught
F23C	10/28	Combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles
G03G	21/20	Electrographic, electrophotographic or magnetographic processes
H02P	5/00	Dynamo-electric motors or generators
H02P	9/00	

Subclass index

1/00 **Control of position, course, altitude, or attitude of land, water, air, or space vehicles, e.g. automatic pilot** (radio navigation systems or analogous systems using other waves G01S)

1/02 . Control of position or course in two dimensions **[2]**

1/03 . . using near-field transmission systems, e.g. inductive-loop type

1/04 . Control of altitude or depth

1/06 . . Rate of change of altitude or depth

1/08 . Control of attitude, i.e. control of roll, pitch, or yaw

1/10 . Simultaneous control of position or course in three dimensions (G05D 1/12 takes precedence)

1/12 . Target-seeking control

3/00 **Control of position or direction** (G05D 1/00 takes precedence; for numerical control G05B 19/18)

3/10 . without using feedback **[3]**

3/12 . using feedback **[3]**

3/14 . . using an analogue comparing device **[3]**

3/16 . . . whose output amplitude can only take a number of discrete values (G05D 3/18 takes precedence) **[3]**

3/18 . . . delivering a series of pulses **[3]**

3/20 . . using a digital comparing device **[3]**

5/00 **Control of dimensions of material**

5/02 . of thickness, e.g. of rolled material

5/03 . . characterised by the use of electric means

5/04 . of the size of items, e.g. of particles

5/06 . . characterised by the use of electric means

7/00 **Control of flow** (level control G05D 9/00; ratio control G05D 11/00; weighing apparatus G01G)

7/01 . without auxiliary power

7/03 . with auxiliary non-electric power **[2]**

7/06 . characterised by the use of electric means

9/00 **Level control, e.g. controlling quantity of material stored in vessel**

9/02 . without auxiliary power

9/04 . with auxiliary non-electric power **[2]**

9/12 . characterised by the use of electric means

11/00 **Ratio control** (control of chemical or physico-chemical variables, e.g. pH-value, G05D 21/00; humidity control G05D 22/00; control of viscosity G05D 24/00) **[3]**

11/02 . Controlling ratio of two or more flows of fluid or fluent material

11/03 . . without auxiliary power

11/035 . . with auxiliary non-electric power **[2]**

11/04 . . . by sensing weight of individual components, e.g. gravimetric procedure

11/06 . . . by sensing density of mixture, e.g. using aerometer

11/08 . . . by sensing concentration of mixture, e.g. by measuring pH-value **[3]**

11/10 . . . . by sensing moisture of non-aqueous liquids

11/12 . . . by sensing viscosity of mixture

11/13 . . characterised by the use of electric means

11/16 . Controlling mixing ratio of fluids having different temperatures, e.g. by sensing the temperature of a mixture of fluids having different viscosities

13/00 **Control of linear speed**; **Control of angular speed**; **Control of acceleration or deceleration, e.g. of a prime mover** (synchronising telegraph receiver and transmitter H04L 7/00)

13/02 . Details

13/04 . . providing for emergency tripping of an engine in case of exceeding maximum speed

13/06 . . providing for damping of erratic vibrations in governors

13/08 . without auxiliary power

13/10 . . Centrifugal governors with fly-weights

13/12 . . . Details

13/14 . . . . Fly-weights; Mountings thereof; Adjusting equipment for limits, e.g. temporarily

13/16 . . . . Risers; Transmission gear therefor; Restoring mechanisms therefor

13/18 . . . counterbalanced by spider springs acting immediately upon the fly-weights

13/20 . . . counterbalanced by spider springs acting upon the articulated riser

13/22 . . . counterbalanced by fluid pressure acting upon the articulated riser

13/24 . . . counterbalanced by two or more different appliances acting simultaneously upon the riser, e.g. with both spring force and fluid pressure, with both spring force and electromagnetic force

13/26 . . . with provision for modulating the degree of non-uniformity of speed

13/28 . . . with provision for performing braking effects in case of increased speed

13/30 . . Governors characterised by fluid features in which the speed of a shaft is converted into fluid pressure (transducers converting variations of physical quantities into fluid-pressure variations F15B 5/00)

13/32 . . . using a pump

13/34 . with auxiliary non-electric power (fluid-pressure converters F15B 3/00) **[2]**

13/36 . . using regulating devices with proportional band, i.e. P. regulating devices

13/38 . . . involving centrifugal governors of fly-weight type

13/40 . . . involving centrifugal governors of pump type

13/42 . . . involving fluid governors of flow-controller type, i.e. the width of liquid flow being controlled by fly-weights

13/44 . . . involving fluid governors of jet type

13/46 . . using regulating devices with proportional band and integral action, i.e. P.I. regulating devices

13/48 . . . involving resilient restoring mechanisms

13/50 . . . involving connecting means for superimposing a proportional regulating device and an integral regulating device

13/52 . . using regulating devices with proportional band and derivative action, i.e. P.D. regulating devices

13/54 . . . involving centrifugal governors of fly-weight type exerting an acceleratory effect

13/56 . . . involving restoring mechanisms exerting a delay effect

13/58 . . . involving means for connecting a speed-regulating device and an acceleration-regulating device

13/60 . . using regulating devices with proportional band, derivative, and integral action, i.e. P.I.D. regulating devices

13/62 . characterised by the use of electric means, e.g. use of a tachometric dynamo, use of a transducer converting an electric value into a displacement

13/64 . Compensating the speed difference between engines meshing by a differential gearing or the speed difference between a controlling shaft and a controlled shaft

13/66 . Governor units providing for co-operation with control dependent upon a variable other than speed

15/00 Control of mechanical force or stress; **Control of mechanical pressure**

15/01 . characterised by the use of electric means

16/00 Control of fluid pressure

16/02 . Modifications to reduce the effects of instability, e.g. due to vibrations, friction, abnormal temperature, overloading, unbalance (vibration-dampers F16F 7/00)

16/04 . without auxiliary power

16/06 . . the sensing element being a flexible member yielding to pressure, e.g. diaphragm, bellows, capsule

16/08 . . . Control of liquid pressure

16/10 . . the sensing element being a piston or plunger

16/12 . . the sensing element being a float

16/14 . with auxiliary non-electric power **[2]**

16/16 . . derived from the controlled fluid

16/18 . . derived from an external source

16/20 . characterised by the use of electric means

17/00 Control of torque; **Control of mechanical power**

17/02 . characterised by the use of electric means

19/00 Control of mechanical oscillations, e.g. of amplitude, of frequency, of phase

19/02 . characterised by the use of electric means

21/00 Control of chemical or physico-chemical variables, e.g. pH-value [3]

21/02 . characterised by the use of electric means

22/00 Control of humidity [2]

22/02 . characterised by the use of electric means

23/00 Control of temperature (automatic switching arrangements for electric heating apparatus H05B 1/02)

23/01 . without auxiliary power

23/02 . . with sensing element expanding and contracting in response to changes of temperature (G05D 23/13 takes precedence)

23/08 . . . with bimetallic element (arrangement of valves and flow lines specially adapted for mixing fluid F16K 11/00)

23/10 . . . . with snap-action elements (for valves F16K 31/56)

23/12 . . with sensing element responsive to pressure or volume changes in a confined fluid

23/13 . . by varying the mixing ratio of two fluids having different temperatures

23/185 . with auxiliary non-electric power **[2]**

23/19 . characterised by the use of electric means

23/20 . . with sensing elements having variation of electric or magnetic properties with change of temperature (G05D 23/13 takes precedence)

23/22 . . . the sensing element being a thermocouple

23/24 . . . the sensing element having a resistance varying with temperature, e.g. thermistor

23/26 . . . the sensing element having a permeability varying with temperature

23/27 . . with sensing element responsive to radiation

23/275 . . with sensing element expanding, contracting, or fusing in response to changes of temperature

23/30 . . Automatic controllers with an auxiliary heating device affecting the sensing element, e.g. for anticipating change of temperature (automatic controllers in general and not restricted to control of temperature G05B)

23/32 . . . with provision for adjustment of the effect of the auxiliary heating device, e.g. as a function of time

24/00 Control of viscosity

24/02 . characterised by the use of electric means

25/00 Control of light, e.g. intensity, colour, phase (mechanically operable parts of lighting devices for the control of light F21V; optical devices or arrangements using movable or deformable elements for controlling light independent of the light source G02B 26/00; devices or arrangements, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements for the control of light, circuit arrangements specially adapted therefor, control of light by electro-magnetic waves, electrons or other elementary particles G02F 1/00) **[4]**

25/02 . characterised by the use of electric means

27/00 Simultaneous control of variables covered by two or more of main groups G05D 1/00 to G05D 25/00

27/02 . characterised by the use of electric means

29/00 Simultaneous control of electric and non-electric variables

99/00 Subject matter not provided for in other groups of this subclass [8]

G05F **SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES** (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02; closed-loop systems for regulating non-electric variables by electric means G05D; regulating power supply of digital computers G06F 1/26; for obtaining desired operating characteristics of electromagnets with armatures H01F 7/18; regulating electric power distribution networks H02J; regulating the charging of batteries H02J 7/00; regulating of the output of static converters, e.g. switching regulators, H02M; regulation of the output of electric generators H02N, H02P 9/00; controlling transformers, reactors or choke coils H02P 13/00; regulating frequency response, gain, maximum output, amplitude or bandwidth of amplifiers H03G; regulating tuning of resonant circuits H03J; controlling generators of electronic oscillations or pulses H03L; regulating characteristics of transmission lines H04B; controlling electric light sources H05B 37/02, H05B 39/04, H05B 41/36; electric control of X-ray apparatus H05G 1/30) **[4,5]**

(1) This subclass covers:
- systems only;
- use of hydraulic, pneumatic, mechanical, and electrical motors for varying electric characteristics of devices which restore the quantity regulated;
- the combination of static converters and current or voltage regulators, if the essential characteristic resides in the combination. **[4]**

(2) This subclass does not cover elements per se, which are covered by the relevant subclasses.

1/00 **Automatic systems in which deviations of an electric quantity from one or more predetermined values are detected at the output of the system and fed back to a device within the system to restore the detected quantity to its predetermined value or values, i.e. retroactive systems**

1/02 . Regulating electric characteristics of arcs (arrangements for feeding or moving of electrodes for spot or seam welding or cutting B23K 9/12; arrangements for feeding electrodes for electric heating or electric lighting H05B 7/109, H05B 31/18; automatic control of power for heating by discharge H05B 7/148) **[2]**

1/04 . . by means of saturable magnetic devices

1/06 . . by means of discharge tubes

1/08 . . by means of semiconductor devices

1/10 . Regulating voltage or current (G05F 1/02 takes precedence; for electric railways B60M 3/02)

1/12 . . wherein the variable is actually regulated by the final control device is ac (G05F 1/625 takes precedence) **[4]**

1/13 . . . using ferroresonant transformers as final control devices **[4]**

1/14 . . . using tap transformers or tap changing inductors as final control devices **[4]**

1/147 . . . . with motor driven tap switch **[4]**

1/153 . . . . . controlled by discharge tubes or semiconductor devices **[4]**

1/16 . . . . combined with discharge tubes or semiconductor devices

1/20 . . . . . semiconductor devices only

1/22 . . . . combined with separate magnetic control devices having a controllable degree of saturation

1/24 . . . using bucking or boosting transformers as final control devices

1/247 . . . . with motor in control circuit **[4]**

1/253 . . . . the transformers including plural windings in series between source and load (G05F 1/247 takes precedence) **[4]**

1/26 . . . . combined with discharge tubes or semiconductor devices

1/30 . . . . . semiconductor devices only

1/32 . . . using magnetic devices having a controllable degree of saturation as final control devices

1/325 . . . . with specific core structure, e.g. gap, aperture, slot, permanent magnet **[4]**

1/33 . . . . with plural windings through which current to be controlled is conducted **[4]**

1/335 . . . . . on different cores **[4]**

1/34 . . . . combined with discharge tubes or semiconductor devices

1/38 . . . . . semiconductor devices only

1/40 . . . using discharge tubes or semiconductor devices as final control devices

1/42 . . . . discharge tubes only

1/44 . . . . semiconductor devices only

1/445 . . . . . being transistors in series with the load **[3]**

1/45 . . . . . being controlled rectifiers in series with the load **[3]**

1/455 . . . . . with phase control **[3]**

1/46 . . wherein the variable actually regulated by the final control device is dc (G05F 1/625 takes precedence) **[4]**

1/52 . . . using discharge tubes in series with the load as final control devices

1/54 . . . . additionally controlled by the unregulated supply

1/56 . . . using semiconductor devices in series with the load as final control devices

1/563 . . . . including two stages of regulation, at least one of which is output level responsive, e.g. coarse and fine regulation **[4]**

1/565 . . . . sensing a condition of the system or its load in addition to means responsive to deviations in the output of the system, e.g. current, voltage, power factor (G05F 1/563 takes precedence) **[4]**

1/567 . . . . . for temperature compensation **[4]**

1/569 . . . . . for protection **[4]**

1/571 . . . . . with overvoltage detector **[4]**

1/573 . . . . . with overcurrent detector **[4]**

1/575 . . . . characterised by the feedback circuit **[4]**

1/577 . . . . for plural loads **[4]**

1/585 . . . . . providing voltages of opposite polarities **[4]**

1/59 . . . . including plural semiconductor devices as final control devices for a single load **[4]**

1/595 . . . . . semiconductor devices connected in series **[4]**
1/607 . . . using discharge tubes in parallel with the load as final control devices **[3]**
1/61 . . . . including two stages of regulation, at least one of which is output level responsive **[4]**
1/613 . . . using semiconductor devices in parallel with the load as final control devices **[3]**
1/614 . . . . including two stages of regulation, at least one of which is output level responsive **[4]**
1/618 . . . using semiconductor devices in series and in parallel with the load as final control devices **[4]**
1/62 . . . using bucking or boosting dc sources
1/625 . . wherein it is irrelevant whether the variable actually regulated is ac or dc **[4]**
1/63 . . . using variable impedances in series with the load as final control devices **[4]**
1/635 . . . . being Hall effect devices, magnetoresistors or thermistors **[4]**
1/644 . . . . being pressure-sensitive resistors **[4]**
1/648 . . . . being plural resistors among which a selection is made **[4]**
1/652 . . . using variable impedances in parallel with the load as final control devices **[4]**
1/656 . . . using variable impedances in series and in parallel with the load as final control devices **[4]**
1/66 . Regulating electric power
1/67 . . to the maximum power available from a generator, e.g. from solar cell **[4]**
1/70 . Regulating power factor; Regulating reactive current or power **[3]**

3/00 Non-retroactive systems for regulating electric variables by using an uncontrolled element, or an uncontrolled combination of elements, such element or such combination having self-regulating properties

3/02 . Regulating voltage or current
3/04 . . wherein the variable is ac
3/06 . . . using combinations of saturated and unsaturated inductive devices, e g. combined with resonant circuit
3/08 . . wherein the variable is dc
3/10 . . . using uncontrolled devices with non-linear characteristics **[4]**
3/12 . . . . being glow discharge tubes
3/16 . . . . being semiconductor devices **[3]**
3/18 . . . . . using Zener diodes **[3]**
3/20 . . . . . using diode-transistor combinations (G05F 3/18 takes precedence) **[3]**
3/22 . . . . . wherein the transistors are of the bipolar type only (G05F 3/26, G05F 3/30 take precedence) **[4]**
3/24 . . . . . wherein the transistors are of the field-effect type only (G05F 3/26, G05F 3/30 take precedence) **[4]**
3/26 . . . . . Current mirrors **[4]**
3/28 . . . . . combined with a non-linear current amplifier **[4]**
3/30 . . . . . Regulators using the difference between the base-emitter voltages of two bipolar transistors operating at different current densities (G05F 3/26 takes precedence) **[4]**

5/00 Systems for regulating electric variables by detecting deviations in the electric input to the system and thereby controlling a device within the system to obtain a regulated output

5/02 . Phase controlled switching using electronic tubes or three or more terminal semiconductive devices **[4]**
5/04 . using a transformer or inductor as the final control device **[4]**
5/06 . . saturable **[4]**
5/08 . using a linearly acting final control device **[4]**

7/00 Regulating magnetic variables (details of apparatus for measuring magnetic variables involving magnetic resonance G01R 33/28) **[5]**

G05G CONTROL DEVICES OR SYSTEMS INSOFAR AS CHARACTERISED BY MECHANICAL FEATURES ONLY (“Bowden” or like mechanisms F16C 1/10; gearings or mechanisms not peculiar to this purpose F16H; speed changing or reversing mechanisms for gearings conveying rotary motion F16H 59/00 to F16H 63/00)

(1) This subclass covers:
– members of general applicability for mechanical control;
– mechanical systems for moving members to one or more definite settings.

(2) Systems peculiar to the control of particular machines or apparatus provided for in a single other class are classified in the relevant class for such machines or apparatus, for example:

A61G	13/02	Controls for adjusting operating tables
A61G	15/02	Controls for adjusting operating chairs
A63F	13/02	Accessories for games using an electronically generated display
B25J		Manipulators, e.g. controls therefor
B60K	26/00	Arrangement or mounting of propulsion-unit control devices in vehicles
B60T	7/00	Vehicle brake-action initiating means
B62D	33/073	Adaptations of control devices for movable vehicle cabs
B62K	21/00	Cycle-steering devices
B62K	23/00	Rider-operated controls specially adapted for cycles
B62L	3/00	Brake-actuating mechanisms specially adapted for cycles
B63H	25/02	Marine steering initiating means
B66B	1/00	Controls for elevators
B66C	13/18	Control systems or devices for cranes
B66C	13/56	Arrangements of handles or pedals for crane operation

E02F	9/20		Control devices for dredging or soil shifting machines
F16C	3/28		Adjustable cranks or eccentrics
F16D	43/00		Automatic clutches
F16K	31/00,		Controls for valves
F16K	33/00		
F16P	3/00		Safety devices acting in conjunction with the control or operation of a machine
F16P	7/02		Stopping machines on occurrence of dangerous conditions therein
G02B	21/32		Micromanipulators structurally combined with microscopes
G04B	1/00	to	Driving mechanisms in clocks or watches
G04B	18/00		
G06C			Digital computers in which all the computation is effected mechanically
G06F	3/01		Manual computer input arrangements
G06K	11/00		Converting a pattern of mechanical parameters into electric signals
G21C	7/08		Displacement of solid control elements in nuclear reactors
H01H			Mechanisms for operating switch contacts
H03J	1/00		Mechanical control of resonant circuits.

Subclass index

1/00 **Controlling members, e.g. knobs or handles**; **Assemblies or arrangements thereof**; **Indicating position of controlling members** (joysticks G05G 9/04; steering wheels for motor vehicles B62D)

Note

In this group the first place priority rule is applied, i.e. at each hierarchical level classification is made in the first appropriate place. **[2008.04]**

1/01 . Arrangements of two or more controlling members with respect to one another (double foot control, e.g. for instruction vehicles G05G 1/34; mounting units comprising an assembly with two or more pedals G05G 1/36) **[2008.04]**

1/015 . Arrangements for indicating the position of a controlling member (means for continuously detecting pedal position G05G 1/38; means for detecting position through tactile feedback G05G 5/03) **[2008.04]**

1/02 . Controlling members for hand-actuation by linear movement, e.g. push buttons **[1,7]**

1/04 . Controlling members for hand-actuation by pivoting movement, e.g. levers **[1,7]**

1/06 . . Details of their grip parts **[1,7]**

1/08 . Controlling members for hand-actuation by rotary movement, e.g. hand wheels **[1,7]**

1/10 . . Details, e.g. of discs, knobs, wheels or handles

1/12 . . . Means for securing the members on rotatable spindles or the like

1/30 . Controlling members actuated by foot **[2008.04]**

1/32 . . with means to prevent injury **[2008.04]**

1/323 . . . means disconnecting the connection between pedal and controlled member, e.g. by breaking or bending the connecting rod **[2008.04]**

1/327 . . . means disconnecting the pedal from its hinge or support, e.g. by breaking or bending the support **[2008.04]**

1/34 . . Double foot controls, e.g. for instruction vehicles **[2008.04]**

1/36 . . Mounting units comprising an assembly of two or more pedals, e.g. for facilitating mounting **[2008.04]**

1/38 . . comprising means to continuously detect pedal position **[2008.04]**

1/40 . . adjustable **[2008.04]**

1/405 . . . infinitely adjustable **[2008.04]**

1/42 . . non-pivoting, e.g. sliding **[2008.04]**

1/44 . . pivoting **[2008.04]**

1/445 . . . about a central fulcrum **[2008.04]**

1/46 . . Means, e.g. links, for connecting the pedal to the controlled unit **[2008.04]**

1/48 . . Non-slip pedal treads; Pedal extensions or attachments characterised by mechanical features only **[2008.04]**

1/483 . . . Non-slip treads **[2008.04]**

1/487 . . . Pedal extensions **[2008.04]**

1/50 . . Manufacturing of pedals; Pedals characterised by the material used **[2008.04]**

1/52 . Controlling members specially adapted for actuation by other parts of the human body than hand or foot **[2008.04]**

1/54 . Controlling members specially adapted for actuation by auxiliary operating members or extensions; Operating members or extensions therefor (pedal extensions G05G 1/487) **[2008.04]**

1/56 . . Controlling members specially adapted for actuation by keys, screwdrivers or like tools **[2008.04]**

1/58 . Rests or guides for relevant parts of the operator's body **[2008.04]**

1/60 . . Foot rests or foot guides **[2008.04]**

1/62 . . Arm rests **[2008.04]**

3/00 **Controlled members** (gear shifter yokes F16H 63/32); **Assemblies or arrangements thereof** (interlocking of controlled members G05G 5/08) **[1,7]**

5/00 **Means for preventing, limiting or returning the movements of parts of a control mechanism, e.g. locking controlling member** (G05G 17/00 takes precedence) **[5]**

5/02 . Means preventing undesired movements of a controlling member which can be moved in two or more separate steps or ways, e.g. restricting to a stepwise movement or to a particular sequence of movements (G05G 5/28 takes precedence)

5/03 . Means for enhancing the operator's awareness of the arrival of the controlling member at a command or datum position; Providing feel, e.g. means for creating a counterforce (arrangements for indicating the position of the controlling member G05G 1/015) **[5,2008.04]**

5/04 . Stops for limiting movement of members, e.g. adjustable stop (G05G 5/03, G05G 5/05, G05G 5/28 take precedence) **[5]**

5/05 . Means for returning or tending to return controlling members to an inoperative or neutral position, e.g. by providing return springs or resilient end-stops (G05G 5/28 takes precedence) **[5]**

5/06 . for holding members in one or a limited number of definite positions only (G05G 5/03, G05G 5/05, G05G 5/28 take precedence) **[5]**

5/08 . . Interlocking of members, e.g. locking a member in a particular position before or during the movement of another member

5/12 . for holding members in an indefinite number of positions, e.g. by a toothed quadrant (G05G 5/28 takes precedence) **[5]**

5/14 . . by locking a member with respect to a fixed quadrant, rod, or the like

5/16 . . . by friction

5/18 . . . by positive interengagement, e.g. by a pawl

5/20 . . by locking a quadrant, rod, or the like carried by the member

5/22 . . . by friction

5/24 . . . by positive interengagement, e.g. by a pawl

5/26 . . by other means than a quadrant, rod, or the like

5/28 . for preventing unauthorised access to the controlling member or its movement to a command position **[5]**

7/00 **Manually-actuated control mechanisms provided with one single controlling member co-operating with one single controlled member**; **Details thereof** (controlling members G05G 1/00)

7/02 . characterised by special provisions for conveying or converting motion, or for acting at a distance

7/04 . . altering the ratio of motion or force between controlling member and controlled member as a function of the position of the controlling member

7/06 . . in which repeated movement of the controlling member produces increments of movement of the controlled member (G05G 7/08 takes precedence)

7/08 . . in which repeated movement of the controlling member moves the controlled member through a cycle of distinct positions

7/10 . . specially adapted for remote control (G05G 7/04 to G05G 7/08 take precedence)

7/12 . specially adapted for actuating a member on a system in motion with respect to the controlling member, e.g. on a rotating shaft

7/14 . characterised by means for delaying initiation of, or making more gradual throughout, the movement of the controlled member in response to a given input from the controlling member, e.g. by providing lost motion in the command train

7/16 . Special provisions for reducing the effect of slight relative movement between supports of the mechanism, e.g. resulting from resilient mounting of a controlled mechanism

9/00 **Manually-actuated control mechanisms provided with one single controlling member co-operating with two or more controlled members, e.g. selectively, simultaneously**

9/02 . the controlling member being movable in different independent ways, movement in each individual way actuating one controlled member only

9/04 . . in which movement in two or more ways can occur simultaneously

9/047 . . . the controlling member being movable by hand about orthogonal axes, e.g. joysticks **[5]**

9/053 . . . . the controlling member comprising a ball **[5]**

9/06 . the controlled members being actuated successively by repeated movement of the controlling member

9/08 . the controlled members being actuated successively by progressive movement of the controlling member

9/10 . with preselection and subsequent movement of each controlled member by movement of the controlling member in two different ways, e.g. guided by a shift gate

11/00 **Manually-actuated control mechanisms provided with two or more controlling members co-operating with one single controlled member**

13/00 **Manually-actuated control mechanisms provided with two or more controlling members and also two or more controlled members** (interlocking G05G 5/08)

13/02 . with separate controlling members for preselection and shifting of controlled members

15/00 **Mechanical devices for initiating a movement automatically due to a specific cause**

15/02 . due to alteration of the sense of movement of a member

15/04 . due to distance or angle travelled by a member

15/06 . due to the speed of rotation or of bodily movement of a member, e.g. passing an upper or lower limit thereof (speedometers G01P)

15/08 . due to the load or torque on a member, e.g. if exceeding a predetermined value thereof

17/00 **Mechanical devices for moving a member after being released**; **Trip or release mechanisms characterised thereby**

19/00 **Servo-mechanisms with follow-up action, e.g. occurring in steps**

21/00 **Mechanical apparatus for control of a series of operations, i.e. programme control, e.g. involving a set of cams** (G05G 5/02 takes precedence)

23/00 **Means for ensuring the correct positioning of parts of control mechanisms, e.g. for taking-up play**

23/02 . self-adjusting

25/00 **Other details, features or accessories of control mechanisms, e.g. supporting intermediate members elastically**

25/02 . Inhibiting the generation or transmission of noise **[5]**

25/04 . Sealing against entry of dust, weather or the like **[5]**

G06 COMPUTING; CALCULATING; COUNTING

(1) This class covers :
- simulators which are concerned with the mathematics of computing the existing or anticipated conditions within the real device or system;
- simulators which demonstrate, by means involving computing, the function of apparatus or of a system, if no provision exists elsewhere;
- image data processing or generation.

(2) This class does not cover :
- *combinations of writing implements with computing devices, which are covered by group B43K 29/08;* **[2011.01]**
- control functions derived from simulators, in general, which are covered by class G05, although such functions may be covered by the subclass of this class for the device controlled;
- measurement or analysis of an individual variable to serve as an input to a simulator, which is covered by class G01;
- simulators regarded as teaching or training devices which is the case if they give perceptible sensations having a likeness to the sensations a student would experience in reality in response to actions taken by him. Such simulators are covered by class G09;
- components of simulators, if identical with real devices or machines, which are covered by the relevant subclass for these devices or machines (and not by class G09).

(3) In this class, the following terms or expressions are used with the meanings indicated:
- "data" is used as the synonym of "information". Therefore, the term "information" is not used in subclasses G06C, G06For G06Q;
- "calculating or computing" includes, inter alia, operations on numerical values and on data expressed in numerical form. Of these terms "computing" is used throughout the class;
- "computation" is derived from this interpretation of "computing". In the French language the term "calcul" will serve for either term;
- "simulator" is a device which may use the same time scale as the real device or operate on an expanded or compressed time scale. In interpreting this term models of real devices to reduced or expanded scales are not regarded as simulators;
- "record carrier" means a body, such as a cylinder, disc, card, tape, or wire, capable of permanently holding information, which can be read-off by a sensing element movable relative to the recorded information.

(4) Attention is drawn to the Notes following the title of section G, especially as regards the definition of the term "variable".

G06C DIGITAL COMPUTERS IN WHICH ALL THE COMPUTATION IS EFFECTED MECHANICALLY (score computers for card games A63F 1/18; construction of keys, printing mechanisms, or other parts of general application to the typewriting or printing art B41; keys or printing mechanisms for special applications, see the relevant subclass, e.g. G05G, G06K; cash registers G07G 1/00) **[4]**

Note

This subclass does not cover details of mechanisms covered by main groups G06C 9/00, G06C 11/00 or G06C 15/00, which are applicable to mechanical counters driven only through the lowest denomination. Such details are covered by subclass G06M.

Subclass index

1/00 Computing aids in which the computing members form at least part of the displayed result and are manipulated directly by hand, e.g. abacus, pocket adding device

3/00 Arrangements for table look-up, e.g. menstruation table

5/00 Non-functional elements

5/02 . Housings; Frameworks

7/00 Input mechanisms (pin carriage G06C 13/02)

7/02 . Keyboards

7/04 . . Interlocking devices, e.g. between keys (interlocking devices covered by this subclass, in general G06C 25/00)

7/06 . . with one set of keys for each denomination

7/08 . . with one set of keys for all denominations, e.g. ten-key board

7/09 . Transfer of data from record carrier to computing mechanisms (sensing record carriers G06K 7/00)
7/10 . Transfer mechanisms, e.g. transfer of a figure from a ten-key keyboard into the pin carriage
7/12 . Resetting devices, e.g. for the keyboard

9/00 Transfer mechanisms, e.g. for transmitting figures from the input mechanism into the computing mechanism (G06C 7/10, G06C 11/00, G06C 15/00 take precedence)
9/02 . Back-transfer arrangements, e.g. to transfer a value accumulated in a register back into the selection mechanism

11/00 Output mechanisms (marking record carriers in general, visual presentation in general of results of the mathematical operations G06K)
11/02 . with visual indication, e.g. counter drum
11/04 . with printing mechanisms, e.g. for character-at-a-time or line-at-a-time printing
11/06 . . having type hammers
11/08 . with punching mechanism
11/10 . Arrangements for feeding single sheets or continuous web or tape, e.g. ejection device (conveying record carriers G06K 13/00); Line-spacing devices
11/12 . . for feeding tape

13/00 Storage mechanisms (mechanical counters with input only to the lowest order G06M; information storage in general G11)
13/02 . Operand stores, e.g. pin carriage (input mechanisms G06C 7/00)
13/04 . Print buffer stores

15/00 Computing mechanisms; **Actuating devices therefor** (mechanisms for operating automatically upon more than two numbers otherwise than by repeated addition or subtraction G06C 21/00)
15/02 . operating on the binary scale

Note

Group G06C 15/02 takes precedence over groups G06C 15/04 to G06C 15/42.

15/04 . Adding or subtracting devices (G06C 15/08 takes precedence)
15/06 . . having balance totalising; Obtaining sub-total
15/08 . Multiplying or dividing devices; Devices for computing the exponent or root
15/10 . . having more than one denominational set of keys operating directly on computing mechanism
15/12 . . having pin carriage
15/14 . . having pin wheel, e.g. Odhner type
15/16 . . having stepped-toothed actuating drums, e.g. Thomas type
15/18 . . having multiplication table for forming partial products
15/20 . . adapted for short-cut multiplication or division **[2]**
15/22 . Arrangements for two or more computing devices; Arrangements for subdivision into two or more computing mechanisms, e.g. splitting
15/24 . Devices for counting the cycles of operation in division or multiplication (item-counting devices G06C 25/02)
15/26 . Devices for transfer between orders, e.g. tens-transfer device
15/28 . . where transfer is effected in one step
15/30 . . where transfer is effected in two steps
15/32 . . . with provision for simultaneous transfer between all orders
15/34 . . where transfer is effected by planet gear, i.e. crawl type
15/36 . . . with aligning means
15/38 . . for pin-wheel computing mechanisms
15/40 . . for stepped-toothed-drum computing mechanism
15/42 . Devices for resetting to zero or other datum
15/44 . Devices for comparing numerical values, e.g. zero check
15/46 . Arrangements for rounding-off
15/48 . Arrangements for selection of one out of several counting registers (arrangements for controlling subsequent operating functions G06C 21/04; item counters G06C 25/02)

17/00 Mechanisms for converting from one notational system to another, i.e. radix conversion

19/00 Decimal-point mechanisms; **Analogous mechanisms for non-decimal notations**
19/02 . Devices for indicating the point
19/04 . Devices for printing the point

21/00 Programming-mechanisms for determining the steps to be performed by the computing machine, e.g. when a key or certain keys are depressed (mechanisms merely for producing multiplication by repeated addition G06C 15/08)
21/02 . in which the operation of the mechanism is determined by the position of the carriage
21/04 . Conditional arrangements for controlling subsequent operating functions, e.g. control arrangement triggered by a function key and depending on the condition of the register (arrangements for selection of one out of several counting registers G06C 15/48)

23/00 Driving mechanisms for functional elements

Note

Group G06C 23/08 takes precedence over groups G06C 23/02 to G06C 23/06.

23/02 . of main shaft
23/04 . of pin carriage, e.g. for step-by-step movement
23/06 . of tabulation devices, e.g. of carriage skip
23/08 . Hydraulic or pneumatic actuation

25/00 Auxiliary functional arrangements, e.g. interlocks (interlocks in keyboards G06C 7/04) **[2]**
25/02 . Item-counting devices (devices for counting the cycles of operation in division or multiplication G06C 15/24)

27/00 Computing machines characterised by the structural interrelation of their functional units, e.g. invoicing machines

29/00 Combinations of computing machines with other machines, e.g. with typewriter, with money-changing apparatus

G06D DIGITAL FLUID-PRESSURE COMPUTING DEVICES

Note

This subclass covers all devices in which at least one computing function is performed by hydraulic or pneumatic means.

1/00 **Details, e.g. functional units** (individual logic elements F15C; valves F16K)
1/02 . having at least one moving part, e.g. spool valve
1/04 . . Adding; Subtracting
1/06 . . Multiplying; Dividing
1/08 . having no moving parts
1/10 . . Adding; Subtracting
1/12 . . Multiplying; Dividing

3/00 **Computing devices characterised by the interrelationship of the functional units and having at least one moving part**

5/00 **Computing devices characterised by the interrelationship of the functional units and having no moving parts**

7/00 **Computing devices characterised by the combination of hydraulic or pneumatic functional elements with at least one other type of functional element**

G06E OPTICAL COMPUTING DEVICES (optical logic elements per se G02F 3/00; computer systems based on specific computational models G06N; digital storage using optical elements G11C 13/04) **[5]**

(1) This subclass covers all devices in which at least one computing function is performed by optical means. **[5]**
(2) If other aspects, for example mechanical, fluid pressure or electrical computing, are of interest, classification is also made in the relevant subclass for such aspects. **[5]**

1/00 **Devices for processing exclusively digital data [5]**
1/02 . operating upon the order or content of the data handled **[5]**
1/04 . . for performing computations using exclusively denominational number representation, e.g. using binary, ternary, decimal representation **[5]**
1/06 . . for performing computations using a digital non-denominational number representation, i.e. number representation without radix; using combinations of denominational and non-denominational number representations **[5]**

3/00 **Devices not provided for in group G06E 1/00, e.g. for processing analogue or hybrid data [5]**

G06F ELECTRIC DIGITAL DATA PROCESSING (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; computer systems based on specific computational models G06N; impedance networks using digital techniques H03H)

Note

In this subclass, the following terms or expressions are used with the meaning indicated:
– "handling" includes processing or transporting of data;
– "data processing equipment" means an association of an electric digital data processor classifiable under group G06F 7/00, with one or more arrangements classifiable under groups G06F 1/00 to G06F 5/00 and G06F 9/00 to G06F 13/00.

Subclass index

1/00 **Details not covered by groups G06F 3/00 to G06F 13/00 and G06F 21/00** (architectures of general purpose stored programme computers G06F 15/76) **[1,8]**

1/02 . Digital function generators

1/025 . . for functions having two-valued amplitude, e.g. Walsh functions **[5]**

1/03 . . working, at least partly, by table look-up (G06F 1/025 takes precedence) **[5]**

Note

In order to be classified in this group, the table must contain function values of the desired or an intermediate function, not merely coefficients. **[5]**

1/035 . . . Reduction of table size **[5]**

1/04 . Generating or distributing clock signals or signals derived directly therefrom

1/06 . . Clock generators producing several clock signals **[5]**

1/08 . . Clock generators with changeable or programmable clock frequency **[5]**

1/10 . . Distribution of clock signals **[5]**

1/12 . . Synchronisation of different clock signals **[5]**

1/14 . . Time supervision arrangements, e.g. real time clock **[5]**

1/16 . Constructional details or arrangements (instrument details G12B) **[5]**

1/18 . . Packaging or power distribution **[5]**

1/20 . . Cooling means **[5]**

1/22 . Means for limiting or controlling the pin/gate ratio **[5]**

1/24 . Resetting means (micro-programme loading G06F 9/24; restoration from data faults G06F 11/00) **[5]**

1/26 . Power supply means, e.g. regulation thereof (for memories G11C) **[5]**

1/28 . . Supervision thereof, e.g. detecting power-supply failure by out of limits supervision **[5]**

1/30 . . Means for acting in the event of power-supply failure or interruption, e.g. power-supply fluctuations (for resetting only G06F 1/24; involving the processing of data-words G06F 11/00) **[5]**

1/32 . . Means for saving power **[5]**

3/00 **Input arrangements for transferring data to be processed into a form capable of being handled by the computer**; **Output arrangements for transferring data from processing unit to output unit, e.g. interface arrangements** (typewriters B41J; conversion of physical variables F15B 5/00, G01; image acquisition G06T 1/00, G06T 9/00; coding, decoding or code conversion, in general H03M; transmission of digital information H04L) **[4]**

3/01 . Input arrangements or combined input and output arrangements for interaction between user and computer (G06F 3/16 takes precedence) **[8]**

3/02 . . Input arrangements using manually operated switches, e.g. using keyboards or dials (keyboard switches per se H01H 13/70; electronic switches characterised by the way in which the control signals are generated H03K 17/94) **[3,8]**

3/023 . . . Arrangements for converting discrete items of information into a coded form, e.g. arrangements for interpreting keyboard generated codes as alphanumeric codes, operand codes or instruction codes (coding in connection with keyboards or like devices in general H03M 11/00) **[3,8]**

3/027 . . . . for insertion of the decimal point **[3,8]**

3/03 . . Arrangements for converting the position or the displacement of a member into a coded form **[3,8]**

Note

In this group, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[8]**

3/033 . . . Pointing devices displaced or positioned by the user, e.g. mice, trackballs, pens or joysticks; Accessories therefor **[3,8]**

3/037 . . . . using the raster scan of a cathode-ray tube (CRT) for detecting the position of the member, e.g. light pens cooperating with CRT monitors **[3,8]**

3/038 . . . . Control and interface arrangements therefor, e.g. drivers or device-embedded control circuitry **[8]**

3/039 . . . . Accessories therefor, e.g. mouse pads (furniture aspects A47B 21/00) **[8]**

3/041 . . . Digitisers, e.g. for touch screens or touch pads, characterised by the transducing means **[8]**

3/042 . . . . by opto-electronic means **[8]**

3/043 . . . . using propagating acoustic waves **[8]**

3/044 . . . . by capacitive means **[8]**

3/045 . . . . using resistive elements, e.g. a single continuous surface or two parallel surfaces put in contact **[8]**

3/046 . . . . by electromagnetic means **[8]**

3/047 . . . . using sets of wires, e.g. crossed wires **[8]**

3/048 . . Interaction techniques for graphical user interfaces, e.g. interaction with windows, icons or menus **[8]**

3/05 . Digital input using the sampling of an analogue quantity at regular intervals of time (sample-and-hold arrangements G11C 27/02; sampling per se H03K 17/00; analogue/digital conversion, in general H03M 1/00)

3/06 . Digital input from, or digital output to, record carriers

3/08 . . from or to individual record carriers, e.g. punched card

3/09 . Digital output to typewriters **[3]**

3/12 . Digital output to print unit (digital output to typewriter G06F 3/09; arrangements for producing a permanent visual presentation of the output data using printers G06K 15/02)

3/13 . Digital output to plotter (arrangements for producing a permanent visual presentation of the output data using plotters G06K 15/22) **[3]**

3/14 . Digital output to display device (arrangements for producing a permanent visual presentation of the output data G06K 15/00; control of display in general G09G)

3/147 . . using display panels **[3]**

3/153 . . using cathode-ray tubes **[3]**

3/16 . Sound input; Sound output (conversion of speech into digital information or vice versa G10L)

3/18 . Digital input from automatic curve follower (automatic curve followers per se G06K 11/02) **[3]**

5/00 Methods or arrangements for data conversion without changing the order or content of the data handled (coding, decoding or code conversion, in general H03M) **[4]**

5/01 . for shifting, e.g. justifying, scaling, normalising **[5]**

5/06 . for changing the speed of data flow, i.e. speed regularising

5/08 . . having a sequence of storage locations, the intermediate ones not being accessible for either enqueue or dequeue operations, e.g. using a shift register **[8]**

5/10 . . having a sequence of storage locations each being individually accessible for both enqueue and dequeue operations, e.g. using random access memory **[8]**

5/12 . . . Means for monitoring the fill level; Means for resolving contention, i.e. conflicts between simultaneous enqueue and dequeue operations **[8]**

5/14 . . . . for overflow or underflow handling, e.g. full or empty flags **[8]**

5/16 . . Multiplexed systems, i.e. using two or more similar devices which are alternately accessed for enqueue and dequeue operations, e.g. ping-pong buffers **[8]**

7/00 Methods or arrangements for processing data by operating upon the order or content of the data handled (logic circuits H03K 19/00)

7/02 . Comparing digital values (G06F 7/06, G06F 7/38 take precedence; information retrieval G06F 17/30; comparing pulses H03K 5/22)

7/04 . . Identity comparison, i.e. for like or unlike values

7/06 . Arrangements for sorting, selecting, merging, or comparing data on individual record carriers (sorting of postal letters B07C; conveying record carriers from one station to another G06K 13/02)

7/08 . . Sorting, i.e. grouping record carriers in numerical or other ordered sequence according to the classification of at least some of the information they carry (by merging two or more sets of carriers in ordered sequence G06F 7/16)

7/10 . . Selecting, i.e. obtaining data of one kind from those record carriers which are identifiable by data of a second kind from a mass of ordered or randomly-distributed record carriers

7/12 . . . with provision for printing-out a list of selected items

7/14 . . Merging, i.e. combining at least two sets of record carriers each arranged in the same ordered sequence to produce a single set having the same ordered sequence

7/16 . . . Combined merging and sorting

7/20 . . Comparing separate sets of record carriers arranged in the same sequence to determine whether at least some of the data in one set is identical with that in the other set or sets

7/22 . Arrangements for sorting or merging computer data on continuous record carriers, e.g. tape, drum, disc

7/24 . . Sorting, i.e. extracting data from one or more carriers, re-arranging the data in numerical or other ordered sequence, and re-recording the sorted data on the original carrier or on a different carrier or set of carriers (G06F 7/36 takes precedence)

7/26 . . . the sorted data being recorded on the original record carrier within the same space in which the data had been recorded prior to their sorting, without using intermediate storage

7/32 . . Merging, i.e. combining data contained in ordered sequence on at least two record carriers to produce a single carrier or set of carriers having all the original data in the ordered sequence (G06F 7/36 takes precedence)

7/36 . . Combined merging and sorting

7/38 . Methods or arrangements for performing computations using exclusively denominational number representation, e.g. using binary, ternary, decimal representation **[3]**

7/40 . . using contact-making devices, e.g. electromagnetic relay (G06F 7/46 takes precedence)

7/42 . . . Adding; Subtracting

7/44 . . . Multiplying; Dividing

7/46 . . using electromechanical counter-type accumulators

7/48 . . using non-contact-making devices, e.g. tube, solid state device; using unspecified devices **[3]**

7/483 . . . Computations with numbers represented by a non-linear combination of denominational numbers, e.g. rational numbers, logarithmic number system, floating-point numbers (conversion to or from floating-point codes H03M 7/24) **[8]**

7/485 . . . . Adding; Subtracting **[8]**

7/487 . . . . Multiplying; Dividing **[8]**

7/49 . . . Computations with a radix, other than binary, 8, 16 or decimal, e.g. ternary, negative or imaginary radices, mixed radix **[3]**

7/491 . . . Computations with decimal numbers **[8]**

7/492 . . . . using a binary weighted representation within each denomination **[8]**

7/493 . . . . . the representation being the natural binary coded representation, i.e. 8421-code **[8]**

7/494 . . . . . Adding; Subtracting **[8]**

7/495 . . . . . in digit-serial fashion, i.e. having a single digit-handling circuit treating all denominations after each other **[8]**

7/496 . . . . . Multiplying; Dividing **[8]**

7/498 . . . . using counter-type accumulators **[8]**

7/499 . . . Denomination or exception handling, e.g. rounding, overflow **[8]**

7/50 . . . Adding; Subtracting (G06F 7/483 to G06F 7/491, G06F 7/544 to G06F 7/556 take precedence) **[3,8]**

7/501 . . . . Half or full adders, i.e. basic adder cells for one denomination (EXCLUSIVE-OR circuits H03K 19/21) **[8]**

7/502 . . . . . Half adders; Full adders consisting of two cascaded half adders **[8]**

7/503 . . . . . using carry switching, i.e. the incoming carry being connected directly, or only via an inverter, to the carry output under control of a carry propagate signal **[8]**

7/504 . . . . in bit-serial fashion, i.e. having a single digit-handling circuit treating all denominations after each other **[8]**

7/505 . . . . in bit-parallel fashion, i.e. having a different digit-handling circuit for each denomination (half or full adders G06F 7/501) **[8]**

7/506 . . . . . with simultaneous carry generation for, or propagation over, two or more stages **[8]**

7/507 . . . . . using selection between two conditionally calculated carry or sum values **[8]**

7/508 . . . . . using carry look-ahead circuits **[8]**
7/509 . . . . . for multiple operands, e.g. digital integrators **[8]**
7/52 . . . Multiplying; Dividing (G06F 7/483 to G06F 7/491, G06F 7/544 to G06F 7/556 take precedence) **[3,8]**
7/523 . . . . Multiplying only **[8]**
7/525 . . . . . in serial-serial fashion, i.e. both operands being entered serially (G06F 7/533 takes precedence) **[8]**
7/527 . . . . . in serial-parallel fashion, i.e. one operand being entered serially and the other in parallel (G06F 7/533 takes precedence) **[8]**
7/53 . . . . . in parallel-parallel fashion, i.e. both operands being entered in parallel (G06F 7/533 takes precedence) **[8]**
7/533 . . . . . Reduction of the number of iteration steps or stages, e.g. using the Booth algorithm, log-sum, odd-even **[8]**
7/535 . . . . Dividing only **[8]**
7/537 . . . . . Reduction of the number of iteration steps or stages, e.g. using the Sweeny-Robertson-Tocher (SRT) algorithm **[8]**
7/544 . . . for evaluating functions by calculation (with a look-up table G06F 1/02) **[3]**
7/548 . . . . Trigonometric functions; Co-ordinate transformations **[3]**
7/552 . . . . Powers or roots **[3]**
7/556 . . . . Logarithmic or exponential functions **[3]**
7/57 . . . Arithmetic logic units (ALU), i.e. arrangements or devices for performing two or more of the operations covered by groups G06F 7/483 to G06F 7/556 or for performing logical operations (instruction execution G06F 9/30) **[8]**
7/575 . . . . Basic arithmetic logic units, i.e. devices selectable to perform either addition, subtraction or one of several logical operations, using, at least partially, the same circuitry **[8]**
7/58 . Random or pseudo-random number generators **[3]**
7/60 . Methods or arrangements for performing computations using a digital non-denominational number representation, i.e. number representation without radix; Computing devices using combinations of denominational and non-denominational quantity representations **[3]**
7/62 . . Performing operations exclusively by counting total number of pulses **[3]**
7/64 . . Digital differential analysers, i.e. computing devices for differentiation, integration or solving differential or integral equations, using pulses representing increments; Other incremental computing devices for solving difference equations (G06F 7/70 takes precedence; differential analysers using hybrid computing techniques G06J 1/02) **[3]**
7/66 . . . wherein pulses represent unitary increments only **[3]**
7/68 . . using pulse rate multipliers or dividers (G06F 7/70 takes precedence) **[3]**
7/70 . . using stochastic pulse trains, i.e. randomly occurring pulses the average pulse rates of which represent numbers **[3]**
7/72 . . using residue arithmetic **[3]**
7/74 . Selecting or encoding within a word the position of one or more bits having a specified value, e.g. most or least significant one or zero detection, priority encoders **[8]**
7/76 . Arrangements for rearranging, permuting or selecting data according to predetermined rules, independently of the content of the data (according to the content of the data G06F 7/06, G06F 7/22; parallel/series conversion or vice versa H03M 9/00) **[8]**
7/78 . . for changing the order of data flow, e.g. matrix transposition, LIFO buffers; Overflow or underflow handling therefor **[8]**

9/00 Arrangements for programme control, e.g. control unit (programme control for peripheral devices G06F 13/10) **[4]**
9/02 . using wired connections, e.g. plugboard
9/04 . using record carriers containing only programme instructions (G06F 9/06 takes precedence)
9/06 . using stored programme, i.e. using internal store of processing equipment to receive and retain programme
9/22 . . Micro-control or micro-programme arrangements **[3]**
9/24 . . . Loading of the micro-programme **[3]**
9/26 . . . Address formation of the next micro-instruction (G06F 9/28 takes precedence) **[3]**
9/28 . . . Enhancement of operational speed, e.g. by using several micro-control devices operating in parallel **[3]**
9/30 . . Arrangements for executing machine- instructions, e.g. instruction decode (for executing micro-instructions G06F 9/22; for executing subprogrammes G06F 9/40) **[3]**
9/302 . . . Controlling the executing of arithmetic operations **[5]**
9/305 . . . Controlling the executing of logical operations **[5]**
9/308 . . . Controlling single bit operations (G06F 9/305 takes precedence) **[5]**
9/312 . . . Controlling loading, storing or clearing operations **[5]**
9/315 . . . Controlling moving, shifting or rotation operations **[5]**
9/318 . . . with operation extension or modification **[5]**
9/32 . . . Address formation of the next instruction, e.g. incrementing the instruction counter, jump (G06F 9/38 takes precedence; subprogramme jump G06F 9/42) **[3]**
9/34 . . . Addressing or accessing the instruction operand or the result (address translation G06F 12/00) **[3,5]**
9/345 . . . . of multiple operands or results **[5]**
9/35 . . . . Indirect addressing **[5]**
9/355 . . . . Indexed addressing **[5]**
9/38 . . . Concurrent instruction execution, e.g. pipeline, look ahead **[3]**
9/40 . . Arrangements for executing subprogrammes, i.e. combinations of several instructions **[3]**
9/42 . . . Formation of subprogramme-jump address or of return address **[3]**
9/44 . . Arrangements for executing specific programmes **[3]**
9/445 . . . Programme loading or initiating **[5]**
9/45 . . . Compilation or interpretation of high level programme languages **[5]**
9/455 . . . Emulation; Software simulation **[5]**

9/46 . . Multiprogramming arrangements **[3]**
9/48 . . . Programme initiating; Programme switching, e.g. by interrupt **[7]**
9/50 . . . Allocation of resources, e.g. of the central processing unit (CPU) **[7]**
9/52 . . . Programme synchronisation; Mutual exclusion, e.g. by means of semaphores **[7]**
9/54 . . . Interprogramme communication **[7]**

11/00 **Error detection**; **Error correction**; **Monitoring** (methods or arrangements for verifying the correctness of marking on a record carrier G06K 5/00; in information storage based on relative movement between record carrier and transducer G11B, e.g. G11B 20/18; in static stores G11C 29/00; coding, decoding or code conversion, for error detection or error correction, in general H03M 13/00) **[4]**
11/07 . Responding to the occurrence of a fault, e.g. fault tolerance **[7]**
11/08 . . Error detection or correction by redundancy in data representation, e.g. by using checking codes
11/10 . . . Adding special bits or symbols to the coded information, e.g. parity check, casting out nines or elevens
11/14 . . Error detection or correction of the data by redundancy in operation, e.g. by using different operation sequences leading to the same result (G06F 11/16 takes precedence) **[3]**
11/16 . . Error detection or correction of the data by redundancy in hardware **[3]**
11/18 . . . using passive fault-masking of the redundant circuits, e.g. by quadding or by majority decision circuits **[3]**
11/20 . . . using active fault-masking, e.g. by switching out faulty elements or by switching in spare elements **[3]**
11/22 . Detection or location of defective computer hardware by testing during standby operation or during idle time, e.g. start-up testing (testing of digital circuits, e.g. of separate computer components, G01R 31/317) **[3]**
11/24 . . Marginal testing **[3]**
11/25 . . Testing of logic operation, e.g. by logic analysers **[6]**
11/26 . . Functional testing **[3]**
11/263 . . . Generation of test inputs, e.g. test vectors, patterns or sequences **[6]**
11/267 . . . Reconfiguring circuits for testing, e.g. LSSD, partitioning **[6]**
11/27 . . . Built-in tests **[6]**
11/273 . . . Tester hardware, i.e. output processing circuits **[6]**
11/277 . . . . with comparison between actual response and known fault-free response **[6]**
11/28 . by checking the correct order of processing (G06F 11/07, G06F 11/22 take precedence; monitoring patterns of pulse trains H03K 5/19) **[3]**
11/30 . Monitoring **[3]**
11/32 . . with visual indication of the functioning of the machine **[3]**
11/34 . . Recording or statistical evaluation of computer activity, e.g. of down time, of input/output operation **[3]**
11/36 . Preventing errors by testing or debugging of software **[7]**

12/00 **Accessing, addressing or allocating within memory systems or architectures** (information storage in general G11) **[4,5]**
12/02 . Addressing or allocation; Relocation (programme address sequencing G06F 9/00; arrangements for selecting an address in a digital store G11C 8/00) **[4]**
12/04 . . Addressing variable-length words or parts of words **[4]**
12/06 . . Addressing a physical block of locations, e.g. base addressing, module addressing, address space extension, memory dedication (G06F 12/08 takes precedence) **[4]**
12/08 . . in hierarchically structured memory systems, e.g. virtual memory systems **[4]**
12/10 . . . Address translation **[4]**
12/12 . . . Replacement control **[4]**
12/14 . Protection against unauthorised use of memory **[4]**
12/16 . Protection against loss of memory contents **[4]**

13/00 **Interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units** (interface circuits for specific input/output devices G06F 3/00; multi-processor systems G06F 15/16; transmission of digital information in general H04L; selecting H04Q) **[4]**
13/10 . Programme control for peripheral devices (G06F 13/14 to G06F 13/42 take precedence) **[4]**
13/12 . . using hardware independent of the central processor, e.g. channel or peripheral processor **[4]**
13/14 . Handling requests for interconnection or transfer **[4]**
13/16 . . for access to memory bus (G06F 13/28 takes precedence) **[4]**
13/18 . . . with priority control **[4]**
13/20 . . for access to input/output bus **[4]**
13/22 . . . using successive scanning, e.g. polling (G06F 13/24 takes precedence) **[4]**
13/24 . . . using interrupt (G06F 13/32 takes precedence) **[4]**
13/26 . . . . with priority control **[4]**
13/28 . . . using burst mode transfer, e.g. direct memory access, cycle steal (G06F 13/32 takes precedence) **[4]**
13/30 . . . . with priority control **[4]**
13/32 . . . using combination of interrupt and burst mode transfer **[4]**
13/34 . . . . with priority control **[4]**
13/36 . . for access to common bus or bus system **[4]**
13/362 . . . with centralised access control **[5]**
13/364 . . . . using independent requests or grants, e.g. using separated request and grant lines **[5]**
13/366 . . . . using a centralised polling arbiter **[5]**
13/368 . . . with decentralised access control **[5]**
13/37 . . . . using a physical-position-dependent priority, e.g. daisy chain, round robin or token passing **[5]**
13/372 . . . . using a time-dependent priority, e.g. individually loaded time counters or time slot **[5]**
13/374 . . . . using a self-select method with individual priority code comparator **[5]**
13/376 . . . . using a contention resolving method, e.g. collision detection, collision avoidance **[5]**
13/378 . . . . using a parallel poll method **[5]**
13/38 . Information transfer, e.g. on bus (G06F 13/14 takes precedence) **[4]**

13/40 . . Bus structure **[4]**

13/42 . . Bus transfer protocol, e.g. handshake; Synchronisation (synchronisation in transmission of digital information in general H04L 7/00) **[4]**

15/00 Digital computers in general (details G06F 1/00 to G06F 13/00); **Data processing equipment in general** (neural networks for image data processing G06T)

15/02 . manually operated with input through keyboard and computation using a built-in programme, e.g. pocket calculators

15/04 . programmed simultaneously with the introduction of data to be processed, e.g. on the same record carrier

15/08 . using a plugboard for programming **[5]**

15/10 . . Tabulators **[5]**

15/12 . . . having provision for both printed and punched output **[5]**

15/14 . . Calculating-punches **[5]**

15/16 . Combinations of two or more digital computers each having at least an arithmetic unit, a programme unit and a register, e.g. for a simultaneous processing of several programmes (interface circuits for specific input/output devices G06F 3/00; multi-programming arrangements G06F 9/46; transmission of digital information in general H04L, e.g. in computer networks H04L 12/00; selecting H04Q)

15/163 . . Interprocessor communication **[6]**

15/167 . . . using a common memory, e.g. mailbox (memory protection G06F 12/14; memory access priority G06F 13/18) **[6]**

15/17 . . . using an input/output type connection, e.g. channel, I/O port **[6]**

15/173 . . . using an interconnection network, e.g. matrix, shuffle, pyramid, star, snowflake (interface switching circuits G06F 13/40) **[6]**

15/177 . . Initialisation or configuration control (configuration control for monitoring, testing or in case of failure G06F 11/00) **[6]**

15/18 . in which a programme is changed according to experience gained by the computer itself during a complete run; Learning machines (adaptive control systems G05B 13/00)

15/76 . Architectures of general purpose stored programme computers (with programme plugboard G06F 15/08; multicomputers G06F 15/16; general purpose image data processing G06T 1/00) **[5,6]**

15/78 . . comprising a single central processing unit **[5]**

15/80 . . comprising an array of processing units with common control, e.g. single instruction multiple data processors (G06F 15/82 takes precedence) **[5]**

15/82 . . data or demand driven **[5]**

17/00 Digital computing or data processing equipment or methods, specially adapted for specific functions [6]

17/10 . Complex mathematical operations **[6]**

17/11 . . for solving equations **[6]**

17/12 . . . Simultaneous equations **[6]**

17/13 . . . Differential equations (using digital differential analysers G06F 7/64) **[6]**

17/14 . . Fourier, Walsh or analogous domain transformations **[6]**

17/15 . . Correlation function computation **[6]**

17/16 . . Matrix or vector computation **[6]**

17/17 . . Function evaluation by approximation methods, e.g. inter- or extrapolation, smoothing, least mean square method (interpolation for numerical control G05B 19/18) **[6]**

17/18 . . for evaluating statistical data **[6]**

17/20 . Handling natural language data (speech analysis or synthesis G10L) **[6]**

17/21 . . Text processing (G06F 17/27, G06F 17/28 take precedence; systems for composing machines B41B 27/00) **[6]**

17/22 . . . Manipulating or registering by use of codes, e.g. in sequence of text characters **[6]**

17/24 . . . Editing, e.g. insert/delete **[6]**

17/25 . . . Automatic justification **[6]**

17/26 . . . Automatic hyphenation **[6]**

17/27 . . Automatic analysis, e.g. parsing, orthograph correction **[6]**

17/28 . . Processing or translating of natural language (G06F 17/27 takes precedence) **[6]**

17/30 . Information retrieval; Database structures therefor **[6]**

17/40 . Data acquisition and logging (for input to computer G06F 3/00) **[6]**

17/50 . Computer-aided design (for the design of test circuits for static stores G11C 29/54) **[6,8]**

19/00 Digital computing or data processing equipment or methods, specially adapted for specific applications *(G06F 17/00 takes precedence; data processing systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes G06Q)* **[6,8,2011.01]**

Note

This group covers: **[6]**
- special constructions of computers to permit or facilitate use in specific applications; **[6]**
- non-structural adaptations of computers to a specific application, e.g. computing methods. **[6]**

19/10 . Bioinformatics, i.e. methods or systems for genetic or protein-related data processing in computational molecular biology (in silico methods of screening virtual chemical libraries C40B 30/02; in silico or mathematical methods of creating virtual chemical libraries C40B 50/02) **[2011.01]**

(1) This group also covers bioinformatics methods or systems where digital data processing is inherent or implicit, but not explicitly mentioned. **[2011.01]**

(2) In this group, the following term is used with the meaning indicated:
- *"systems" includes apparatus.* **[2011.01]**

(3) In this group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2011.01]**

19/12 . . for modelling or simulation in systems biology, e.g. probabilistic or dynamic models, gene-regulatory networks, protein interaction networks or metabolic networks **[2011.01]**

19/14 . . for phylogeny or evolution, e.g. evolutionarily conserved regions determination or phylogenetic tree construction **[2011.01]**

19/16 . . for molecular structure, e.g. structure alignment, structural or functional relations, protein folding, domain topologies, drug targeting using structure data, involving two-dimensional or three-dimensional structures **[2011.01]**

19/18 . . *for functional genomics or proteomics, e.g. genotype-phenotype associations, linkage disequilibrium, population genetics, binding site identification, mutagenesis, genotyping or genome annotation, protein-protein interactions or protein-nucleic acid interactions* **[2011.01]**

19/20 . . *for hybridisation or gene expression, e.g. microarrays, sequencing by hybridisation, normalisation, profiling, noise correction models, expression ratio estimation, probe design or probe optimisation* **[2011.01]**

19/22 . . *for sequence comparison involving nucleotides or amino acids, e.g. homology search, motif or SNP [Single-Nucleotide Polymorphism] discovery or sequence alignment* **[2011.01]**

19/24 . . *for machine learning, data mining or biostatistics, e.g. pattern finding, knowledge discovery, rule extraction, correlation, clustering or classification* **[2011.01]**

19/26 . . *for data visualisation, e.g. graphics generation, display of maps or networks or other visual representations* **[2011.01]**

19/28 . . *for programming tools or database systems, e.g. ontologies, heterogeneous data integration, data warehousing or computing architectures* **[2011.01]**

21/00 **Security arrangements for protecting computers or computer systems against unauthorised activity** (multiprogramming G06F 9/46; protection against unauthorised use of memory G06F 12/14; dispensing apparatus actuated by coded identity card or credit card G07F 7/08; equipment anti-theft monitoring by a central station G08B 26/00; secret or secure communication H04L 9/00; data switching networks H04L 12/00) **[8]**

21/02 . by protecting specific internal components of computers **[8]**

21/04 . by protecting specific peripheral devices, e.g. keyboards or displays **[8]**

21/06 . by sensing unauthorised manipulation of, or intrusion into, an enclosure e.g. a housing or a room **[8]**

21/20 . by restricting access to nodes in a computer system or computer network **[8]**

21/22 . by restricting access to, or manipulation of, programmes or processes **[8]**

21/24 . by protecting data directly, e.g. by labelling **[8]**

G06G **ANALOGUE COMPUTERS** (analogue optical computing devices G06E 3/00; computer systems based on specific computational models G06N)

1/00 **Hand-manipulated computing devices** (planimeters G01B 5/26)

1/02 . Devices in which computing is effected by adding, subtracting, or comparing lengths of parallel or concentric graduated scales

1/04 . . characterised by construction (G06G 1/10 takes precedence)

1/06 . . . with rectilinear scales, e.g. slide rule

1/08 . . . with circular or helical scales

1/10 . . characterised by the graduation

1/12 . . . logarithmic graduations, e.g. for multiplication

1/14 . in which a straight or curved line has to be drawn from given points on one or more input scales to one or more points on a result scale

1/16 . in which a straight or curved line has to be drawn through related points on one or more families of curves

3/00 **Devices in which the computing operation is performed mechanically** (G06G 1/00 takes precedence)

3/02 . for performing additions or subtractions, e.g. differential gearing

3/04 . for performing multiplications or divisions, e.g. variable-ratio gearing

3/06 . for evaluating functions by using cams and cam followers

3/08 . for integrating or differentiating, e.g. by wheel and disc

3/10 . for simulating specific processes, systems, or devices

5/00 **Devices in which the computing operation is performed by means of fluid-pressure elements** (such elements in general F15C)

7/00 **Devices in which the computing operation is performed by varying electric or magnetic quantities** (neural networks for image data processing G06T; speech analysis or synthesis G10L)

7/02 . Details not covered by groups G06G 7/04 to G06G 7/10

7/04 . Input or output devices (graph readers G06K 11/00; using function plotters, co-ordinate plotters G06K 15/22)

7/06 . Programming arrangements, e.g. plugboard for interconnecting functional units of the computer; Digital programming

7/10 . Power supply arrangements

7/12 . Arrangements for performing computing operations, e.g. amplifiers specially adapted therefor (amplifiers in general H03F)

7/122 . . for optimisation, e.g. least square fitting, linear programming, critical path analysis, gradient method **[2]**

7/14 . . for addition or subtraction (of vector quantities G06G 7/22)

7/16 . . for multiplication or division

7/161 . . . with pulse modulation, e.g. modulation of amplitude, width, frequency, phase, or form **[2]**

7/162 . . . using galvano-magnetic effects, e.g. Hall effect; using similar magnetic effects **[2]**

7/163 . . . using a variable impedance controlled by one of the input signals, variable amplification or transfer function **[2]**

7/164 . . . using means for evaluating powers, e.g. quarter square multiplier (evaluating powers G06G 7/20) **[3]**

7/18 . . for integration or differentiation (G06G 7/19 takes precedence) **[3]**

7/182 . . . using magnetic elements **[3]**

7/184 . . . using capacitive elements **[3]**
7/186 . . . . using an operational amplifier comprising a capacitor or a resistor in the feedback loop **[3]**
7/188 . . . using electromechanical elements **[3]**
7/19 . . for forming integrals of products, e.g. Fourier integrals, Laplace integrals, correlation integrals; for analysis or synthesis of functions using orthogonal functions (Fourier or spectrum analysis G01R 23/16) **[3]**
7/195 . . . using electro-acoustic elements **[3]**
7/20 . . for evaluating powers, roots, polynomes, mean square values, standard deviation (G06G 7/122, G06G 7/28 take precedence; gamma correction in television systems H04N 5/202, H04N 9/69) **[3]**
7/22 . . for evaluating trigonometric functions; for conversion of co-ordinates; for computations involving vector quantities (trigonometric computations using simultaneous equations G06G 7/34)
7/24 . . for evaluating logarithmic or exponential functions, e.g. hyperbolic functions
7/25 . . for discontinuous functions, e.g. backlash, dead zone, limiting, absolute value, or peak value **[2]**
7/26 . . Arbitrary function generators (using orthogonal functions, e.g. Fourier series, G06G 7/19; using curve follower G06K 11/02)
7/28 . . . for synthesising functions by piecewise approximation
7/30 . . for interpolation or extrapolation (G06G 7/122 takes precedence) **[2]**
7/32 . . for solving of equations
7/34 . . . of simultaneous equations (G06G 7/122 takes precedence) **[2]**
7/36 . . . of single equations of quadratic or higher degree (G06G 7/22, G06G 7/24 take precedence)
7/38 . . . of differential or integral equations
7/40 . . . . of partial differential equations (simulating specific devices G06G 7/48)
7/42 . . . . . using electrolytic tank
7/44 . . . . . using continuous medium, current-sensitive paper
7/46 . . . . . using discontinuous medium, e.g. resistance network
7/48 . Analogue computers for specific processes, systems, or devices, e.g. simulators **[2]**
7/50 . . for distribution networks, e.g. for fluids (G06G 7/62 takes precedence)
7/52 . . for economic systems; for statistics (G06G 7/122, G06G 7/19, G06G 7/20 take precedence) **[3]**
7/54 . . for nuclear physics, e.g. nuclear reactors, radioactive fallout
7/56 . . for heat flow (G06G 7/58 takes precedence)
7/57 . . for fluid flow (G06G 7/50 takes precedence)
7/58 . . for chemical processes (G06G 7/75 takes precedence)
7/60 . . for living beings, e.g. their nervous systems
7/62 . . for electric systems or apparatus
7/625 . . . for impedance networks, e.g. determining response, determining poles or zeros, determining the Nyquist diagram (measuring impedance G01R 27/00) **[2]**
7/63 . . . for power apparatus, e.g. motors, or supply distribution networks **[2]**
7/635 . . . . for determining the most economical distribution in power systems **[2]**
7/64 . . for non-electric machines, e.g. turbine
7/66 . . for control systems
7/68 . . for civil-engineering structures, e.g. beam, strut, girder
7/70 . . for vehicles, e.g. to determine permissible loading of ships
7/72 . . . Flight simulators (Link trainers G09B 9/08)
7/75 . . for component analysis, e.g. of mixtures, of colours (G06G 7/122 takes precedence) **[2]**
7/76 . . for traffic
7/78 . . for direction-finding, locating, distance or velocity measuring, or navigation systems
7/80 . . for gun-laying; for bomb aiming; for guiding missiles **[2]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

G06J HYBRID COMPUTING ARRANGEMENTS (optical hybrid computing devices G06E 3/00; computer systems based on specific computational models G06N; neural networks for image data processing G06T; analogue/digital conversion, in general H03M 1/00)

Note

In this subclass, the following expression is used with the meaning indicated:
– "hybrid computing arrangement" is an arrangement in which part of the computation is digital and part is analogue.

1/00 Hybrid computing arrangements (digitally-programmed analogue computers G06G 7/06)
1/02 . Differential analysers

3/00 Systems for conjoint operation of complete digital and complete analogue computers

G06K RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS (postal sorting B07C; secondary surveillance radar G01S; detecting presence of transponders or tags G01S, G01V)

(1) This subclass covers:
- marking, sensing, and conveying of record carriers;
- recognising characters or other data;
- presenting visually or otherwise the data recognised or the result of a computation.

(2) This subclass does not cover printing per se.

Subclass index

1/00 Methods or arrangements for marking the record carrier in digital fashion (interpreting G06K 3/02)

1/02 . by punching (punching in general B26F)
1/04 . . controlled by sensing markings on the record carrier being punched (sensing of record carriers G06K 7/00)
1/05 . . High-speed punches, e.g. controlled by electric computer
1/06 . . Manually-controlled devices
1/08 . . . Card punches
1/10 . . . Tape punches (specially adapted for a particular purpose, see the relevant subclass, e.g. for transmission of digital information H04L)
1/12 . otherwise than by punching (printing in general B41, e.g. B41J)
1/14 . by transferring data from a similar or dissimilar record carrier
1/16 . . by reproducing data from one punched card on to one or more punched cards without the code representation, i.e. duplicating
1/18 . . by transferring data from one type of record carrier on to another type of record carrier, e.g. from magnetic tape to punched card
1/20 . Simultaneous marking of record carrier and printing-out of data, e.g. printing-punch
1/22 . . Simultaneous marking and printing on different record carriers, e.g. on different types of record carrier

3/00 Methods or arrangements for printing of data in the shape of alphanumeric or other characters from a record carrier, e.g. interpreting, printing-out from a magnetic tape

3/02 . Translating markings on a record carrier into printed data on the same record carrier, i.e. interpreting

5/00 Methods or arrangements for verifying the correctness of markings on a record carrier; Column-detection devices

5/02 . the verifying forming a part of the marking action
5/04 . Verifying the alignment of markings

7/00 Methods or arrangements for sensing record carriers (G06K 9/00 takes precedence)

7/01 . Details
7/015 . . Aligning or centring of the sensing device with respect to the record carrier (in general G11B)
7/016 . . Synchronisation of sensing process (in general G11B)
7/02 . by pneumatic or hydraulic means, e.g. sensing punched holes with compressed air; by sonic means
7/04 . by mechanical means, e.g. by pins operating electric contacts
7/06 . by means which conduct current when a mark is sensed or absent, e.g. contact brush for a conductive mark
7/08 . by means detecting the change of an electrostatic or magnetic field, e.g. by detecting change of capacitance between electrodes
7/10 . by electromagnetic radiation, e.g. optical sensing; by corpuscular radiation
7/12 . . using a selected wavelength, e.g. to sense red marks and ignore blue marks
7/14 . . using light without selection of wavelength, e.g. sensing reflected white light

9/00 Methods or arrangements for reading or recognising printed or written characters or for recognising patterns, e.g. fingerprints (processing or analysis of tracks of nuclear particles G01T 5/02; testing patterns on paper currency or similar valuable papers G07D 7/20; speech recognition G10L 15/00) **[1,7]**

9/03 . Detection or correction of errors, e.g. by rescanning the pattern **[3]**
9/18 . using printed characters having additional code marks or containing code marks, e.g. the character being composed of individual strokes of different shape, each representing a different code value
9/20 . Image acquisition **[3]**
9/22 . . using hand-held instruments **[3]**
9/24 . . . Construction of the instrument **[3]**
9/26 . . using a slot moved over the image **[3]**
9/28 . . using discrete sensing elements at predetermined points **[3]**

9/30 . . using automatic curve following means **[3]**
9/32 . . Aligning or centering of the image pick-up or image-field **[3]**
9/34 . . Segmentation of touching or overlapping patterns in the image field **[3]**
9/36 . Image preprocessing, i.e. processing the image information without deciding about the identity of the image (image data processing or generation, in general G06T) **[3]**

Note

Group G06K 9/58 takes precedence over groups G06K 9/38 to G06K 9/54. **[3]**

9/38 . . Quantising the analogue image signal **[3]**
9/40 . . Noise filtering **[3]**
9/42 . . Normalisation of the pattern dimensions **[3]**
9/44 . . Smoothing or thinning of the pattern **[3]**
9/46 . . Extraction of features or characteristics of the image **[3]**
9/48 . . . by coding the contour of the pattern **[3]**
9/50 . . . by analysing segments intersecting the pattern **[3]**
9/52 . . . by deriving mathematical or geometrical properties from the whole image **[3]**
9/54 . . Combinations of preprocessing functions **[3]**
9/56 . . . using a local operator, i.e. means to operate on an elementary image point in terms of the immediate surroundings of this point **[3]**
9/58 . . using optical means **[3]**
9/60 . Combination of image acquisition and preprocessing functions **[3]**
9/62 . Methods or arrangements for recognition using electronic means (learning machines G06F 15/18; digital correlation G06F 17/15; analogue correlation G06G 7/19) **[3]**
9/64 . . using simultaneous comparisons or correlations of the image signals with a plurality of references, e.g. resistor matrix **[3]**
9/66 . . . references adjustable by an adaptive method, e.g. learning **[3]**
9/68 . . using sequential comparisons of the image signals with a plurality of reference, e.g. addressable memory **[3]**
9/70 . . . the selection of the next reference depending on the result of the preceding comparison **[3]**
9/72 . . using context analysis based on the provisionally recognised identity of a number of successive patterns, e.g. a word **[3]**
9/74 . Arrangements for recognition using optical reference masks (optical analogue correlation G06E 3/00) **[3]**
9/76 . . using holographic masks **[3]**
9/78 . Combination of image acquisition and recognition functions **[3]**
9/80 . Combination of image preprocessing and recognition functions **[3]**
9/82 . . using optical means in one or both functions **[3]**

11/00 Methods or arrangements for graph-reading or for converting the pattern of mechanical parameters, e.g. force or presence, into electrical signals (combined with character or pattern recognition G06K 9/00; feelers for copying devices on machine tools B23Q 35/00; arrangements for measuring areas G01B; measuring force G01L; adapted as input devices to computers G06F 3/00; systems for transmitting the position of an object with respect to a predetermined reference system, e.g. tele-autographic system, G08C 21/00) **[2]**
11/02 . Automatic curve followers
11/04 . . using an auxiliary scanning pattern **[2]**
11/06 . Devices for converting the position of a manually-operated writing or tracing member into an electrical signal **[3]**

13/00 Conveying record carriers from one station to another, e.g. from stack to punching mechanism (transport devices in general B65G)
13/02 . the record carrier having longitudinal dimension comparable with transverse dimension, e.g. punched card
13/04 . . Details, e.g. flaps in card-sorting apparatus
13/05 . . . Capstans; Pinch rollers
13/06 . . Guiding cards; Checking correct operation of card-conveying mechanisms **[2]**
13/063 . . . Aligning cards **[2]**
13/067 . . . Checking presence, absence, correct position, or moving status of cards **[2]**
13/07 . . Transporting of cards between stations
13/073 . . . with continuous movement **[2]**
13/077 . . . with intermittent movement; Braking or stopping movement **[2]**
13/08 . . Feeding or discharging cards
13/10 . . . from magazine to conveying arrangement
13/103 . . . . using mechanical means **[2]**
13/107 . . . . using pneumatic means **[2]**
13/12 . . . from conveying arrangement to magazine
13/14 . . . Card magazines, e.g. pocket, hopper (card magazines in general B42F)
13/16 . . Handling flexible sheets, e.g. cheques
13/18 . the record carrier being longitudinally extended, e.g. punched tape (features of interest apart from data processing G11B; magnetic-tape drive G11B 15/00)
13/20 . . Details
13/22 . . . Capstans; Pinch rollers
13/24 . . Guiding of record carriers; Recognising end of record carrier
13/26 . . Winding-up or unwinding of record carriers; Driving of record carriers **[2]**
13/28 . . . continuously **[2]**
13/30 . . . intermittently **[2]**

15/00 Arrangements for producing a permanent visual presentation of the output data [3]
15/02 . using printers (printers per se B41J)
15/04 . . by rack-type printers
15/06 . . by type-wheel printers
15/07 . . . by continuously-rotating-type-wheel printers, e.g. rotating-type-drum printers **[2]**
15/08 . . by flight printing with type font moving in the direction of the printed line, e.g. chain printers
15/10 . . by matrix printers
15/12 . . by photographic printing
15/14 . . by electrographic printing, e.g. xerography; by magnetographic printing

15/16 . . Means for paper feeding or form feeding
15/22 . using plotters (plotters per se B43L 13/00) **[3]**

17/00 Methods or arrangements for effecting co-operative working between equipments covered by two or more of main groups G06K 1/00 to G06K 15/00, e.g. automatic card files incorporating conveying and reading operations

19/00 Record carriers for use with machines and with at least a part designed to carry digital markings (record carriers adapted for controlling specific machines, see the appropriate subclass for the machine, e.g. B23Q, D03C, G10F, H04L; form printing B41; file cards B42F 19/00; record carriers in general G11)

19/02 . characterised by the selection of materials, e.g. to avoid wear during transport through the machine
19/04 . characterised by the shape
19/06 . characterised by the kind of the digital marking, e.g. shape, nature, code
19/063 . . the carrier being marginally punched or notched, e.g. having elongated slots **[5]**
19/067 . . Record carriers with conductive marks, printed circuits or semiconductor circuit elements, e.g. credit or identity cards (using a coded card to authorise calls from a telephone set H04M 1/675) **[5]**
19/07 . . . with integrated circuit chips **[5]**
19/073 . . . . Special arrangements for circuits, e.g. for protecting identification code in memory (protection against unauthorised use of computer memory G06F 12/14) **[5]**
19/077 . . . . Constructional details, e.g. mounting of circuits in the carrier **[5]**
19/08 . . using markings of different kinds in the same record carrier, e.g. one marking being sensed by optical and the other by magnetic means
19/10 . . . at least one kind of marking being used for authentication, e.g. of credit or identity cards (verification of coded identity or credit cards in mechanisms actuated by them G07F 7/12) **[5]**
19/12 . . . . the marking being sensed by magnetic means **[5]**
19/14 . . . . the marking being sensed by radiation **[5]**
19/16 . . . . . the marking being a hologram or diffraction grating **[5]**
19/18 . . . . Constructional details **[5]**

21/00 Information retrieval from punched cards designed for manual use or handling by machine (G06K 19/00 takes precedence); **Apparatus for handling such cards, e.g. marking or correcting**

21/02 . in which coincidence of markings is sensed mechanically, e.g. by needle
21/04 . in which coincidence of markings is sensed optically, e.g. peek-a-boo system
21/06 . Apparatus or tools adapted for slotting or otherwise marking information-retrieval cards (tools for perforating in general B26F)
21/08 . Apparatus or tools for correcting punching or slotting errors **[2]**

G06M COUNTING MECHANISMS; **COUNTING OF OBJECTS NOT OTHERWISE PROVIDED FOR** (counting by measuring volume or weight of articles to be counted G01F, G01G; adaptation of counters to electricity meters in electromechanical arrangements for measuring time integral of electric power or current G01R 11/16; computers G06C to G06J; counting electric pulses H03K; counting characters, words or messages in switching networks for transmission of digital information H04L 12/08; metering arrangements in telephonic systems H04M 15/00)

Note

This subclass covers:
– stepping or continuously-moving mechanical counters operated through one or more inputs applied to the lowest order mechanically or electrically;
– counting systems involving applications of either mechanical, electrical, or electronic counters.

1/00 Design features of general application

1/02 . Housing (for measuring instruments in general G01D)
1/04 . for driving the stage of lowest order (with variable ratio of drive G06M 1/38)
1/06 . . producing continuous revolution of the stage, e.g. with gear train
1/08 . for actuating the drive
1/10 . . by electric or magnetic means
1/12 . . by fluid means
1/14 . for transferring a condition from one stage to a higher stage (with variable ratio of transfer G06M 1/38)
1/16 . . self-operating, e.g. by Geneva mechanism
1/18 . . requiring external operation, e.g. by electromagnetic force
1/20 . . specially adapted for denominations with unequal numbers in each stage, e.g. degrees and minutes of angle
1/22 . for visual indication of the result of count on counting mechanisms, e.g. by window with magnifying lens
1/24 . . Drums; Dials; Pointers
1/26 . . Aligning means
1/27 . for representing the result of count in the form of electric signals, e.g. by sensing markings on the counter drum
1/272 . . using photoelectric means
1/274 . . using magnetic means; using Hall-effect devices
1/276 . . using mechanically-actuated contacts
1/28 . for zeroising or setting to a particular value
1/30 . . using heart-shaped or similar cams; using levers
1/32 . . . Actuating means, e.g. magnet, spring, weight
1/34 . . using reset shafts
1/36 . . . Actuating means, e.g. magnet, spring, weight
1/38 . for varying ratio of drive or transfer mechanism, e.g. by using alternative counting trains

3/00 **Counters with additional facilities** (generating electric pulses at random intervals H03K 3/84)

3/02 . for performing an operation at a predetermined value of the count, e.g. arresting a machine

3/04 . . with an additional counter train operating in the reverse direction

3/06 . for printing or separately displaying result of count (display systems G09)

3/08 . for counting the input from several sources; for counting inputs of different amounts

3/10 . for counting denominations with unequal numbers in each stage, e.g. degrees and minutes of angle (transfer mechanism therefor G06M 1/20)

3/12 . for preventing incorrect actuation, e.g. for preventing falsification

3/14 . for registering difference of positive and negative actuations

Counting of objects

7/00 **Counting of objects carried by a conveyer**

7/02 . wherein objects ahead of the sensing element are separated to produce a distinct gap between successive objects

7/04 . . Counting of piece goods, e.g. of boxes

7/06 . . Counting of flat articles, e.g. of sheets of paper

7/08 . wherein the direction of movement of the objects is changed at the station where they are sensed

7/10 . . Counting of flat overlapped articles, e.g. of cards

9/00 **Counting of objects in a stack thereof**

9/02 . by using a rotating separator incorporating pneumatic suction nozzles

11/00 **Counting of objects distributed at random, e.g. on a surface**

11/02 . using an electron beam scanning a surface line by line, e.g. of blood cells on a substrate

11/04 . . with provision for distinguishing between different sizes of objects (investigating particle size in general G01N 15/00)

15/00 ***Counting of objects, not otherwise provided for*** **[2011.01]**

G06N COMPUTER SYSTEMS BASED ON SPECIFIC COMPUTATIONAL MODELS [7]

3/00 **Computer systems based on biological models** (analogue computers simulating functional aspects of living beings G06G 7/60) **[7]**

3/02 . using neural network models (for adaptive control G05B 13/00; for image pattern matching G06K 9/00; for image data processing G06T 1/40; for phonetic pattern matching G10L 15/16) **[7]**

3/04 . . Architecture, e.g. interconnection topology **[7]**

3/06 . . Physical realisation, i.e. hardware implementation of neural networks, neurons or parts of neurons **[7]**

3/063 . . . using electronic means **[7]**

3/067 . . . using optical means **[7]**

3/08 . . Learning methods **[7]**

3/10 . . Simulation on general purpose computers **[7]**

3/12 . using genetic models **[7]**

5/00 **Computer systems utilizing knowledge based models [7]**

5/02 . Knowledge representation **[7]**

5/04 . Inference methods or devices **[7]**

7/00 **Computer systems based on specific mathematical models [7]**

7/02 . using fuzzy logic (G06N 3/00, G06N 5/00 take precedence; for adaptive control G05B 13/00) **[7]**

7/04 . . Physical realisation **[7]**

7/06 . . Simulation on general purpose computers **[7]**

7/08 . using chaos models or non-linear system models **[7]**

99/00 **Subject matter not provided for in other groups of this subclass [2010.01]**

G06Q DATA PROCESSING SYSTEMS OR METHODS, SPECIALLY ADAPTED FOR ADMINISTRATIVE, COMMERCIAL, FINANCIAL, MANAGERIAL, SUPERVISORY OR FORECASTING PURPOSES; SYSTEMS OR METHODS SPECIALLY ADAPTED FOR ADMINISTRATIVE, COMMERCIAL, FINANCIAL, MANAGERIAL, SUPERVISORY OR FORECASTING PURPOSES, NOT OTHERWISE PROVIDED FOR [8]

(1) Groups G06Q 10/00 to G06Q 50/00 and G06Q 99/00 only cover systems or methods that involve significant data processing operations, i.e. data processing operations that need to be carried out by a technological, e.g. computing, system or device. **[8]**
Group G06Q 90/00 covers systems or methods that do not involve significant data processing, when both of the following conditions are fulfilled: **[8]**
- the systems or methods are specially adapted for the purposes mentioned in the subclass title or the titles of groups G06Q 10/00 to G06Q 50/00; and **[8]**
- the systems or methods cannot be classified elsewhere in the IPC, for example by applying the principles described in paragraph 96 of the Guide. **[8]**

When classifying such systems or methods in group G06Q 90/00, additional classification may be made in the most closely related group of this or any other subclass, if this classification gives information about the application of the systems or methods that could be of interest for search. Such non-obligatory classification must be given as "additional information". **[8]**

(2) When classifying in groups G06Q 10/00 to G06Q 40/00, systems or methods that are specially adapted for a specific business sector must also be classified in group G06Q 50/00, when the special adaptation is determined to be novel and non-obvious. **[8]**

(3) In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place. **[8]**

10/00 **Administration, e.g. office automation or reservations**; **Management, e.g. resource or project management [8]**

20/00 **Payment schemes, architectures or protocols** (apparatus for performing or posting payment transactions G07F 7/08, G07F 19/00; electronic cash registers G07G 1/12) **[8]**

Note

This group covers: **[8]**
- protocols or schemes which include procedures whereby a payment is made between a merchant, a bank, a user and sometimes a third party; the procedure usually includes verification and authentication of all parties involved. **[8]**

30/00 **Commerce, e.g. marketing, shopping, billing, auctions or e-commerce [8]**

40/00 **Finance, e.g. banking, investment or tax processing**; **Insurance, e.g. risk analysis or pensions [8]**

50/00 **Systems or methods specially adapted for a specific business sector, e.g. health care, utilities, tourism or legal services [8]**

90/00 **Systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes, not involving significant data processing [8]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

G06T **IMAGE DATA PROCESSING OR GENERATION, IN GENERAL** (specially adapted for particular applications, see the relevant subclasses, e.g. G01C, G06K, G09G, H04N) **[6,8]**

(1) This subclass covers: **[6]**
- arrangements for geometrically modelling objects, whether the final model is used for display of an image of the object or for some other purpose, such as manufacture of a corresponding object; **[6]**
- arrangements for analysing the geometric attributes of an image of an object. **[6]**

(2) This subclass does not cover: **[6]**
- photogrammetry or videogrammetry, which are covered by subclass G01C; **[8]**
- reading or recognising printed or written characters or recognising patterns, e.g. fingerprints, which is covered by subclass G06K; **[6]**
- modification of image data to allow display using multiple viewports, which is covered by subclass G09G; **[6]**
- circuits for generating functions for visual indicators, which are covered by subclass G09G; **[6]**
- scanning of documents or the like in pictorial communication, which is covered by subclass H04N. **[6]**

Subclass index

1/00 **General purpose image data processing [6]**

1/20 . Processor architectures; Processor configuration, e.g. pipelining (architectures of general purpose stored programme computers G06F 15/76) **[6]**

1/40 . . Neural networks **[6]**

1/60 . Memory management **[6]**

3/00 **Geometric image transformation in the plane of the image, e.g. from bit-mapped to bit-mapped creating a different image [6]**

3/20 . Linear translation of a whole image or part thereof, e.g. panning **[6]**

3/40 . Scaling of a whole image or part thereof **[6]**

3/60 . Rotation of a whole image or part thereof **[6]**

5/00 **Image enhancement or restoration, e.g. from bit-mapped to bit-mapped creating a similar image [6]**

5/10 . by non-spatial domain filtering **[6]**

5/20 . by the use of local operators **[6]**
5/30 . . Erosion or dilatation, e.g. thinning **[6]**
5/40 . by the use of histogram techniques **[6]**
5/50 . by the use of more than one image, e.g. averaging, subtraction **[6]**

7/00 Image analysis, e.g. from bit-mapped to non bit-mapped [6]
7/20 . Analysis of motion **[6]**
7/40 . Analysis of texture **[6]**
7/60 . Analysis of geometric attributes, e.g. area, centre of gravity, perimeter, from an image **[6]**

9/00 Image coding, e.g. from bit-mapped to non bit-mapped (compression in general H03M; compression for image communication H04N) **[6]**
9/20 . Contour coding, e.g. using detection of edges **[6]**
9/40 . Tree coding, e.g. quadtree, octree **[6]**

11/00 2D [Two Dimensional] image generation [6]
11/20 . Drawing from basic elements, e.g. lines or circles **[6]**
11/40 . Filling a planar surface by adding surface attributes, e.g. colour or texture **[6]**
11/60 . Editing figures and text; Combining figures or text **[6]**
11/80 . Creating or modifying a manually drawn or painted image using a manual input device, e.g. mouse, light pen, direction keys on keyboard **[6]**

***13/00 Animation* [6,2011.01]**
13/20 . *3D [Three Dimensional] animation* **[2011.01]**
13/40 . . *of characters, e.g. humans, animals or virtual beings* **[2011.01]**
13/60 . . *of natural phenomena, e.g. rain, snow, water or plants* **[2011.01]**
13/80 . *2D animation, e.g. using sprites* **[2011.01]**

***15/00 3D [Three Dimensional] image rendering* [6,2011.01]**
15/02 . *Non-photorealistic rendering* **[2011.01]**
15/04 . *Texture mapping* **[2011.01]**
15/06 . *Ray-tracing* **[2011.01]**
15/08 . *Volume rendering* **[2011.01]**
15/10 . *Geometric effects* **[6,2011.01]**
15/20 . . *Perspective computation* **[6,2011.01]**
15/30 . . *Clipping* **[6,2011.01]**
15/40 . . *Hidden part removal* **[6,2011.01]**
15/50 . *Lighting effects* **[6,2011.01]**
15/55 . . *Radiosity* **[2011.01]**
15/60 . . Shadow generation **[6]**
15/70 (transferred to G06T 13/00 to G06T 13/60)
15/80 . . *Shading* **[2011.01]**
15/83 . . . *Phong shading* **[2011.01]**
15/87 . . . *Gouraud shading* **[2011.01]**

17/00 3D modelling for computer graphics [6]
17/05 . *Geographic models* **[2011.01]**
17/10 . Volume description, e.g. cylinders, cubes or using CSG [Constructive Solid Geometry] **[6]**
17/20 . Wire-frame description, e.g. polygonalisation or tessellation **[6]**
17/30 . Surface description, e.g. polynomial surface description **[6]**

***19/00 Manipulating 3D models or images for computer graphics* [2011.01]**
19/20 . *Editing of 3D images, e.g. changing shapes or colours, aligning objects or positioning parts* **[2011.01]**

G07 CHECKING-DEVICES

G07B TICKET-ISSUING APPARATUS; TAXIMETERS; ARRANGEMENTS OR APPARATUS FOR COLLECTING FARES, TOLLS OR ENTRANCE FEES AT ONE OR MORE CONTROL POINTS; FRANKING APPARATUS

Subclass index

1/00 **Machines for printing and issuing tickets** (printing mechanisms per se B41; output mechanisms of digital computers G06C 11/00)

1/02 . employing selectable printing plates

1/04 . . wherein the plates are inserted

1/06 . without selectable printing plates

1/08 . portable

3/00 **Machines for issuing preprinted tickets**

3/02 . from stock in wound strip form

3/04 . from a stack

5/00 **Details of, or auxiliary devices for, ticket-issuing machines** (for validating inserted tickets G07B 11/02)

5/02 . for cutting-off or separating tickets

5/04 . for recording or registering tickets issued

5/06 . for preventing fraudulent operation

5/08 . for avoiding incorrect action of the machine

5/10 . . indicating when ticket supply is exhausted

5/12 . allowing manual writing on the tickets

7/00 **Holders providing direct manual access to the tickets**

9/00 **Ticket punches** (perforating pliers B26F 1/36; marking record carriers in digital fashion by punching G06K 1/02)

9/02 . Toy ticket-punches

11/00 **Apparatus for validating or cancelling issued tickets [2]**

11/02 . for validating inserted tickets

11/03 . . by printing **[2]**

11/05 . . by perforating **[2]**

11/07 . . by separating part of ticket **[2]**

11/09 . . . combined with receptacle for separated part of ticket (refuse receptacles in general B65F 1/00) **[2]**

11/11 . for cancelling tickets **[2]**

13/00 **Taximeters** (measuring distance travelled G01C; measuring time G04)

13/02 . Details; Accessories

13/04 . . for indicating fare or state of hire

13/06 . . Driving arrangements

13/08 . . Tariff-changing arrangements

13/10 . . . automatically actuated

15/00 ***Arrangements or apparatus for collecting fares, tolls or entrance fees at one or more control points*** *(handling coins or paper currency G07D; apparatus for vending or hiring articles or services activated by coins, credit cards, paper currency or the like G07F 7/00, G07F 17/00)* **[1,2011.01]**

Note

Data processing aspects of payment systems or protocols relating to toll, entrance fee or fare collection, e.g. in road pricing or congestion charging, are also classified in G06Q 20/00. **[2011.01]**

15/02 . *taking into account a variable factor such as distance or time, e.g. for passenger transport, parking systems or car rental systems (G07B 15/06 takes precedence; taximeters G07B 13/00; parking meters per se G07F 17/24)* **[1,2011.01]**

15/04 . . comprising devices to free a barrier, turnstile, or the like (coin-freed turnstiles in general G07C 9/00)

15/06 . *Arrangements for road pricing or congestion charging of vehicles or vehicle users, e.g. automatic toll systems* **[2011.01]**

Note

This group covers the identification or tracking of vehicles or vehicle users for the purpose of road pricing or congestion charging, which means that vehicles or vehicle users are not necessarily channelled through fixed control points, e.g. toll booths or overhead gantries, but may be detected at a number of places when they travel in normal fashion in a pre-defined locality, e.g. a defined area in a city centre or an expressway, and where the information so generated is then used to determine a charge to be paid. **[2011.01]**

17/00 **Franking apparatus** (printing aspects B41)

17/02 . with means for computing or counting

17/04 . with means for avoiding misuse

G07C TIME OR ATTENDANCE REGISTERS; **REGISTERING OR INDICATING THE WORKING OF MACHINES**; **GENERATING RANDOM NUMBERS**; **VOTING OR LOTTERY APPARATUS**; **ARRANGEMENTS, SYSTEMS, OR APPARATUS FOR CHECKING NOT PROVIDED FOR ELSEWHERE** (identification of persons, e.g. finger-printing, foot-printing, A61B 5/117; indicating or recording apparatus for measuring in general, analogous apparatus but in which the input is not a variable to be measured, e.g. a hand operation, G01D; clocks, clock mechanisms G04B, G04C; time-interval measuring G04F; counting mechanisms per se G06M)

Subclass index

1/00 Registering, indicating, or recording the time of events or elapsed time, e.g. time-recorders for work people (registering or indicating the working of machines or vehicles G07C 3/00, G07C 5/00)

Note

Groups G07C 1/20 to G07C 1/32 take precedence over groups G07C 1/02 to G07C 1/10.

1/02 . not involving the registering, indicating, or recording of other data
1/04 . . wherein the time is indicated in figures
1/06 . . . with apparatus adapted for use with individual cards
1/08 . . wherein the time is indicated by marking an element, e.g. a card or tape, in a position determined by the time
1/10 . together with the recording, indicating, or registering of other data, e.g. of signs of identity (together with the recording of a continuously-varying variable G01D or the appropriate other subclass of class G01, dependent on the variable)
1/12 . . wherein the time is indicated in figures
1/14 . . . with apparatus adapted for use with individual cards
1/16 . . wherein the time is indicated by marking an element, e.g. a card or tape, in a position determined by the time
1/18 . . . with apparatus adapted for use with individual cards
1/20 . Checking timed patrols, e.g. of watchman
1/22 . in connection with sports or games
1/24 . . Race time-recorders (race-finish cameras G03B 41/00)
1/26 . . Pigeon-timing or like equipment
1/28 . . Indicating playing time
1/30 . Parking meters (registering or indicating waiting time of vehicles by means driven by the vehicle G07C 5/02; coin-freed parking meters G07F 17/24)
1/32 . Time-recording locks (locks giving indication of unauthorised unlocking E05B 39/00)

3/00 Registering or indicating the condition or the working of machines or other apparatus, other than vehicles (engine indicators G01L; testing apparatus incident to its manufacture G01M; signalling arrangements per se, indicating undesired or abnormal working conditions G08B)

3/02 . Registering or indicating working or idle time only
3/04 . . using counting means or digital clocks
3/06 . . in graphical form
3/08 . Registering or indicating the production of the machine either with or without registering working or idle time
3/10 . . using counting means
3/12 . . in graphical form
3/14 . Quality control systems

5/00 Registering or indicating the working of vehicles (for measuring distance travelled or combinations of speed and distance G01C; engine indicators G01L; devices for measuring speed or acceleration G01P; apparatus forming part of taximeters G07B)

5/02 . Registering or indicating driving, working, idle, or waiting time only
5/04 . . using counting means or digital clocks
5/06 . . in graphical form
5/08 . Registering or indicating performance data other than driving, working, idle, or waiting time, with or without registering driving, working, idle, or waiting time
5/10 . . using counting means or digital clocks
5/12 . . in graphical form

7/00 Details or accessories common to the registering or indicating apparatus of groups G07C 3/00 and G07C 5/00

9/00 Individual entry or exit registers

9/02 . Turnstiles with registering means (coin-freed aspects G07F)

11/00 Arrangements, systems, or apparatus for checking, e.g. the occurrence of a condition, not provided for elsewhere (for checking lottos or bingo games A63F 3/06; signalling or alarm arrangements G08B)

13/00 Voting apparatus

13/02 . Ballot boxes

15/00 Generating random numbers; **Lottery apparatus** (digital computer arrangements for generating random or pseudo-random numbers G06F 7/58; generating electric pulses at random intervals H03K 3/84) **[3]**

G07D HANDLING OF COINS OR OF PAPER CURRENCY OR SIMILAR VALUABLE PAPERS, E.G. TESTING, SORTING BY DENOMINATIONS, COUNTING, DISPENSING, CHANGING OR DEPOSITING [2]

Note

In this subclass, the following terms or expressions are used with the meaning indicated:
– "coins" also covers tokens of similar nature;
– *"paper currency or similar valuable papers" covers banknotes, bills, cheques, vouchers, securities, bonds or the like.* **[2011.01]**

1/00 Coin dispensers
1/02 . giving change
1/04 . . dispensing change equal to a sum deposited
1/06 . . dispensing the difference between a sum paid and a sum charged
1/08 . . hand actuated

3/00 Sorting a mixed bulk of coins into denominations [1,7]
3/02 . Sorting coins by means of graded apertures
3/04 . . arranged on an inclined rail
3/06 . . arranged along a circular path
3/08 . . arranged on a helix
3/10 . . provided by sieves arranged in series
3/12 . Sorting coins by means of stepped deflectors
3/14 . Apparatus driven under control of coin-sensing elements
3/16 . in combination with coin-counting

5/00 Testing specially adapted to determine the identity or genuineness of coins, e.g. for segregating coins which are unacceptable or alien to a currency [1,7]

Note

In groups G07D 5/02 to G07D 5/10, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[3]**

5/02 . Testing the dimensions, e.g. thickness, diameter; Testing the deformation **[3]**
5/04 . Testing the weight **[3]**
5/06 . Testing the hardness or elasticity **[3]**
5/08 . Testing the magnetic or electric properties **[3]**
5/10 . Testing the rim, e.g. the milling of the rim **[3]**

7/00 Testing specially adapted to determine the identity or genuineness of paper currency or similar valuable papers, e.g. for segregating those which are unacceptable or alien to a currency [2]

Note

Groups G07D 7/16 to G07D 7/20 take precedence over groups G07D 7/02 to G07D 7/14 **[7]**

7/02 . using electric means (G07D 7/04, G07D 7/06 take precedence) **[7]**
7/04 . using magnetic means, e.g. detection of magnetic imprint **[7]**
7/06 . using wave or particle radiation **[7]**
7/08 . . Acoustic waves **[7]**
7/10 . . Microwaves **[7]**
7/12 . . Visible light, infra-red or ultra-violet radiation **[7]**
7/14 . using chemical means **[7]**
7/16 . Testing the dimensions **[7]**
7/18 . Testing the stiffness **[7]**
7/20 . Testing patterns thereon **[7]**

9/00 Counting coins (in combination with coin-sorting G07D 3/16); **Handling of coins not provided for in the other groups of this subclass**
9/02 . Change trays
9/04 . Hand- or motor-driven devices for counting coins
9/06 . Devices for stacking or otherwise arranging coins on a support, e.g. apertured plate for use in counting coins

11/00 Devices accepting coins or paper currency, e.g. depositing machines (apparatus freed or actuated by coins or the like G07F; apparatus freed or actuated by paper currency G07F 7/04; complete banking systems G07F 19/00) **[5]**

13/00 Handling of coins or of paper currency or similar valuable papers, characterised by a combination of mechanisms not covered by a single one of groups G07D 1/00 to G07D 11/00 [5]

G07F COIN-FREED OR LIKE APPARATUS (coin sorting G07D 3/00; coin testing G07D 5/00) **[1,7]**

(1) This subclass does not cover constructions or details of apparatus which includes, or is combined with, coin-actuated mechanisms but is not specially adapted or modified for use therewith. Such constructions or details are covered by the relevant subclass for the particular apparatus.
(2) In this subclass, the following term is used with the meaning indicated:
– "coins" covers also tokens or the like.

Subclass index

1/00 **Coin inlet arrangements**; **Coins specially adapted to operate coin-freed mechanisms** (coins in general A44C)

1/02 . Coin slots

1/04 . Coin chutes

1/06 . Coins specially adapted to operate coin-freed mechanisms

5/00 **Coin-actuated mechanisms**; **Interlocks**

5/02 . actuated mechanically by coins, e.g. by a single coin

5/04 . . wherein two or more coins of the same denomination are required for each transaction

5/06 . . wherein two or more coins of different denominations are required for each transaction

5/08 . . wherein the use of two or more coins or an equivalent single coin is optional for each transaction; wherein the use of two or more coins or an alternative equivalent combination of coins is optional for each transaction

5/10 . actuated electrically by the coin, e.g. by a single coin

5/12 . . wherein two or more coins of the same denomination are required for each transaction

5/14 . . wherein two or more coins of different denominations are required for each transaction

5/16 . . wherein the use of two or more coins or an equivalent single coin is optional for each transaction; wherein the use of two or more coins or an alternative equivalent combination of coins is optional for each transaction

5/18 . specially adapted for controlling several coin-freed apparatus from one place (interlocks G07F 5/26)

5/20 . specially adapted for registering coins as credit, e.g. mechanically actuated

5/22 . . electrically actuated

5/24 . with change-giving (coin-changing mechanisms per se G07D)

5/26 . Interlocks, e.g. for locking the doors of compartments other than that to be used

7/00 **Mechanisms actuated by objects other than coins to free or to actuate vending, hiring, coin or paper currency dispensing or refunding apparatus** (complete banking systems G07F 19/00; handling coins or paper currencies apart from coin-freed or like apparatus G07D) **[2]**

7/02 . by keys or other credit registering devices (for producing a coded signal for use together with coded identity cards G07F 7/10) **[2]**

7/04 . by paper currency

7/06 . by returnable containers, e.g. bottles

7/08 . by coded identity card or credit card **[2]**

7/10 . . together with a coded signal **[2]**

7/12 . . Card verification **[5]**

9/00 **Details other than those peculiar to special kinds or types of apparatus** (coin inlet arrangements G07F 1/00; coin-actuated mechanisms, interlocks G07F 5/00)

9/02 . Devices for alarm or indication, e.g. when empty; Advertising arrangements in coin-freed apparatus (alarms or warning devices indicating the interruption of flow to be metered G07F 15/10)

9/04 . Means for returning surplus or unused coins

9/06 . Coin boxes

9/08 . Counting total of coins inserted

9/10 . Casings, e.g. with means for heating or cooling

11/00 **Coin-freed apparatus for dispensing, or the like, discrete articles**

11/02 . from non-movable magazines

11/04 . . in which magazines the articles are stored one vertically above the other

11/06 . . . supported individually on pivotally-mounted flaps or shelves

11/08 . . . arranged in two columns in staggered relationship

11/10 . . . two or more magazines having a common delivery chute

11/12 . . . with means for automatically changing to reserve stacks

11/14 . . . with means for raising the stack of articles to permit delivery of the topmost

11/16 . . . Delivery means

11/18 . . . . Recessed drawers

11/20 . . . . Pushers actuated directly by hand

11/22 . . . . Pushers actuated indirectly by hand, e.g. through cranks or levers

11/24 . . . . Rotary or oscillatory members

11/26 . . . . Endless bands

11/28 . . in which the magazines are inclined

11/30 . . . two or more magazines having independent delivery

11/32 . . . two or more magazines having a common delivery chute

11/34 . . in which the magazines are of zig-zag form

11/36 . . in which the magazines are of helical or spiral form

11/38 . . in which the magazines are horizontal

11/40 . . . the articles being delivered by hand-operated means

11/42 . . . the articles being delivered by motor-driven means

11/44 . . in which magazines the articles are stored in bulk

11/46 . from movable storage containers or supports

11/48 . . the storage containers or supports, e.g. magazine, being pivotally mounted (articles supported on pivotally-mounted flaps or shelves in magazines G07F 11/06)

11/50 . . the storage containers or supports being rotatably mounted

11/52 . . . about horizontal axes
11/54 . . . about vertical axes
11/56 . . . . the storage containers or supports both rotating and moving axially
11/58 . . the articles being supported on or by endless belts or like conveyers
11/60 . . the storage containers or supports being rectilinearly movable (endless belts or like conveyers G07F 11/58)
11/62 . in which the articles are stored in compartments in fixed receptacles
11/64 . in which the articles are individually suspended from stationary supports
11/66 . in which the articles are dispensed by cutting from a mass
11/68 . in which the articles are torn or severed from strips or sheets
11/70 . in which the articles are formed in the apparatus from components, blanks, or material constituents
11/72 . Auxiliary equipments, e.g. for lighting cigars, opening bottles

13/00 Coin-freed apparatus for controlling dispensing of fluids, semiliquids or granular material from reservoirs
13/02 . by volume
13/04 . by weight
13/06 . with selective dispensing of different fluids or materials or mixtures thereof
13/08 . in the form of a spray
13/10 . with associated dispensing of containers, e.g. cups or other articles (dispensing discrete articles per se G07F 11/00)

15/00 Coin-freed apparatus with meter-controlled dispensing of liquid, gas, or electricity (tariff-metering apparatus in general G01D 4/00)
15/02 . in which the quantity mechanism is set forward by hand after insertion of a coin
15/04 . in which the quantity mechanism is set forward automatically by the insertion of a coin
15/06 . with means for prepaying basic charges, e.g. rent for meters
15/08 . with means for varying the tariff or changing the price
15/10 . with alarm or warning devices, e.g. indicating the interrupting of the supply
15/12 . in which metering is on a time basis

17/00 Coin-freed apparatus for hiring articles; **Coin-freed facilities or services** (picture juke-boxes G03B; prepayment telephone systems H04M 17/00)
17/02 . for optical devices, e.g. telescopes
17/04 . for anthropometrical measurements such as weight, height, strength
17/06 . for inflating-pumps
17/08 . for seats or footstools
17/10 . for means for safe-keeping of property, left temporarily, e.g. by fastening the property
17/12 . . comprising lockable containers, e.g. for accepting clothes to be cleaned
17/14 . for fastenings for doors (of containers for safe-keeping G07F 17/12); for turnstiles
17/16 . for devices exhibiting advertisements, announcements, pictures, or the like
17/18 . for washing or drying persons
17/20 . for washing or drying articles, e.g. clothes, motor cars
17/22 . for cleaning and polishing boots or shoes
17/24 . for parking meters (devices for checking parking time G07C 1/30)
17/26 . for printing, stamping, franking, typing, or teleprinting apparatus (ticket printing or like apparatus G07F 17/42)
17/28 . for radio apparatus
17/30 . for musical instruments (recording or playback apparatus G11B)
17/32 . for games, toys, sports, or amusements
17/34 . . depending on the stopping of moving members, e.g. "fruit" machines
17/36 . . Age, character, or fortune telling apparatus
17/38 . . Ball games; Shooting apparatus
17/40 . for devices for accepting orders, advertisements, or the like
17/42 . for ticket printing or like apparatus

19/00 Complete banking systems; **Coded card-freed arrangements adapted for dispensing or receiving monies or the like and posting such transactions to existing accounts, e.g. automatic teller machines** (mechanisms in general actuated by objects other than coins G07F 7/00; data processing equipment for bank accounting G06Q 40/00; handling coins or paper currencies apart from coin-freed or like apparatus G07D) **[5]**

G07G REGISTERING THE RECEIPT OF CASH, VALUABLES, OR TOKENS (digital computing in general G06C, G06F) **[4]**

1/00 Cash registers (alarm indicators G07G 3/00)
1/01 . Details for indicating (displaying information in general G09F, G09G) **[4]**
1/06 . . with provision for the noting of the money to be paid **[4]**
1/08 . . with rotating drums which display the money entered **[4]**
1/10 . mechanically operated **[4]**
1/12 . electronically operated (digital data processing aspects G06Q 20/00) **[4]**
1/14 . . Systems including one or more distant stations co-operating with a central processing unit (data transmission in general H04L; telemetry systems for selectively calling a substation from a main station H04Q 9/00) **[4]**

3/00 Alarm indicators, e.g. bells

5/00 Receipt-giving machines (cash registers giving receipts G07G 1/00)

G08 SIGNALLING

G08B **SIGNALLING OR CALLING SYSTEMS**; **ORDER TELEGRAPHS**; **ALARM SYSTEMS** (signalling arrangements on vehicles B60Q, B62D 41/00; railway signalling systems or devices B61L; on cycles B62J 3/00, B62J 6/00; safes or strong-rooms with alarm devices E05G; signalling or alarm devices in mines E21F 17/18; sensitive measuring elements, see the appropriate subclasses of G01; traffic control systems G08G; visual indicating means G09; sound-producing devices G10; radio or near-field calling systems H04B 5/00, H04B 7/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R)

(1) This subclass covers also means for identifying or incapacitating burglars or the like.
(2) This subclass does not cover:
- the mere provision of an audible or visible signalling device on measuring or switching apparatus;
- alarm systems for indicating that a specific variable has exceeded, or fallen below, a predetermined value, which are covered by the relevant subclasses of class G01 for the measurement of that variable.
- alarms for specific processes or types of machines or apparatus, which are covered by the relevant subclasses for the processes, machines, or apparatus.

(3) In this subclass, the following term is used with the meaning indicated:
- "systems" may cover also devices peculiar thereto.

Subclass index

1/00 **Systems for signalling characterised solely by the form of transmission of the signal**

1/02 . using only mechanical transmission
1/04 . using hydraulic transmission; using pneumatic transmission
1/06 . . hydraulic only
1/08 . using electric transmission

3/00 **Audible signalling systems**; **Audible personal calling systems** (audible indication of time signals G04B 21/00, G04C 21/00)

3/02 . using only mechanical transmission
3/06 . using hydraulic transmission; using pneumatic transmission
3/10 . using electric transmission; using electromagnetic transmission
3/14 . using explosives

5/00 **Visible signalling systems, e.g. personal calling systems, remote indication of seats occupied** (display of time signals G04B 19/00, G04C 17/00, G04C 19/00, G04G 9/00; for display of alphanumeric information G09F; flags, banners G09F)

5/02 . using only mechanical transmission
5/06 . using hydraulic transmission; using pneumatic transmission
5/14 . . with indicator element moving about a pivot, e.g. hinged flap, rotating vane
5/16 . . . with reset means necessitating a separate operation to return the indicator element
5/18 . . with indicator element moving rectilinearly
5/20 . . . with reset means necessitating a separate operation to return the indicator element
5/22 . using electric transmission; using electromagnetic transmission
5/24 . . with indicator element moving about a pivot, e.g. hinged flap, rotating vane
5/26 . . . with reset means necessitating a separate operation to return the indicator element
5/28 . . . with hinged flap or arm
5/30 . . . with rotating or oscillating members, e.g. vanes
5/32 . . with indicator element moving rectilinearly
5/34 . . . with reset means necessitating a separate operation to return the indicator element
5/36 . . using visible light sources
5/38 . . . using flashing light
5/40 . using smoke, fire, or coloured gases (sky-writing G09F 21/16)

6/00 **Tactile signalling systems, e.g. personal calling systems** (indication of time by feeling G04B 25/02; deaf-aid sets H04R 25/00) **[6]**

7/00 **Signalling systems according to more than one of groups G08B 3/00 to G08B 6/00** (combinations of display arrangements with audible advertising G09F 27/00); **Personal calling systems according to more than one of groups G08B 3/00 to G08B 6/00**

7/02 . using mechanical transmission

7/04 . using hydraulic transmission; using pneumatic transmission
7/06 . using electric transmission
7/08 . using explosives

9/00 Order telegraph apparatus, i.e. means for transmitting one of a finite number of different orders at the discretion of the user, e.g. bridge to engine room orders in ships (signalling devices in mines E21F 17/18)

9/02 . Details
9/04 . . Means for recording operation of the apparatus
9/06 . . Means for indicating disagreement between orders given and those carried out
9/08 . mechanical
9/10 . . using ratchet
9/12 . . using rotary shaft
9/14 . hydraulic; pneumatic
9/16 . . using ratchet
9/18 . . by varying displacement of the fluid
9/20 . . by varying pressure of the fluid

13/00 Burglar, theft, or intruder alarms (vehicle theft alarms B60R 25/10; cycle theft alarms B62H 5/00)

13/02 . Mechanical actuation
13/04 . . by breaking of glass
13/06 . . by tampering with fastening (alarm locks E05B 45/00; alarm devices on safes E05G 1/10)
13/08 . . by opening, e.g. of door, of window, of drawer, of shutter, of curtain, of blind
13/10 . . by pressure on floors, floor coverings, stair treads, counters, or tills
13/12 . . by the breaking or disturbance of stretched cords or wires
13/14 . . by lifting or attempted removal of hand-portable articles
13/16 . Actuation by interference with mechanical vibrations in air or other fluid
13/18 . Actuation by interference with heat, light, or radiation of shorter wavelength; Actuation by intruding sources of heat, light, or radiation of shorter wavelength
13/181 . . using active radiation detection systems **[5]**
13/183 . . . by interruption of a radiation beam or barrier (light barriers G01V 8/10) **[5]**
13/184 . . . . using radiation reflectors **[5]**
13/186 . . . . using light guides, e.g. optical fibres **[5]**
13/187 . . . by interference of a radiation field **[5]**
13/189 . . using passive radiation detection systems **[5]**
13/19 . . . using infra-red-radiation detection systems **[5]**
13/191 . . . . using pyroelectric sensor means **[5]**
13/193 . . . . using focusing means **[5]**
13/194 . . . using image scanning and comparing systems **[5]**
13/196 . . . . using television cameras **[5]**
13/20 . Actuation by change of fluid pressure
13/22 . Electrical actuation
13/24 . . by interference with electromagnetic field distribution
13/26 . . by proximity of an intruder causing variation in capacitance or inductance of a circuit

15/00 Identifying, scaring, or incapacitating burglars, thieves, or intruders, e.g. by explosives (burglar traps, or the like, on safes E05G 5/02)

15/02 . with smoke, gas, or coloured or odorous powder or liquid

17/00 Fire alarms; **Alarms responsive to explosion** (temperature-responsive elements G01K)

17/02 . Mechanical actuation of the alarm, e.g. by the breaking of a wire
17/04 . Hydraulic or pneumatic actuation of the alarm, e.g. by change of fluid pressure
17/06 . Electric actuation of the alarm, e.g. using a thermally-operated switch (thermally-operated electric switches per se H01H 37/00)
17/08 . Actuation involving the use of explosive means
17/10 . Actuation by presence of smoke or gases
17/103 . . using a light emitting and receiving device **[5]**
17/107 . . . for detecting light-scattering due to smoke **[5]**
17/11 . . using an ionisation chamber for detecting smoke or gas (vacuum gauges making use of ionisation effects G01L 21/30; gas analysis by investigating the ionisation G01N 27/62) **[5]**
17/113 . . . Constructional details (discharge tubes for measuring pressure of introduced gas, or for detecting presence of gas, in general H01J 41/02) **[5]**
17/117 . . by using a detection device for specific gases, e.g. combustion products, produced by the fire (G08B 17/103, G08B 17/11 take precedence; investigating or analysing gases in general G01N, e.g. by using electric means G01N 27/00) **[5]**
17/12 . Actuation by presence of radiation or particles, e.g. of infra-red radiation, of ions

19/00 Alarms responsive to two or more different undesired or abnormal conditions, e.g. burglary and fire, abnormal temperature and abnormal rate of flow

19/02 . Alarm responsive to formation or anticipated formation of ice (indicating weather conditions G01W 1/00)

21/00 Alarms responsive to a single specified undesired or abnormal condition and not otherwise provided for

21/02 . Alarms for ensuring the safety of persons **[7]**
21/04 . . responsive to non-activity, e.g. of elderly persons (G08B 21/06 takes precedence) **[7]**
21/06 . . indicating a condition of sleep, e.g. anti-dozing alarms (safety devices for propulsion-unit control of vehicles responsive to incapacity of driver B60K 28/06) **[7]**
21/08 . . responsive to the presence of persons in a body of water, e.g. a swimming pool; responsive to an abnormal condition of a body of water **[7]**
21/10 . . responsive to calamitous events, e.g. tornados, earthquakes (seismology G01V 1/00; indicating weather conditions G01W 1/00) **[7]**
21/12 . . responsive to undesired emission of substances, e.g. pollution alarms (alarms on pipe-lines F17D 3/01) **[7]**
21/14 . . . Toxic gas alarms (G08B 21/16 takes precedence) **[7]**
21/16 . . . Combustible gas alarms **[7]**
21/18 . Status alarms (G08B 21/02 takes precedence) **[7]**
21/20 . . responsive to moisture **[7]**
21/22 . . responsive to presence or absence of persons **[7]**
21/24 . . Reminder alarms, e.g. anti-loss alarms (devices to prevent loss of bags or the like A45C 13/24) **[7]**

23/00 Alarms responsive to unspecified undesired or abnormal conditions

25/00 **Alarm systems in which the location of the alarm condition is signalled to a central station, e.g. fire or police telegraphic systems**

25/01 . characterised by the transmission medium **[5]**

25/04 . . using a single signalling line, e.g. in a closed loop **[5]**

25/06 . . using power transmission lines (systems in general for transmission of information via power distribution lines H04B 3/54) **[5]**

25/08 . . using communication transmission lines (telephonic communication systems combined with alarm systems H04M 11/04) **[5]**

25/10 . . using wireless transmission systems **[5]**

25/12 . Manually actuated calamity alarm transmitting arrangements **[5]**

25/14 . Central alarm receiver or annunciator arrangements **[5]**

26/00 **Alarm systems in which substations are interrogated in succession by a central station**

27/00 **Alarm systems in which the alarm condition is signalled from a central station to a plurality of substations**

29/00 **Checking or monitoring of signalling or alarm systems**; **Prevention or correction of operating errors, e.g. preventing unauthorised operation**

29/02 . Monitoring continuously signalling or alarm systems **[5]**

29/04 . . Monitoring of the detection circuits **[5]**

29/06 . . Monitoring of the line circuits, e.g. signalling of line faults (testing or locating faults in cables or lines in general G01R 31/02, G01R 31/08) **[5]**

29/08 . . . Signalling of tampering with the line circuit **[5]**

29/10 . . Monitoring of the annunciator circuits **[5]**

29/12 . Checking intermittently signalling or alarm systems **[5]**

29/14 . . checking the detection circuits **[5]**

29/16 . Security signalling or alarm systems, e.g. redundant systems **[5]**

29/18 . Prevention or correction of operating errors (G08B 29/02, G08B 29/12 take precedence) **[5]**

29/20 . . Calibration, including self-calibrating arrangements **[5]**

29/22 . . . Provisions facilitating manual calibration, e.g. input or output provisions for testing; Holding of intermittent values to permit measurement **[5]**

29/24 . . . Self-calibration, e.g. compensating for environmental drift or ageing of components **[5]**

29/26 . . . . by updating and storing reference thresholds **[5]**

29/28 . . . . by changing the gain of an amplifier **[5]**

31/00 **Predictive alarm systems characterised by extrapolation or other computation using updated historic data [5]**

G08C **TRANSMISSION SYSTEMS FOR MEASURED VALUES, CONTROL OR SIMILAR SIGNALS** (fluid pressure transmission systems F15B; mechanical means for transferring the output of a sensing member into a different variable G01D 5/00; mechanical control systems G05G) **[4]**

Subclass index

13/00 **Arrangements for influencing the relationship between signals at input and output, e.g. differentiating, delaying**

13/02 . to yield a signal which is a function of two or more signals, e.g. sum, product

15/00 **Arrangements characterised by the use of multiplexing for the transmission of a plurality of signals over a common path**

15/02 . simultaneously, i.e. using frequency division

15/04 . . the signals being modulated on carrier frequencies

15/06 . successively, i.e. using time division

15/08 . . the signals being represented by amplitude of current or voltage in transmission link

15/10 . . the signals being represented by frequencies or phase of current or voltage in transmission link

15/12 . . the signals being represented by pulse characteristics in transmission link

17/00 **Arrangements for transmitting signals characterised by the use of a wireless electrical link [6]**

17/02 . using a radio link **[6]**

17/04 . using magnetically coupled devices **[6]**

17/06 . using capacity coupling **[6]**

19/00 **Electric signal transmission systems** (G08C 17/00 takes precedence)

19/02 . in which the signal transmitted is magnitude of current or voltage (G08C 19/36, G08C 19/38 take precedence)

19/04 . . using variable resistance

19/06 . . using variable inductance

19/08 . . . differentially influencing two coils

19/10 . . using variable capacitance

19/12 . in which the signal transmitted is frequency or phase of ac

19/14 . . using combination of fixed frequencies

19/16 . in which transmission is by pulses

19/18 . . using a variable number of pulses in a train
19/20 . . . operating on dynamo-electric devices, e.g. step motor
19/22 . . by varying the duration of individual pulses
19/24 . . using time shift of pulses
19/26 . . by varying pulse repetition frequency
19/28 . . using pulse code
19/30 . in which transmission is by selection of one or more conductors or channels from a plurality of conductors or channels (G08C 19/38 takes precedence)
19/32 . . of one conductor or channel
19/34 . . of a combination of conductors or channels
19/36 . using optical means to convert the input signal
19/38 . using dynamo-electric devices (operated by pulses G08C 19/20)
19/40 . . of which only the rotor or the stator carries a winding to which a signal is applied, e.g. using step motor
19/42 . . . having three stator poles
19/44 . . . having more than three stator poles
19/46 . . of which both rotor and stator carry windings (having squirrel-cage rotor G08C 19/40)
19/48 . . . being of the type with a three-phase stator and a rotor fed by constant-frequency ac, e.g. selsyn, magslip

21/00 Systems for transmitting the position of an object with respect to a predetermined reference system, e.g. tele-autographic system [5]

23/00 Non-electric signal transmission systems, e.g. optical systems
23/02 . using acoustic waves **[6]**
23/04 . using light waves, e.g. infra-red **[6]**
23/06 . . through light guides, e.g. optical fibres **[6]**

25/00 Arrangements for preventing or correcting errors; Monitoring arrangements
25/02 . by signalling back from receiving station to transmitting station
25/04 . by recording transmitted signals

G08G TRAFFIC CONTROL SYSTEMS (guiding railway traffic, ensuring the safety of railway traffic B61L; arrangement of road signs or traffic signals E01F 9/00; radar systems or analogous systems, designed for traffic control G01S 13/91; sonar or lidar systems specially designed for traffic control G01S 15/88, G01S 17/88) **[2]**

Note

This subclass covers:
– identification of traffic offenders;
– indicating the position of vehicles for traffic control purposes; **[7]**
– navigation systems for traffic control purposes, i.e. systems in which the navigation is not performed autonomously by or in the vehicles, but where the vehicles are guided by instructions transmitted to them; **[7]**
– indication of free spaces in parking areas.

1/00 Traffic control systems for road vehicles
1/005 . including pedestrian guidance indicator **[5]**
1/01 . Detecting movement of traffic to be counted or controlled (G08G 1/07 to G08G 1/14 take precedence; road pricing or congestion charging of vehicles or vehicle users G07B 15/06)
1/015 . . with provision for distinguishing between motor cars and cycles
1/017 . . identifying vehicles (G08G 1/015, G08G 1/054 take precedence) **[5]**
1/02 . . using treadles built into the road (pads or other sensitive devices responsive to passage of vehicles E01F 11/00)
1/04 . . using optical or ultrasonic detectors
1/042 . . using inductive or magnetic detectors **[5]**
1/048 . . with provision for compensation of environmental or other condition, e.g. snow, vehicle stopped at detector **[5]**
1/052 . . with provision for determining speed or overspeed **[5]**
1/054 . . . photographing overspeeding vehicles **[5]**
1/056 . . with provision for distinguishing direction of travel **[5]**
1/065 . by counting the vehicles in a section of the road or in a parking area, i.e. comparing incoming count with outgoing count (road pricing or congestion charging of vehicles or vehicle users G07B 15/06)
1/07 . Controlling traffic signals
1/08 . . according to detected number or speed of vehicles
1/081 . . Plural intersections under common control **[5]**
1/082 . . . Controlling the time between beginning of the same phase of a cycle at adjacent intersections **[5]**
1/083 . . . Controlling the allocation of time between phases of a cycle **[5]**
1/085 . . using a free-running cyclic timer
1/087 . . Override of traffic control, e.g. by signal transmitted by an emergency vehicle **[5]**
1/09 . Arrangements for giving variable traffic instructions (indicating arrangements for variable information by selection or combination of individual elements G09F 9/00)
1/095 . . Traffic lights
1/0955 . . . transportable **[5]**
1/096 . . provided with indicators in which a mark progresses showing the time elapsed, e.g. of green phase
1/0962 . . having an indicator mounted inside the vehicle, e.g. giving voice messages **[5]**
1/0965 . . . responding to signals from another vehicle, e.g. emergency vehicle **[5]**
1/0967 . . . Systems involving transmission of highway information, e.g. weather, speed limits (transmission of navigation instructions to the vehicle G08G 1/0968) **[5]**
1/0968 . . . Systems involving transmission of navigation instructions to the vehicle **[5]**
1/0969 . . . . having a display in the form of a map **[5]**

1/097 . Supervising of traffic control systems, e.g. by giving an alarm if two crossing streets have green light simultaneously

1/123 . indicating the position of vehicles, e.g. scheduled vehicles (transmission of navigation instructions to vehicles G08G 1/0968) **[5]**

1/127 . . to a central station **[5]**

1/13 . . . the indicator being in the form of a map **[5]**

1/133 . . within the vehicle **[5]**

1/137 . . . the indicator being in the form of a map **[5]**

1/14 . indicating individual free spaces in parking areas

1/16 . Anti-collision systems (road vehicle drive control systems for predicting or avoiding probable or impending collision otherwise than by control of a particular sub-unit B60W 30/08) **[2,8]**

3/00 **Traffic control systems for marine craft** (marking of navigational route B63B 22/16, B63B 51/00)

3/02 . Anti-collision systems

5/00 **Traffic control systems for aircraft [2]**

5/02 . Automatic landing aids, i.e. systems in which flight data of incoming planes are processed to provide landing data (landing aids fitted in or to aircraft B64D 45/04; visual or acoustic landing aids B64F 1/18)

5/04 . Anti-collision systems

5/06 . for control when on the ground **[2]**

7/00 **Traffic control systems for simultaneous control of two or more different kinds of craft [2]**

7/02 . Anti-collision systems **[2]**

9/00 **Traffic control systems for craft where the kind of craft is irrelevant or unspecified [2]**

9/02 . Anti-collision systems **[2]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

G09 EDUCATING; CRYPTOGRAPHY; DISPLAY; ADVERTISING; SEALS

G09B EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS (devices for psychotechnics or for testing reaction times A61B 5/16; games, sports, amusements A63; projectors, projector screens G03B)

(1) This subclass covers :
- simulators regarded as teaching or training devices, which is the case if they give perceptible sensations having a likeness to the sensations a student would experience in reality in response to actions taken by him;
- models of buildings, installations, or the like.

(2) This subclass does not cover :
- simulators which merely demonstrate or illustrate the function of an apparatus or of a system by means involving computing, and therefore cannot be regarded as teaching or training devices. Such simulators are covered by class G06, if no provision exists elsewhere;
- components of simulators, if identical with real devices or machines, which are covered by the relevant subclasses for these devices or machines and not by class G09.

Subclass index

1/00 Manually- or mechanically-operated educational appliances using elements forming or bearing symbols, signs, pictures, or the like which are arranged or adapted to be arranged in one or more particular ways (puzzle-games A63F 9/00; advertising or displaying in general G09F)

1/02 . and having a support carrying or adapted to carry the elements

1/04 . . the elements each bearing a single symbol or a single combination of symbols

1/06 . . . and being attachable to, or mounted on, the support

1/08 . . . . by means of magnets

1/10 . . . . by means of pins and holes

1/12 . . . . by means of ring-like securing elements (sheets temporarily attached together by rings or coils B42F 3/00, B42F 5/00)

1/14 . . . . the elements being slidably mounted on the support

1/16 . . the elements each bearing a plurality of different symbols, signs, or combinations of symbols and signs, only one symbol, sign, or combination thereof, of each element to be used at a time

1/18 . . . the elements being rotatable

1/20 . . . . and bearing the symbols on a surface parallel to the axis of rotation

1/22 . . . . and bearing the symbols on a surface perpendicular to the axis of rotation

1/24 . . . the elements being in flexible-strip form, e.g. endless bands

1/26 . . . the elements being arranged in fan form

1/28 . . . the elements being slidable

1/30 . . wherein the elements are adapted to be arranged in co-operation with the support to form symbols (without special support G09B 1/40)

1/32 . comprising elements to be used without a special support

1/34 . . the elements to be placed loosely in adjacent relationship

1/36 . . the elements being connectible by corresponding projections and recesses

1/38 . . the elements being connectible magnetically

1/40 . . to form symbols or signs by appropriate arrangement

3/00 Manually- or mechanically-operated teaching appliances working with questions and answers (electrically-operated G09B 7/00; advertising or displaying in general G09F)

3/02 . of the type wherein the student is expected to construct an answer to the question which is presented or wherein the machine gives an answer to the question presented by the student

3/04 . . of chart form (masks G09B 17/02)

3/06 . of the multiple-choice answer type, i.e. where a given question is provided with a series of answers and a choice has to be made

3/08 . . of chart form (having one set of answers common to a plurality of questions G09B 3/12)

3/10 . . wherein one set of answers is common to a plurality of questions

3/12 . . . of chart form

5/00 **Electrically-operated educational appliances** (working with questions and answers G09B 7/00; simulators G09B 9/00; advertising or displaying in general G09F) **[2]**

Note

Group G09B 5/08 takes precedence over groups G09B 5/02 to G09B 5/06. **[2]**

5/02 . with visual presentation of the material to be studied, e.g. using film strip
5/04 . with audible presentation of the material to be studied (reading and recognising printed or written characters G06K 9/00; sound-recording or reproducing G11B)
5/06 . with both visual and audible presentation of the material to be studied
5/08 . providing for individual presentation of information to a plurality of student stations **[2]**
5/10 . . all student stations being capable of presenting the same information simultaneously (G09B 5/14 takes precedence) **[2]**
5/12 . . different stations being capable of presenting different information simultaneously (G09B 5/14 takes precedence) **[2]**
5/14 . . with provision for individual teacher-student communication **[2]**

7/00 **Electrically-operated teaching apparatus or devices working with questions and answers** (mechanically-operated G09B 3/00; computing arrangements G06F)
7/02 . of the type wherein the student is expected to construct an answer to the question which is presented or wherein the machine gives an answer to the question presented by the student
7/04 . . characterised by modifying the teaching programme in response to a wrong answer, e.g. repeating the question, supplying a further explanation
7/06 . of the multiple-choice answer type, i.e. where a given question is provided with a series of answers and a choice has to be made from the answers
7/07 . . providing for individual presentation of questions to a plurality of student stations **[2]**
7/073 . . . all student stations being capable of presenting the same questions simultaneously **[2]**
7/077 . . . different stations being capable of presenting different questions simultaneously **[2]**
7/08 . . characterised by modifying the teaching programme in response to a wrong answer, e.g. repeating the question, supplying further information
7/10 . . wherein a set of answers is common to a plurality of questions
7/12 . . . characterised by modifying the teaching programme in response to a wrong answer, e.g. repeating the question, supplying further information

9/00 **Simulators for teaching or training purposes** (for the use of weapons F41; computing aspects G06)
9/02 . for teaching control of vehicles or other craft
9/04 . . for teaching control of land vehicles
9/042 . . . providing simulation in a real vehicle (G09B 9/052, G09B 9/058 take precedence) **[5]**
9/048 . . . a model being viewed and manoeuvred from a remote point (G09B 9/052, G09B 9/058 take precedence) **[5]**
9/05 . . . the view from a vehicle being simulated (G09B 9/052, G09B 9/058 take precedence) **[5]**
9/052 . . . characterised by provision for recording or measuring trainee's performance (devices for psychotechnics, e.g. for vehicle drivers, A61B 5/16, A61B 5/18) **[5]**
9/058 . . . for teaching control of cycles or motocycles **[5]**
9/06 . . for teaching control of ships, boats, or other waterborne vehicles **[2]**
9/08 . . for teaching control of aircraft, e.g. Link trainer
9/10 . . . with simulated flight- or engine-generated force being applied to aircraft occupant (G09B 9/28 takes precedence) **[5]**
9/12 . . . Motion systems for aircraft simulators **[5]**
9/14 . . . . controlled by fluid actuated piston or cylinder ram **[5]**
9/16 . . . Ambient or aircraft conditions simulated or indicated by instrument or alarm **[5]**
9/18 . . . . Condition of engine or fuel supply **[5]**
9/20 . . . . Simulation or indication of aircraft attitude **[5]**
9/22 . . . including aircraft sound simulation **[5]**
9/24 . . . including display or recording of simulated flight path **[5]**
9/26 . . . Simulation of radio-navigation **[5]**
9/28 . . . Simulation of stick forces or the like **[5]**
9/30 . . . Simulation of view from aircraft **[5]**
9/32 . . . . by projected image (G09B 9/36 takes precedence) **[5]**
9/34 . . . . by cathode-ray screen display (G09B 9/36 takes precedence) **[5]**
9/36 . . . . Simulation of night or reduced visibility flight **[5]**
9/38 . . . . . Simulation of runway outlining or approach lights **[5]**
9/40 . . . Simulation of airborne radar **[5]**
9/42 . . . Aircraft, aircraft simulator, or means connected thereto, travelling on the ground or water during simulated flight training **[5]**
9/44 . . . providing simulation in a real aircraft flying through the atmosphere without restriction of its path **[5]**
9/46 . . . the aircraft being a helicopter **[5]**

Note

When classifying in group G09B 9/46, classification is also made in other appropriate subgroups of group G09B 9/08, if of interest. **[5]**

9/48 . . . a model being viewed and manoeuvred from a remote point **[5]**
9/50 . . . Automatically directing the course of the aircraft **[5]**
9/52 . . for teaching control of an outer space vehicle **[5]**
9/54 . Simulation of radar (G09B 9/40 takes precedence) **[5]**
9/56 . Simulation of sonar **[5]**

11/00 **Teaching hand-writing, shorthand, drawing, or painting**
11/02 . Finger, hand, or arm supporting devices
11/04 . Guide sheets or plates; Tracing charts (templets for drawing purposes B43L 13/20)
11/06 . Devices involving the use of transparent or translucent tracing material, e.g. copy books
11/08 . Teaching shorthand
11/10 . Teaching painting

13/00 Teaching typing

13/02 . Dummy practice keyboard apparatus (for teaching music G09B 15/08)

13/04 . Devices used in association with a real typewriter, teleprinter, or the like

15/00 Teaching music (metronomes G04F 5/02)

15/02 . Boards or like means for providing an indication of notes

15/04 . . with sound-emitters

15/06 . Devices for exercising or strengthening fingers or arms; Devices for holding fingers or arms in a proper position for playing (for teaching typing G09B 13/00; exercising apparatus for developing or strengthening the muscles for physical training A63B 21/00, A63B 23/00)

15/08 . Practice keyboards (for teaching typing G09B 13/02)

17/00 Teaching reading (teaching lip-reading G09B 21/06)

17/02 . Line indicators or other guides or masks

17/04 . for increasing the rate of reading; Reading rate control

19/00 Teaching not covered by other main groups of this subclass (teaching or practice apparatus for gun-aiming or gun-laying F41G 3/26)

19/02 . Counting; Calculating (abacus G06C 1/00)

19/04 . Speaking (with audible presentation of the material to be studied G09B 5/04)

19/06 . Foreign languages (with audible presentation of the material to be studied G09B 5/04)

19/08 . . Printed or written appliances, e.g. textbooks, bilingual letter assemblies, charts

19/10 . Modelling

19/12 . Clock-reading

19/14 . Traffic procedures, e.g. traffic regulations

19/16 . Control of vehicles or other craft (simulators G09B 9/02)

19/18 . Book-keeping or economics

19/20 . Needlework

19/22 . Games, e.g. card games

19/24 . Use of tools

19/26 . Dot-and-dash telegraph codes **[2]**

21/00 Teaching, or communicating with, the blind, deaf or mute (audible presentation of material to be studied G09B 5/04; devices or methods for replacing direct visual or auditory perception by another kind of perception A61F 9/08, A61F 11/04; audible indication of meter readings or of colour G01D 7/12; watches for blind persons G04B 25/02; methods or arrangements for reading or recognising printed or written characters G06K 9/00; speech analysis, speech recognition G10L; sound-recording or reproducing, per se G11B) **[2,4]**

21/02 . Devices for Braille writing (typewriters for Braille B41J 3/32)

21/04 . Devices for conversing with the deaf-blind

21/06 . Devices for teaching lip-reading

23/00 Models for scientific, medical, or mathematical purposes, e.g. full-sized device for demonstration purposes (in the nature of toys A63H)

23/02 . for mathematics (for statics or dynamics G09B 23/08)

23/04 . . for geometry, trigonometry, projection, or perspective (for surveying G09B 25/06)

23/06 . for physics

23/08 . . for statics or dynamics

23/10 . . . of solid bodies

23/12 . . . of liquids or gases

23/14 . . for acoustics

23/16 . . for science of heat

23/18 . . for electricity or magnetism

23/20 . . for atomic physics or nucleonics

23/22 . . for optics

23/24 . for chemistry

23/26 . for molecular structures; for crystallography

23/28 . for medicine

23/30 . . Anatomical models (dental articulators A61C 11/00)

23/32 . . . with moving parts

23/34 . . . with removable parts

23/36 . for zoology

23/38 . for botany

23/40 . for geology

25/00 Models for purposes not provided for in group G09B 23/00, e.g. full-sized devices for demonstration purposes (model vehicles, tracks therefor, models in the nature of toys A63H)

25/02 . of industrial processes; of machinery

25/04 . of buildings

25/06 . for surveying; for geography, e.g. relief models (globes G09B 27/00; maps G09B 29/00)

25/08 . of scenic effects, e.g. trees, rocks, water surfaces (for stage purposes A63J 1/00)

27/00 Planetaria; **Globes**

27/02 . Tellurions; Orreries

27/04 . Star maps

27/06 . Celestial globes

27/08 . Globes (celestial globes G09B 27/06)

29/00 Maps; **Plans**; **Charts**; **Diagrams, e.g. route diagram** (star maps G09B 27/04; devices for holding or supporting maps A47B 97/02; for computing purposes G06G 1/14, G06G 1/16; display boards G09F)

29/02 . sectional

29/04 . . the sections being arranged in the form of a foldable sheet or sheets

29/06 . of belt form, e.g. endless belt

29/08 . Hanging maps or the like

29/10 . Map spot or co-ordinate position indicators; Map-reading aids (optical projection apparatus G03B)

29/12 . Relief maps (relief models G09B 25/06)

29/14 . Local-time charts

G09C CIPHERING OR DECIPHERING APPARATUS FOR CRYPTOGRAPHIC OR OTHER PURPOSES INVOLVING THE NEED FOR SECRECY (secret communication H04K; arrangements for transmitting secret digital information H04L 9/00)

1/00 Apparatus or methods whereby a given sequence of signs, e.g. an intelligible text, is transformed into an unintelligible sequence of signs by transposing the signs or groups of signs or by replacing them by others according to a predetermined system (cryptographic typewriters G09C 3/00)
1/02 . by using a ciphering code in chart form
1/04 . with sign carriers or indicators moved relative to one another to positions determined by a permutation code or key, so as to indicate the appropriate corresponding clear or ciphered text
1/06 . wherein elements corresponding to the signs making up the clear text are operatively connected with elements corresponding to the signs making up the ciphered text, the connections, during operation of the apparatus, being automatically and continuously permuted by a coding or key member
1/08 . . the connections being mechanical
1/10 . . the connections being electrical
1/12 . . . comprising contact-bearing permutation discs
1/14 . . involving removable or interchangeable coding numbers, e.g. master tapes, punched cards

3/00 Typewriters for ciphering or deciphering cryptographic text (marking record carriers G06K)
3/02 . with auxiliary keys or keyboards acting on the original keys or keyboards
3/04 . wherein the operative connections between the keys and the type-bars are automatically and continuously permuted, during operation, by a coding or key member
3/06 . . the connections being mechanical
3/08 . . the connections being electrical
3/10 . . involving removable or interchangeable coding members, e.g. master tapes, punched cards

5/00 Ciphering or deciphering apparatus or methods not provided for in other groups of this subclass, e.g. involving the concealment or deformation of graphic data such as designs, written or printed messages

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G09D RAILWAY OR LIKE TIME OR FARE TABLES; **PERPETUAL CALENDARS** (calendar blocks B42D 5/04; clockwork-driven G04B; comprising computing means G06C)

1/00 Railway or like time or fare tables; **Indicating or reading aids therefor** (essentially incorporating maps or route diagrams G09B; railway routing charts G09B; display devices, e.g. railway indicator boards, G09F)

3/00 Perpetual calendars
3/02 . with interchangeable members bearing the indicia
3/04 . wherein members bearing the indicia are movably mounted in the calendar
3/06 . . with rotatable members
3/08 . . . of disc form
3/10 . . with members in band form
3/12 . electrically operated

G09F DISPLAYING; **ADVERTISING**; **SIGNS**; **LABELS OR NAME-PLATES**; **SEALS** (display cases A47F; designs or pictures characterised by special or unusual light effects, e.g. changing, B44F 1/00; disposition of road signs or traffic signals E01F 9/00; lighting in general F21; arrangements for controlling light beams G02F 1/00; visible signalling arrangements or devices G08B 5/00; traffic control systems G08G; arrangements or circuits for control of indicating devices using static means to present variable information G09G; static indicating arrangements comprising integral associations of a plurality of light sources H01J, H01K, H01L, H05B 33/12)

(1) In this subclass, the following term is used with the meaning indicated:
– "sign" designates a mark or indication serving to make something recognisable, the information presented being non-varying, even if it is flashing; by way of example it covers, therefore, advertising hoardings, or luminous, or light reflecting, safety arrangements. **[3]**
(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

Subclass index

1/00 Cardboard or like show-cards of foldable or flexible material

1/02 . Single substantially-flat cards

1/04 . Folded cards

1/06 . . to be erected in three dimensions (G09F 1/08 takes precedence)

1/08 . wholly or partly imitating the form of an object, e.g. of the article to be advertised

1/10 . Supports or holders for show-cards

1/12 . . Frames therefor

1/14 . . in the form of legs

3/00 Labels, tag tickets, or similar identification or indication means (medals or badges A44C 3/00; making labels B31D 1/02; sheets temporarily attached together B42F; labelling B65C; tags attached to, or associated with, an object, in order to enable detection of the object G01V 15/00; labels on record carriers G11B 23/38); **Seals**; **Postage or like stamps**

3/02 . Forms or constructions (layered products B32B)

3/03 . . of security seals

3/04 . to be fastened or secured by the material of the label itself, e.g. by thermo-adhesion (by a separate adhesive layer G09F 3/10)

3/06 . . by clamping action (by separate clamps G09F 3/16)

3/08 . Fastening or securing by means not forming part of the material of the label itself

3/10 . . by an adhesive layer

3/12 . . by pins, staples, or the like

3/14 . . by strings, straps, chains, or wires

3/16 . . by clamps

3/18 . . Casings, frames, or enclosures for labels

3/20 . . . for adjustable, removable, or interchangeable labels

5/00 Means for displaying samples

5/02 . Portable sample cases

5/04 . Cards of samples; Books of samples (packages comprising articles attached to cards, sheets, or webs for removal therefrom B65D 73/00)

7/00 Signs, name or number plates, letters, numerals, or symbols (vehicle registration number plates B60R 13/10); **Panels or boards** (show-cards G09F 1/00; indicating arrangements for variable information G09F 9/00, G09F 11/00; illuminated signs G09F 13/00; boards for notices or posters G09F 15/00)

7/02 . Signs, plates, panels, or boards using readily-detachable elements bearing or forming symbols

7/04 . . the elements being secured or adapted to be secured by magnetic means

7/06 . . the elements being secured or adapted to be secured by means of pins and holes

7/08 . . the elements being secured or adapted to be secured by means of grooves, rails, or slits

7/10 . . . and slidably mounted

7/12 . . the elements being secured or adapted to be secured by self-adhesion, moisture, suction, slow-drying adhesive, or the like

7/14 . . Constructional features of the symbol-bearing or -forming elements

7/16 . Letters, numerals, or other symbols, adapted for permanent fixing to a support

7/18 . Means for attaching signs, plates, panels, or boards to a supporting structure

7/20 . . for adjustably mounting

7/22 . . for rotatably or swingably mounting, e.g. for boards adapted to be rotated by the wind

9/00 Indicating arrangements for variable information in which the information is built-up on a support by selection or combination of individual elements (in which the variable information is permanently attached to a movable support G09F 11/00; light guides G02B 6/00; abacus G06C 1/00; slide rules G06G 1/00)

9/30 . in which the desired character or characters are formed by combining individual elements (panels comprising a number of electrodes in a single cell controlling light arriving from an independent light source, e.g. electro-optical or magneto-optical cell, G02F 1/00)

9/302 . . characterised by the form or geometrical disposition of the individual elements **[7]**

9/305 . . being the ends of optical fibres (G09F 9/302 takes precedence) **[7]**

9/307 . . being incandescent filaments (G09F 9/302 takes precedence; incandescent panels comprising a number of separate incandescent bodies, per se H01K 9/00) **[3,7]**

9/313 . . being gas discharge devices (G09F 9/302 takes precedence; gas discharge panels comprising a number of discharge gaps, per se H01J 17/49) **[3,7]**

9/33 . . being semiconductor devices, e.g. diodes (G09F 9/302 takes precedence; semiconductor integrated circuits comprising components specially adapted for emission of light, per se H01L 27/15) **[3,7]**

9/35 . . being liquid crystals (G09F 9/302 takes precedence; liquid crystal materials C09K 19/00) **[3,7]**

9/37 . . being movable elements (G09F 9/302 takes precedence) **[3,7]**

9/40 . in which the desired character is selected from a number of characters arranged one beside the other, e.g. on a common carrier plate

9/46 . in which the desired character is selected from a number of characters arranged one behind the other

11/00 Indicating arrangements for variable information in which the complete information is permanently attached to a movable support which brings it to the display position (using static means to present variable information G09F 9/00; showcases or show-cabinets with arrangements for continuously or intermittently moving the merchandise A47F 3/08)

11/02 . the display elements being secured to rotating members, e.g. drums, spindles

11/04 . . the elements being secured to rotating discs

11/06 . . the elements being stiff plates or cards (on rotating discs G09F 11/04)

11/08 . . the elements being flexible sheets (on rotating discs G09F 11/04)
11/10 . . Electric control therefor
11/12 . the display elements being carried by endless belts, chains, or the like
11/14 . . the elements being in the form of stiff flaps, boards, cards, or the like
11/15 . . the elements being flexible sheets
11/16 . . Electric control therefor
11/18 . the display elements being carried by belts, chains, or the like, other than endless
11/20 . . the elements being in the form of stiff flaps, boards, cards, or the like
11/21 . . the elements being flexible sheets
11/22 . . Electric control therefor
11/23 . the advertising or display material forming part of rotating members, e.g. in the form of perforations, prints, or transparencies on a drum or disc
11/235 . . Electric control therefor
11/24 . the advertising or display material forming part of a moving band, e.g. in the form of perforations, prints, or transparencies
11/26 . . of an endless band
11/28 . . . Electric control therefor
11/29 . . of a band other than endless
11/295 . . . Electric control therefor
11/30 . the display elements being fed one by one from a storage place to a display position
11/32 . . the feeding means comprising belts or chains, e.g. endless belts or chains
11/34 . . the feeding means comprising electromagnets

13/00 Illuminated signs; **Luminous advertising** (G09F 9/00, G09F 11/00 take precedence; control of displays in general using static means to present variable information G09G)

13/02 . Signs, boards, or panels, illuminated by artificial light sources positioned in front of the insignia
13/04 . Signs, boards, or panels, illuminated from behind the insignia
13/06 . . using individual cut-out symbols or cut-out silhouettes, e.g. perforated signs
13/08 . . using both translucent and non-translucent layers (backlighting of liquid crystal display panels G02F 1/13357)
13/10 . . . using transparencies
13/12 . . using a transparent mirror or other light- reflecting surface transparent to transmitted light whereby a sign, symbol, picture, or other information is visible only when illuminated
13/14 . . Arrangements of reflectors therein
13/16 . Signs formed of, or incorporating, reflecting elements or surfaces, e.g. warning signs having triangular or other geometrical shape
13/18 . Edge-illuminated signs
13/20 . with luminescent surfaces or parts (luminescent materials C09K 11/00; light sources using luminescence F21K 2/00)
13/22 . . electroluminescent (electroluminescent light sources per se H05B 33/00)
13/24 . using tubes or the like filled with liquid, e.g. bubbling liquid
13/26 . Signs formed by electric discharge tubes (by selective lighting G09F 9/00)
13/28 . Signs formed by filament-type lamps (by selective lighting G09F 9/00)
13/30 . with moving light sources, e.g. rotating luminous tubes
13/32 . with moving optical part or parts, e.g. mirrors
13/34 . with light sources co-operating with movable members, e.g. with shutters to cover or uncover the light source (apparatus wherein advertising or display material is moved in a continuous or intermittent succession G09F 11/00)
13/36 . . co-operating with rotating screening means
13/42 . with light sources activated by non-visible radiation (cathode ray image or pattern display tubes H01J 31/10; lamps with luminescent screens excited by cathode rays H01J 63/06)
13/44 . with gas as lighting source
13/46 . Advertising by fireworks

15/00 Boards, hoardings, pillars, or like structures for notices, placards, posters, or the like

15/02 . Bills, posters, or the like therefor

17/00 Flags; **Banners**; **Mountings therefor** (devices specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34)

19/00 Advertising or display means not otherwise provided for

19/02 . incorporating moving display members
19/04 . . operated by the opening or closing of doors, e.g. shop door
19/06 . . Writing devices
19/08 . . Dolls, faces, or other representations of living forms with moving parts (in the nature of toys A63H)
19/10 . . Devices demonstrating the action of an article to be advertised
19/12 . using special optical effects (designs or pictures characterised by special light effects B44F 1/00, e.g. changing pictures B44F 1/10)
19/14 . . displaying different signs depending upon the view-point of the observer
19/16 . . involving the use of mirrors
19/18 . . involving the use of optical projection means, e.g. projection of images on clouds (projection apparatus per se G03B)
19/20 . . with colour-mixing effects
19/22 . Advertising or display means on roads, walls, or similar surfaces, e.g. illuminated (illuminated signs in general G09F 13/00)

21/00 Mobile visual advertising

21/02 . by a carrier person or animal
21/04 . by land vehicles
21/06 . by aeroplanes, airships, balloons, or kites
21/08 . . the advertising matter being arranged on the aircraft
21/10 . . . illuminated
21/12 . . the advertising matter being towed by the aircraft (kites per se B64C 31/06)
21/14 . . . illuminated
21/16 . . Sky-writing (aircraft adaptation for sky-writing B64D 1/20)
21/18 . by ships or other floating means
21/20 . . illuminated
21/22 . Dispensing devices for pamphlets or similar advertising matter from vehicles (from aircraft B64D 1/00)

23/00 **Advertising on or in specific articles, e.g. ashtrays, letter-boxes** (on or in vehicles G09F 21/00; containers, packaging-elements, or packages, with auxiliary means or provisions for displaying articles B65D)

23/02 . the advertising matter being displayed by the operation of the article

23/04 . . illuminated

23/06 . the advertising matter being combined with articles for restaurants, shops, or offices (on paper articles G09F 23/10)

23/08 . . with tableware

23/10 . on paper articles, e.g. booklets, newspapers

23/12 . . on toilet paper

23/14 . on toys, games, puzzles, or similar devices

23/16 . on clocks, e.g. controlled by the clock mechanism

25/00 **Audible advertising** (sound-recording or reproducing in general G11B; public address systems H04R 27/00)

27/00 **Combined visual and audible advertising or displaying, e.g. for public address**

G09G **ARRANGEMENTS OR CIRCUITS FOR CONTROL OF INDICATING DEVICES USING STATIC MEANS TO PRESENT VARIABLE INFORMATION** (lighting in general F21; arrangements for displaying electric variables or waveforms G01R 13/00; devices or arrangements for the control of light beams G02F 1/00; indicating of time by visual means G04B 19/00, G04C 17/00, G04G 9/00; arrangements for transferring data between computers and peripheral equipment G06F 3/00; visible signalling arrangements or devices G08B 5/00; traffic control systems G08G; display, advertising, signs G09F, e.g. static indicating arrangements comprising an association of a number of separate sources or light control cells G09F 9/00; static indicating arrangements comprising integral associations of a number of light sources H01J, H01K, H01L, H05B 33/12; circuits in pulse counters for indicating the result H03K 21/18; coding, decoding or code conversion, in general H03M; reproducing a picture or pattern using electric signals representing parts thereof and produced by scanning an original H04N) **[3,4,5]**

(1) This subclass covers indicator consoles, i.e. arrangements or circuits for processing control signals to achieve the display, e.g. for the calling up, reception, storage, regeneration, coding, decoding, addressing of control signals. **[3]**

(2) This subclass does not cover the structural details of the indicating devices, such as panels or tubes per se, or assemblies of individual light sources, which are covered by the relevant subclasses, e.g. H01J, H01K, H01L, G02F, G09F, H05B. **[3]**

(3) Contrary to subclass H04N, in which are classified display devices capable of representing continuous brightness value scales, this subclass is limited to devices using only a discrete number of brightness values, e.g. visible/non-visible. **[3]**

(4) The visual effect may be produced by a luminescent screen scanned by an electron beam, directly by controlled light sources, by projection of light, from controlled light sources onto characters, symbols, or elements thereof drawn on a support, or by electric, magnetic, or acoustic control of the parameters of light rays from an independent source. **[3]**

1/00 **Control arrangements or circuits, of interest only in connection with cathode-ray tube indicators** (cathode-ray oscilloscopes G01R 13/20; television H04N) **[3]**

1/02 . Storage circuits (G09G 1/06 to G09G 1/28 take precedence) **[3]**

1/04 . Deflection circuits **[3]**

1/06 . using single beam tubes (G09G 1/26, G09G 1/28 take precedence) **[3]**

1/07 . . with combined raster scan and calligraphic display **[5]**

1/08 . . the beam directly tracing characters, the information to be displayed controlling the deflection as a function of time in two spatial co-ordinates, e.g. according to a cartesian co-ordinate system **[3]**

1/10 . . . the deflection signals being produced by essentially digital means, e.g. incrementally **[3]**

1/12 . . . the deflection signals being produced by essentially analogue means **[3]**

1/14 . . the beam tracing a pattern independent of the information to be displayed, this latter determining the parts of the pattern rendered respectively visible and invisible **[3]**

1/16 . . . the pattern of rectangular co-ordinates extending over the whole area of the screen, i.e. television type raster **[3]**

1/18 . . . a small local pattern covering only a single character, and stepping to a position for the following character, e.g. in rectangular or polar co-ordinates, or in the form of a framed star **[3]**

1/20 . using multi-beam tubes (G09G 1/26, G09G 1/28 take precedence) **[3]**

1/22 . using tubes permitting selection of a complete character from a number of characters **[3]**

1/24 . using tubes permitting selection of individual elements forming in combination a character **[3]**

1/26 . using storage tubes **[3]**

1/28 . using colour tubes **[3]**

3/00 **Control arrangements or circuits, of interest only in connection with visual indicators other than cathode-ray tubes** (optical scanning systems in general G02B 26/10) **[3]**

3/02 . by tracing or scanning a light beam on a screen **[3]**

3/04 . for presentation of a single character by selection from a plurality of characters, or by composing the character by combination of individual elements, e.g. segments **[3]**

3/06 . . using controlled light sources **[3]**

3/08 . . . using incandescent filaments **[3]**

3/10 . . . using gas tubes **[3]**

3/12 . . . using electroluminescent elements (using cathode-ray tubes with phosphor screens G09G 1/00) **[3]**

3/14 . . . . Semiconductor devices, e.g. diodes **[3]**

3/16 . . by control of light from an independent source **[3]**

3/18 . . . using liquid crystals **[3]**

3/19 . . . using electrochromic devices **[5]**

3/20 . for presentation of an assembly of a number of characters, e.g. a page, by composing the assembly by combination of individual elements arranged in a matrix **[3]**
3/22 . . using controlled light sources **[3]**
3/24 . . . using incandescent filaments **[3]**
3/26 . . . . to give the appearance of moving signs **[3]**
3/28 . . . using luminous gas-discharge panels, e.g. plasma **[3]**
3/282 . . . . using direct current (DC) panels **[7]**
3/285 . . . . . using self-scanning **[7]**
3/288 . . . . using alternating current (AC) panels **[7]**
3/29 . . . . . using self-shift panels **[5]**
3/30 . . . using electroluminescent panels **[3]**
3/32 . . . . semiconductive, e.g. diodes **[3]**
3/34 . . by control of light from an independent source **[3]**
3/36 . . . using liquid crystals **[3]**
3/38 . . . using electrochromic devices **[5]**

5/00 Control arrangements or circuits for visual indicators common to cathode-ray tube indicators and other visual indicators (image data processing or generation, in general G06T) **[5]**
5/02 . characterised by the way in which colour is displayed **[5]**
5/04 . . using circuits for interfacing with colour displays **[5]**
5/06 . . using colour palettes, e.g. look-up tables **[5]**
5/08 . Cursor circuits **[5]**
5/10 . Intensity circuits **[5]**
5/12 . Synchronisation between the display unit and other units, e.g. other display units, video-disc players **[5]**
5/14 . Display of multiple viewports **[5]**
5/16 . Display of right-to-left language **[5]**
5/18 . Timing circuits for raster scan displays (specially adapted for television H04N) **[5]**
5/20 . Function-generator circuits, e.g. circle generators **[5]**
5/22 . characterised by the display of individual characters or indicia using display control signals derived from coded signals representing the characters or indicia with a character-code memory (G09G 5/42 takes precedence) **[5,7]**
5/24 . . Generation of individual character patterns **[5]**
5/26 . . . for modifying the character dimension, e.g. double width, double height **[5]**
5/28 . . . for enhancement of character form, e.g. smoothing **[5]**
5/30 . . Control of display attribute **[5]**
5/32 . . with means for controlling the display position **[5]**
5/34 . for rolling or scrolling **[5]**
5/36 . characterised by the display of individual graphic patterns using a bit-mapped memory (G09G 5/42 takes precedence) **[5,7]**
5/37 . . Details of the operation on graphic patterns (G09G 5/38 takes precedence) **[7]**
5/373 . . . for modifying the size of the graphic pattern **[7]**
5/377 . . . for mixing or overlaying two or more graphic patterns (G09G 5/02, G09G 5/397 take precedence) **[7]**
5/38 . . with means for controlling the display position **[5]**
5/39 . . Control of the bit-mapped memory **[7]**
5/391 . . . Resolution modifying circuits, e.g. variable screen formats **[7]**
5/393 . . . Arrangements for updating the contents of the bit-mapped memory **[7]**
5/395 . . . Arrangements specially adapted for transferring the contents of the bit-mapped memory to the screen (G09G 5/399 takes precedence) **[7]**
5/397 . . . . Arrangements specially adapted for transferring the contents of two or more bit-mapped memories to the screen simultaneously, e.g. for mixing or overlay (G09G 5/02 takes precedence) **[7]**
5/399 . . . using two or more bit-mapped memories, the operations of which are switched in time, e.g. ping-pong buffers **[7]**
5/40 . characterised by the way in which both a pattern determined by character code and another pattern are displayed simultaneously, or either pattern is displayed selectively, e.g. with character code memory and a bit-mapped memory **[5]**
5/42 . characterised by the display of patterns using a display memory without fixed position correspondence between the display memory contents and the display position on the screen **[7]**

G10 MUSICAL INSTRUMENTS; ACOUSTICS

(1) This class covers all sound-emitting devices, in general, whether or not they may be considered as being musical.
(2) In this class, the following expression is used with the meaning indicated:
– "musical instrument" does not exclude devices emitting a single sound signal.
(3) The following Class Index is given in place of subclass indexes, to show the grouping of the elaborations belonging to different subclasses, under the following three fundamental types:
– wind instruments;
– string instruments;
– percussion instruments,
which relate clearly to the majority of instruments.
(4) There are of course some instruments of which the principle of operation belongs less clearly to one of the three types mentioned in Note (3). They correspond to groups G10D 17/00 or G10K 7/00, G10K 9/00 or G10K 15/04, all the other groups normally finding a definite place.

Class index

ACOUSTICS; OPERATIONS ON SOUND WAVES
- Speech analysis or synthesis; speech recognition; audio analysis or processing G10L
- Methods or devices for transmission of sound or protection against sound, not otherwise provided for G10K 11/00, 13/00
- Acoustics not otherwise provided for G10K 15/00

WIND INSTRUMENTS
- General features; details or accessories G10D 7/00; 9/00
- Organs, harmoniums or similar instruments G10B 1/00, 3/00
- Accordions, concertinas or similar instruments; other types of instruments G10D 11/00; 7/00
- Whistles; horns G10K 5/00; 9/00

STRINGED INSTRUMENTS
- General features; details or accessories G10D 1/00; 3/00
- Pianos, harpsichords, spinets or similar stringed musical instruments with one or more keyboards; tools and methods for the manufacture or maintenance thereof G10C 1/00, 3/00; 9/00
- Other instruments G10D 1/00

PERCUSSION INSTRUMENTS
- Bells, rattles or similar instruments G10K 1/00, 3/00
- Other instruments G10D 13/00

OTHER PARTICULAR DEVICES; DEVICES USING UNDEFINED PRINCIPLES; COMBINATIONS OF INSTRUMENTS; MUSIC ACCESSORIES
- Electrophonic musical instruments G10H
- Automatic musical instruments G10F
- Sirens; devices with vibrators G10K 7/00; 9/00
- Combinations: of pianos with other instruments; of other instruments G10C 5/00; G10D 15/00
- Music accessories G10G

INSTRUMENTS NOT OTHERWISE PROVIDED FOR G10D 17/00

G10B ORGANS; HARMONIUMS OR LIKE WIND-ACTUATED MUSICAL INSTRUMENTS (mouth organs G10D 7/12; accordions G10D 11/00; aspects of automatic actuation G10F 1/12; combinations of microphones, pick-ups or amplifiers with musical instruments G10H; electronic organs G10H 7/00)

1/00 General design
1/02 . of organs
1/04 . . electrically operated
1/06 . . fluid operated
1/08 . of harmoniums

3/00 Details or accessories
3/02 . Blowers
3/04 . Reservoirs
3/06 . Valves; Sleeves
3/08 . Pipes, e.g. open pipes or reed pipes
3/10 . Actions, e.g. coupler
3/12 . Keys or keyboards; Manuals
3/14 . Pedals or pedal boards
3/16 . Swell chambers; Accentuating means
3/18 . Tremolo-producing devices
3/20 . Transposing devices
3/22 . Details specially adapted for electrically-operated organs, e.g. contacts therein

G10C PIANOS, HARPSICHORDS, SPINETS OR SIMILAR STRINGED MUSICAL INSTRUMENTS WITH ONE OR MORE KEYBOARDS (non-musical aspects of toy pianos A63H 5/00; aspects of automatic actuation G10F; combinations of microphones, pick-ups or amplifiers with musical instruments G10H)

1/00 General design
1/02 . of upright pianofortes
1/04 . of grand pianofortes
1/06 . of harpsichords, spinets or similar stringed instruments

3/00 Details or accessories
3/02 . Cases
3/04 . Frames; Bridges; Bars
3/06 . Resonating means, e.g. resonant strings, soundboards; Fastenings of the resonating means
3/08 . Arrangements of strings
3/10 . Tuning pins or straining devices
3/12 . Keyboards; Keys
3/14 . . for actuation by the feet
3/16 . Actions
3/18 . . Hammers
3/20 . . involving the use of hydraulic, pneumatic, or electromagnetic means
3/22 . . for grand pianofortes
3/24 . . for reciprocating of tremolo
3/26 . Pedals or pedal mechanisms for half-blow or similar sound-modifying
3/28 . Transposing devices
3/30 . Couplers, e.g. for playing octaves

5/00 Combinations with other musical instruments, e.g. with bells or xylophones

9/00 Methods or tools specially adapted for the manufacture or maintenance of musical instruments covered by this subclass

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G10D STRINGED MUSICAL INSTRUMENTS; **WIND-ACTUATED MUSICAL INSTRUMENTS**; **ACCORDIONS OR CONCERTINAS**; **PERCUSSION MUSICAL INSTRUMENTS**; **MUSICAL INSTRUMENTS NOT OTHERWISE PROVIDED FOR** (automatic musical instruments G10F; combinations of musical instruments with microphones, pick-ups or amplifiers G10H; sound-producing devices not regarded as musical instruments G10K)

(1) This subclass covers certain stringed musical instruments that can optionally include a keyboard, e.g. zithers. **[2010.01]**
(2) This subclass does not cover pianos, harpsichords, spinets or similar stringed instruments provided by design with one or more keyboards, which are covered by subclass G10C. **[2010.01]**

1/00 General design of stringed musical instruments, e.g. violins, harps, mandolins, guitars, banjos or zithers
1/02 . of violins, violas, violoncellos, basses
1/04 . of harps, lyres
1/06 . of mandolins
1/08 . of guitars
1/10 . of banjos
1/12 . of zithers, e.g. autoharp

3/00 Details of, or accessories for, stringed musical instruments, e.g. slide-bars
3/02 . Resonating means, horns, or diaphragms
3/04 . Bridges, mutes, or capo-tastos
3/06 . Fingerboards
3/08 . . in the form of keyboards
3/10 . Strings
3/12 . Anchoring devices for strings, e.g. tail pieces or hitchpins
3/14 . Tuning devices, e.g. pegs, pins or friction discs
3/16 . Bows; Guides for bows; Plectra or like playing means
3/18 . Chin-rests, hand-rests or guards as part of the instrument

7/00 General design of wind-actuated musical instruments, e.g. flutes, ocarinas, oboes, clarinets, bagpipes, saxophones, trumpets or mouth-organs (accordions or concertinas G10D 11/00; organs or harmoniums G10B; whistles G10K)
7/02 . of the type wherein an air current is directed against a ramp edge, e.g. flutes or recorders
7/04 . . Ocarinas
7/06 . of the type with a beating reed [Rohrblatt] or reeds, e.g. oboes, clarinets, bassoons or bagpipes
7/08 . . Saxophones
7/10 . of the type with a cupped mouthpiece, e.g. cornets, orchestral trumpets or trombones
7/12 . of the type with free reeds [Zunge], e.g. mouth-organs or trumpets for children

9/00 Details of, or accessories for, wind-actuated musical instruments
9/02 . Mouthpieces; Reeds
9/04 . Valves; Valve controls
9/06 . Mutes

11/00 Accordions, concertinas or the like; **Keyboards therefor**
11/02 . Actions

13/00 Percussion musical instruments, e.g. drums, tambourines, timpani, castanets, cymbals, triangles, gongs or plates; **Details or accessories**
13/02 . Drums; Tambourines
13/04 . Timpani

13/06 . Castanets, cymbals, triangles or other single-toned percussion musical instruments (bells G10K 1/00)

13/08 . Multi-toned musical instruments, with sonorous bars, blocks, forks, gongs, plates, rods, or teeth

15/00 Combinations of different musical instruments (combinations with pianos, harpsichords, spinets or similar stringed instruments with one or more keyboards G10C 5/00)

17/00 Musical instruments not provided for in any other group of this subclass, e.g. Aeolian harp, singing-flame musical instrument

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G10F AUTOMATIC MUSICAL INSTRUMENTS (non-musical aspects of toy instruments A63H 5/00; sound-recording or reproducing G11B; working in association with recording or reproducing apparatus G11B 31/02)

Note

This subclass does not cover aspects of musical instruments which are independent of the automatic actuation, which are covered by subclass G10B, G10C or G10D.

1/00 Automatic musical instruments

1/02 . Pianofortes with keyboard

1/04 . Pianofortes which have no keyboard

1/06 . Musical boxes with plucked teeth, blades, or the like (combinations with other articles, see the relevant classes for the articles)

1/08 . Percussion musical instruments

1/10 . . Carillons

1/12 . Wind-actuated instruments

1/14 . . Barrel-organs

1/16 . Stringed musical instruments other than pianofortes

1/18 . . to be played by a bow

1/20 . . to be plucked

1/22 . Combinations of two or more instruments

3/00 Independent players for keyboard instruments

5/00 Details or accessories

5/02 . Actions

5/04 . Tune barrels, sheets, rollers, spools, or the like

5/06 . . Driving or setting of tune barrels, discs, or the like; Winding, rewinding, or guiding of tune sheets or the like

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G10G AIDS FOR MUSIC (teaching music G09B 15/00); **SUPPORTS FOR MUSICAL INSTRUMENTS**; **OTHER AUXILIARY DEVICES OR ACCESSORIES FOR MUSIC OR MUSICAL INSTRUMENTS** (metronomes G04F 5/02)

1/00 Means for the representation of music

1/02 . Chord or note indicators, fixed or adjustable, for keyboards or fingerboards

1/04 . Transposing; Transcribing

3/00 Recording music in notation form, e.g. recording the mechanical operation of a musical instrument

3/02 . using mechanical means only

3/04 . using electrical means

5/00 Supports for musical instruments

7/00 Other auxiliary devices or accessories, e.g. conductors' batons or separate holders for resin or strings

7/02 . Tuning forks or like devices

G10H ELECTROPHONIC MUSICAL INSTRUMENTS; **INSTRUMENTS IN WHICH THE TONES ARE GENERATED BY ELECTROMECHANICAL MEANS OR ELECTRONIC GENERATORS, OR IN WHICH THE TONES ARE SYNTHESISED FROM A DATA STORE**

Note

This subclass covers musical instruments in which individual notes are constituted as electric oscillations under the control of a performer and the oscillations are converted to sound-vibrations by a loudspeaker or equivalent device.

1/00 Details of electrophonic musical instruments (keyboards applicable also to other musical instruments G10B, G10C; arrangements for producing a reverberation or echo sound G10K 15/08) **[5]**

1/02 . Means for controlling the tone frequencies, e.g. attack or decay; Means for producing special musical effects, e.g. vibratos or glissandos

1/04 . . by additional modulation

1/043 . . . Continuous modulation **[3]**

1/045 . . . . by electromechanical means **[3]**

1/047 . . . . by acousto-mechanical means, e.g. rotating speakers or sound deflectors **[3]**

1/053 . . during execution only **[3]**

1/055 . . . . by switches with variable impedance elements **[3]**
1/057 . . . . by envelope-forming circuits **[3]**
1/06 . . Circuits for establishing the harmonic content of tones
1/08 . . . by combining tones (G10H 1/14, G10H 1/16 take precedence; chord G10H 1/38; speech analysis or synthesis, G10L) **[3]**
1/10 . . . . for obtaining chorus, celeste or ensemble effects (continuous modulation G10H 1/043) **[3]**
1/12 . . . by filtering complex waveforms (G10H 1/14, G10H 1/16 take precedence) **[3]**
1/14 . . . during execution (modulation during execution G10H 1/053) **[3]**
1/16 . . . by non-linear elements (G10H 1/14 takes precedence; generation of non-sinusoidal basic tones G10H 5/10) **[3]**
1/18 . Selecting circuits **[3]**
1/20 . . for transposition **[3]**
1/22 . . for suppressing tones; Preference networks **[3]**
1/24 . . for selecting plural preset register stops **[3]**
1/26 . . for automatically producing a series of tones **[3]**
1/28 . . . to produce arpeggios **[3]**
1/30 . . . to reiteratively sound two tones **[3]**
1/32 . Constructional details **[3]**
1/34 . . Switch arrangements, e.g. keyboards or mechanical switches peculiar to electrophonic musical instruments (keyboards applicable also to other musical instruments G10B, G10C) **[3]**
1/36 . Accompaniment arrangements **[3]**
1/38 . . Chord **[3]**
1/40 . . Rhythm (metronomes G04F 5/02) **[3]**
1/42 . . . comprising tone forming circuits **[3]**
1/44 . Tuning means **[3]**
1/46 . Volume control **[3]**

3/00 Instruments in which the tones are generated by electromechanical means

3/02 . using mechanical interrupters
3/03 . using pick-up means for reading recorded waves, e.g. on rotating discs **[3]**
3/06 . . using photoelectric pick-up means
3/08 . . using inductive pick-up means
3/09 . . . using tapes or wires **[3]**
3/10 . . using capacitive pick-up means
3/12 . using mechanical resonant generators, e.g. strings or percussion instruments, the tones of which are picked up by electromechanical transducers, the electrical signals being further manipulated or amplified and subsequently converted to sound by a loudspeaker or equivalent device **[3]**
3/14 . . using mechanically actuated vibrators with pick-up means (G10H 3/24 takes precedence) **[3]**
3/16 . . . using a reed **[3]**
3/18 . . . using strings, e.g. electric guitars **[3]**
3/20 . . . using a tuning fork, rod or tube **[3]**
3/22 . . using electromechanically actuated vibrators with pick-up means (G10H 3/24 takes precedence) **[3]**
3/24 . . incorporating feedback means, e.g. acoustic **[3]**
3/26 . . . using electric feedback **[3]**

5/00 Instruments in which the tones are generated by means of electronic generators (G10H 7/00 takes precedence) **[3]**

5/02 . using generation of basic tones
5/04 . . with semiconductor devices as active elements (G10H 5/10, G10H 5/12 take precedence)
5/06 . . tones generated by frequency multiplication or division of a basic tone
5/07 . . . resulting in complex waveforms **[3]**
5/08 . . tones generated by heterodyning
5/10 . using generation of non-sinusoidal basic tones, e.g. sawtooth
5/12 . . using semiconductor devices as active elements
5/14 . using electromechanical resonators, e.g. quartz crystals, as frequency-determining elements **[3]**
5/16 . using cathode ray tubes **[3]**

7/00 Instruments in which the tones are synthesised from a data store, e.g. computer organs (synthesis of acoustic waves not specific to musical instruments G10K 15/02, G10L) **[3,5]**

7/02 . in which amplitudes at successive sample points of a tone waveform are stored in one or more memories **[5]**
7/04 . . in which amplitudes are read at varying rates, e.g. according to pitch **[5]**
7/06 . . in which amplitudes are read at a fixed rate, the read-out address varying stepwise by a given value, e.g. according to pitch **[5]**
7/08 . by calculating functions or polynomial approximations to evaluate amplitudes at successive sample points of a tone waveform **[5]**
7/10 . . using coefficients or parameters stored in a memory, e.g. Fourier coefficients (G10H 7/12 takes precedence) **[5]**
7/12 . . by means of a recursive algorithm using one or more sets of parameters stored in a memory and the calculated amplitudes of one or more preceding sample points **[5]**

G10K SOUND-PRODUCING DEVICES (sound-producing toys A63H 5/00); **METHODS OR DEVICES FOR PROTECTING AGAINST, OR FOR DAMPING, NOISE OR OTHER ACOUSTIC WAVES IN GENERAL**; **ACOUSTICS NOT OTHERWISE PROVIDED FOR [6]**

(1) This subclass covers arrangements for generating mechanical vibrations in fluids. **[6]**
(2) This subclass covers also the production of sounds which may not be audible to human beings but which are audible to animals.

(3) In this subclass, the following terms are used with the meanings indicated: **[6]**
– "acoustics" and "sound" cover the technical field dealing with mechanical vibrations at all infrasonic-, sonic- and ultrasonic frequencies. However, generation or transmission of mechanical waves, in general, is covered by subclass B06B, subject to the exception specified in Note (1) above. **[6]**

1/00 **Devices in which sound is produced by striking a resonating body, e.g. bells, chimes or gongs** (combinations with clocks or watches G04B, G04C; multi-toned musical instruments G10D 13/08; automatic carillons G10F 1/10)
1/06 . the resonating device having the shape of a bell, plate, rod, or tube (bells for towers G10K 1/28)
1/062 . . electrically operated
1/063 . . . the sounding member being a bell
1/064 . . . . Operating or striking mechanisms therefor
1/065 . . . . . for timed or repeated operation
1/066 . . . the sounding member being a tube, plate, or rod
1/067 . . . . Operating or striking mechanisms therefor
1/068 . . hydraulically operated; pneumatically operated
1/07 . . mechanically operated; Hand bells; Bells for animals
1/071 . . . Hand bells; Bells for animals
1/072 . . . Operating or striking mechanisms therefor
1/074 . . . . with rotary clappers or shells
1/076 . . . . for timed or repeated operation
1/08 . . Details or accessories of general applicability
1/10 . . . Sounding members; Mounting thereof; Clappers or other strikers
1/26 . . . Mountings; Casings
1/28 . Bells for towers or the like
1/30 . . Details or accessories
1/32 . . . Sounding members; Clappers or other strikers
1/34 . . . Operating mechanisms
1/36 . . . Means for silencing or damping (means or arrangements for avoiding or reducing out-of-balance forces due to motion F16F 15/00)
1/38 . . . Supports; Mountings

3/00 **Rattles or like noise-producing devices**

5/00 **Whistles**
5/02 . Ultrasonic whistles **[3]**

7/00 **Sirens**
7/02 . in which the sound-producing member is rotated manually or by a motor (G10K 7/06 takes precedence)
7/04 . . by an electric motor
7/06 . in which the sound-producing member is driven by a fluid, e.g. by a compressed gas

9/00 **Devices in which sound is produced by vibrating a diaphragm or analogous element, e.g. fog horns, vehicle hooters or buzzers** (loudspeakers or like acoustic electromechanical transducers H04R)
9/02 . driven by gas, e.g. suction operated
9/04 . . by compressed gases, e.g. compressed air
9/06 . . produced by detonation
9/08 . driven by water or other liquids
9/10 . driven by mechanical means only
9/12 . electrically operated

Note

This group does not cover the construction of, or circuits for, broadband-transducers such as loudspeakers or microphones, which are covered by subclass H04R. **[6]**

9/122 . . using piezo-electric driving means **[6]**
9/125 . . . with a plurality of active elements **[6]**
9/128 . . using magnetostrictive driving means **[6]**
9/13 . . using electromagnetic driving means **[3]**
9/15 . . . Self-interrupting arrangements **[3]**
9/16 . . with means for generating the current by muscle power
9/18 . Details, e.g. bulbs, pumps, pistons, switches or casings
9/20 . . Sounding members
9/22 . . Mountings; Casings

11/00 **Methods or devices for transmitting, conducting or directing sound in general**; **Methods or devices for protecting against, or for damping, noise or other acoustic waves in general**
11/02 . Mechanical acoustic impedances; Impedance matching, e.g. by horns; Acoustic resonators **[3]**
11/04 . . Acoustic filters **[3]**
11/08 . Non-electric sound-amplifying devices, e.g. non-electric megaphones (amplifying by horns G10K 11/02; amplifying by focusing G10K 11/26)
11/16 . Methods or devices for protecting against, or for damping, noise or other acoustic waves in general (G10K 11/36 takes precedence) **[3]**
11/162 . . Selection of materials **[6]**
11/165 . . . Particles in a matrix **[6]**
11/168 . . . Plural layers of different materials, e.g. sandwiches **[6]**

Note

When classifying in this group, classification is also made in subclass B32B, insofar as any layered product is concerned. **[6]**

11/172 . . using resonance effects **[6]**
11/175 . . using interference effects; Masking sound **[6]**
11/178 . . . by electro-acoustically regenerating the original acoustic waves in anti-phase **[6]**
11/18 . Methods or devices for transmitting, conducting or directing sound (G10K 11/02, G10K 11/36 take precedence; medical stethoscopes A61B 7/02) **[3]**
11/20 . . Reflecting arrangements (G10K 11/28 takes precedence) **[3]**
11/22 . . for conducting sound through hollow pipes, e.g. speaking tubes **[3]**
11/24 . . for conducting sound through solid bodies, e.g. wires **[3]**
11/26 . . Sound-focusing or directing, e.g. scanning **[3]**
11/28 . . . using reflection, e.g. parabolic reflectors **[3]**
11/30 . . . using refraction, e.g. acoustic lenses **[3]**
11/32 . . . characterised by shape of the source **[3]**
11/34 . . . using electrical steering of transducer arrays, e.g. beam steering **[3]**

11/35 . . . using mechanical steering of transducers **[6]**
11/36 . Devices for manipulating acoustic surface waves (electro-acoustic amplifiers H03F 13/00; networks comprising electro-acoustic elements H03H 9/00) **[3]**

13/00 Cones, diaphragms, or the like, for emitting or receiving sound in general (for electromechanical transducers H04R 7/00)

15/00 Acoustics not otherwise provided for [4]
15/02 . Synthesis of acoustic waves (synthesis of speech G10L 13/00) **[4]**
15/04 . Sound-producing devices (G10K 15/02 takes precedence) **[4]**
15/06 . . using electric discharge **[4]**
15/08 . Arrangements for producing a reverberation or echo sound **[5]**
15/10 . . using time-delay networks comprising electromechanical or electro-acoustic devices **[5]**
15/12 . . using electronic time-delay networks **[5]**

G10L SPEECH ANALYSIS OR SYNTHESIS; **SPEECH RECOGNITION**; **AUDIO ANALYSIS OR PROCESSING [4]**

Note

This subclass does not cover :
– devices for the storage of speech or audio signals, which are covered by subclasses G11B and G11C; **[2010.01]**
– encoding of compressed speech signals for transmission or storage, which is covered by group H03M 7/30. **[2010.01]**

11/00 Determination or detection of speech or audio characteristics not restricted to a single one of groups G10L 15/00 to G10L 21/00 [7]
11/02 . Detection of presence or absence of speech signals **[7]**
11/04 . Pitch determination of speech signals **[7]**
11/06 . Discriminating between voiced and unvoiced parts of speech signals (G10L 11/04 takes precedence) **[7]**

13/00 Speech synthesis; **Text to speech systems [7]**
13/02 . Methods for producing synthetic speech; Speech synthesisers **[7]**
13/04 . . Details of speech synthesis systems, e.g. synthesiser structure or memory management **[7]**
13/06 . Elementary speech units used in speech synthesisers; Concatenation rules **[7]**
13/08 . Text analysis or generation of parameters for speech synthesis out of text, e.g. grapheme to phoneme translation, prosody generation or stress or intonation determination **[7]**

15/00 Speech recognition (G10L 17/00 takes precedence) **[7]**
15/02 . Feature extraction for speech recognition; Selection of recognition unit **[7]**
15/04 . Segmentation or word limit detection **[7]**
15/06 . Creation of reference templates; Training of speech recognition systems, e.g. adaptation to the characteristics of the speaker's voice (G10L 15/14 takes precedence) **[7]**
15/08 . Speech classification or search **[7]**
15/10 . . using distance or distortion measures between unknown speech and reference templates **[7]**
15/12 . . using dynamic programming techniques, e.g. Dynamic Time Warping [DTW] **[7]**
15/14 . . using statistical models, e.g. Hidden Markov Models [HMM] (G10L 15/18 takes precedence) **[7]**
15/16 . . using artificial neural networks **[7]**
15/18 . . using natural language modelling **[7]**
15/20 . Speech recognition techniques specially adapted for robustness in adverse environments, e.g. in noise or of stress induced speech (G10L 21/02 takes precedence) **[7]**
15/22 . Procedures used during a speech recognition process, e.g. man-machine dialog **[7]**
15/24 . Speech recognition using non-acoustical features, e.g. position of the lips **[7]**
15/26 . Speech to text systems (G10L 15/08 takes precedence) **[7]**
15/28 . Constructional details of speech recognition systems **[7]**

17/00 Speaker identification or verification [7]

19/00 Speech or audio signal analysis-synthesis techniques for redundancy reduction, e.g. in vocoders; **Coding or decoding of speech or audio signals, e.g. for compression or expansion, source-filter models or psychoacoustic analysis [7]**
19/02 . using spectral analysis, e.g. transform vocoders or subband vocoders **[7]**
19/04 . using predictive techniques **[7]**
19/06 . . Determination or coding of the spectral characteristics, e.g. of the short term prediction coefficients **[7]**
19/08 . . Determination or coding of the excitation function; Determination or coding of the long-term prediction parameters **[7]**
19/10 . . . Determination or coding of a multipulse excitation **[7]**
19/12 . . . Determination or coding of a code excitation, e.g. in code excited linear prediction [CELP] vocoders **[7]**
19/14 . . Details not provided for in groups G10L 19/06 to G10L 19/12, e.g. gain coding, post filtering design or vocoder structure **[7]**

21/00 Processing of the speech signal to produce another audible or non-audible signal, e.g. visual or tactile, in order to modify its quality or its intelligibility (G10L 19/00 takes precedence) **[7]**
21/02 . Speech enhancement, e.g. noise reduction or echo cancellation (reducing echo effects in line transmission systems H04B 3/20; echo suppression in hand-free telephones H04M 9/08) **[7]**

21/04 . Time compression or expansion **[7]**

21/06 . Transformation of speech into a non-audible representation, e.g. speech visualisation or speech processing for tactile aids (G10L 15/26 takes precedence) **[7]**

23/00 Speech analysis not provided for in other groups of this subclass [2009.01]

G11 INFORMATION STORAGE

G11B INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D 9/00; recording or playback apparatus using mechanically marked tape, e.g. punched paper tape, or using unit records, e.g. punched or magnetically marked cards G06K; transferring data from one type of record carrier to another G06K 1/18; circuits for coupling output of reproducer to radio receiver H04B 1/20; gramophone pick-ups or like acoustic electromechanical transducers or circuits therefor H04R)

(1) This subclass covers:
- recording or playback of information by relative movement between a record track and a transducer, the transducer directly producing, or being directly actuated by, modulation in the track being recorded or played-back, and the extent of modulation corresponding to the signal being recorded or played-back;
- apparatus and machines for recording or playback, and parts thereof, such as heads;
- record carriers for use with such apparatus and machines;
- associated working of other apparatus with such apparatus and machines.

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
- "record carrier" means a body, such as a cylinder, disc, card, tape, or wire, capable of permanently holding information, which can be read-off by a sensing element movable relatively to the record carrier; **[7]**
- "head" includes any means for converting sinusoidal or non-sinusoidal electric wave-forms into variations of the physical condition of at least the adjacent surface of the record carrier, or vice versa;
- "near-field interaction" means a very short distance interaction using scanning-probe techniques, e.g. quasi- contact or evanescent contact between head and record carrier. **[7]**

(3) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

Subclass index

3/00 **Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits**; **Reproducing by mechanical sensing**; **Record carriers therefor** (G11B 11/00 takes precedence)

3/02 . Arrangements of heads

3/04 . . Multiple, convertible, or alternative transducing arrangements

3/06 . . Determining or indicating position of head

3/08 . . Raising, lowering, traversing otherwise than for transducing, arresting, or holding-up heads against record carriers

3/085 . . . using automatic means (G11B 3/095 takes precedence) **[4]**

3/09 . . . using manual means only (G11B 3/095 takes precedence) **[4]**

3/095 . . . for repeating a part of the record; for beginning or stopping at a desired point of the record **[4]**

3/10 . . Arranging, supporting, or driving of heads or of transducers relatively to record carriers

3/12 . . . Supporting in balanced, counterbalanced, or loaded operative position, e.g. loading in direction of traverse

3/14 . . . . by using effects of gravity or inertia, e.g. counterweight (G11B 3/28 takes precedence) **[4]**

3/16 . . . . . adjustable

3/18 . . . . . Damping by using viscosity effect

3/20 . . . . by elastic means, e.g. spring (G11B 3/28 takes precedence) **[4]**

3/22 . . . . . adjustable

3/24 . . . . . acting to decrease pressure on record

3/26 . . . . . acting to increase pressure on record

3/28 . . . . providing transverse bias parallel to record

3/30 . . . Supporting in inoperative position
3/31 . . . . Construction of arms **[4]**
3/32 . . . . Construction or arrangement of support pillars
3/34 . . . Driving or guiding during transducing operation
3/36 . . . . Automatic-feed mechanisms producing progressive transducing traverse across record carriers otherwise than by grooves, e.g. by lead-screw
3/38 . . . . Guiding, e.g. constructions or arrangements providing linear or other special tracking characteristics
3/40 . . . . Driving of heads relatively to stationary record carriers for transducing
3/42 . . . with provision for adaptation or interchange of heads
3/44 . Styli, e.g. sapphire, diamond
3/46 . . Constructions or forms, e.g. attachment of point to shank
3/48 . . . Needles
3/50 . . Anvils or other supports opposing stylus forces
3/52 . . Arrangements permitting styli to yield under excessive pressure
3/54 . . Storing; Manipulating, e.g. feeding styli to and from heads
3/56 . . Sharpening (by grinding B24B 19/16)
3/58 . Cleaning record carriers or styli, e.g. removing shavings or dust
3/60 . Turntables for record carriers
3/61 . . Damping of vibrations of record carriers on turntables **[4]**
3/64 . Re-recording, i.e. transcribing information from one grooved record carrier on to one or more similar or dissimilar record carriers
3/66 . Erasing information, e.g. for reuse of record carrier
3/68 . Record carriers
3/70 . . characterised by the selection of material or structure; Processes or apparatus specially adapted for manufacturing record carriers **[4]**
3/72 . . Groove formations, e.g. run-in groove, run-out groove
3/74 . . . Multiple output tracks, e.g. binaural stereophonic
3/76 . . . forming part of cinematograph films
3/78 . . Multiple-track arrangements
3/80 . . incorporating subsidiary guide means for heads, other than modulated grooves; Part-formed unmodulated grooves for conversion into transducing grooves
3/90 . . with means indicating prior or unauthorised use

5/00 Recording by magnetisation or demagnetisation of a record carrier; **Reproducing by magnetic means**; **Record carriers therefor** (G11B 11/00 takes precedence) **[4]**

Note

Groups G11B 5/02 to G11B 5/86 take precedence over groups G11B 5/004 to G11B 5/012. **[2]**

5/004 . Recording on, or reproducing or erasing from, magnetic drums (G11B 19/00 takes precedence) **[2]**
5/008 . Recording on, or reproducing or erasing from, magnetic tapes or wires (G11B 15/00 takes precedence) **[2]**
5/012 . Recording on, or reproducing or erasing from, magnetic discs (G11B 17/00, G11B 19/00 take precedence) **[2]**
5/016 . . using magnetic foils **[2]**
5/02 . Recording, reproducing or erasing methods; Read, write or erase circuits therefor **[2]**
5/024 . . Erasing **[4]**
5/027 . . Analogue recording **[2]**
5/03 . . . Biasing **[4]**
5/035 . . . Equalising **[4]**
5/09 . . Digital recording **[2]**
5/10 . Structure or manufacture of housings or shields for heads **[4]**
5/105 . . Mounting of head within housing **[2]**
5/11 . . Shielding of head against electric or magnetic fields **[2]**
5/115 . . . Shielding device arranged between heads or windings (G11B 5/29 takes precedence) **[2]**
5/127 . Structure or manufacture of heads, e.g. inductive **[4]**
5/133 . . with cores composed of particles, e.g. with dust cores, with ferrite cores **[4]**
5/147 . . with cores being composed of metal sheets, i.e. laminated cores **[4]**
5/153 . . . with tape-wound cores **[4]**
5/17 . . Construction or disposition of windings **[4]**
5/187 . . Structure or manufacture of the surface of the head in physical contact with, or immediately adjacent to, the recording medium; Pole pieces; Gap features (G11B 5/265, G11B 5/31 take precedence) **[4]**
5/193 . . . the pole pieces being ferrite **[4]**
5/21 . . . the pole pieces being of ferrous sheet metal **[4]**
5/23 . . . Gap features **[4]**
5/235 . . . . Selection of material for gap filler **[4]**
5/245 . . . comprising means for controlling the reluctance of the magnetic circuit (G11B 5/255 takes precedence) **[4]**
5/255 . . . comprising means for protection against wear **[4]**
5/265 . . Structure or manufacture of a head with more than one gap for erasing, recording or reproducing on the same track (G11B 5/33 takes precedence) **[4]**
5/29 . . Structure or manufacture of unitary devices formed of plural heads for more than one track **[4]**
5/31 . . using thin film (G11B 5/33 takes precedence) **[4]**
5/325 . . Erasing heads using permanent magnets (general details therefor G11B 5/133 to G11B 5/255) **[4]**
5/33 . . Structure or manufacture of flux-sensitive heads (general details therefor G11B 5/133 to G11B 5/255) **[4]**
5/335 . . . with saturated jig, e.g. for detecting second harmonic, balanced-flux head **[4]**
5/35 . . . having vibrating elements **[4]**
5/37 . . . using galvano-magnetic devices, e.g. Hall-effect devices (G11B 5/39 takes precedence) **[4]**
5/39 . . . using magneto-resistive devices **[4]**
5/40 . Protective measures on heads, e.g. against excessive temperature (G11B 5/31 takes precedence; protection against wear G11B 5/255) **[4]**
5/41 . Cleaning of heads **[2]**
5/455 . Arrangements for functional testing of heads; Measuring arrangements for heads **[4]**
5/465 . Arrangements for demagnetisation of heads **[4]**
5/48 . Disposition or mounting of heads relative to record carriers

5/49 . . Fixed mountings **[2]**
5/50 . . Interchangeable mountings, e.g. for replacement of head without readjustment
5/52 . . with simultaneous movement of head and record carrier, e.g. rotation of head (G11B 5/588 takes precedence) **[4]**
5/53 . . . Disposition or mounting of heads on rotating support **[4]**
5/54 . . with provision for moving the head into, or out of, its operative position or across tracks **[2]**
5/55 . . . Track change, selection, or acquisition by displacement of the head **[2]**
5/56 . . with provision for moving the head for the purpose of adjusting the position of the head relative to the record carrier, e.g. manual adjustment for azimuth correction or track centering (G11B 5/54, G11B 5/58 take precedence) **[2]**
5/58 . . with provision for moving the head for the purpose of maintaining alignment of the head relative to the record carrier during transducing operation, e.g. to compensate for surface irregularities of the latter or for track following **[2]**
5/584 . . . for track following on tapes **[4]**
5/588 . . . . by controlling the position of the rotating heads (by controlling the speed of the record carrier G11B 15/467; by controlling the speed of the rotating heads G11B 15/473) **[4]**
5/592 . . . . . using bimorph elements supporting the heads **[4]**
5/596 . . . for track following on discs **[4]**
5/60 . . . Fluid-dynamic spacing of heads from record carriers
5/62 . Record carriers characterised by the selection of the material

Note

This group does not cover compositions, materials or processes, per se, which are covered by the relevant subclasses of section B or C. **[4]**

5/627 . . of leaders for magnetic tapes, e.g. non-magnetic strips on the tapes or for connection **[4]**
5/633 . . of cinematographic films or slides with integral magnetic track **[4]**
5/64 . . comprising only the magnetic material without bonding agent
5/65 . . . characterised by its composition (G11B 5/66 takes precedence) **[7]**
5/66 . . . the record carriers consisting of several layers
5/667 . . . . including a soft magnetic layer **[7]**
5/673 . . . . comprising the repeated occurrence of two or more layers **[7]**
5/68 . . comprising one or more layers of magnetisable particles homogeneously mixed with a bonding agent
5/70 . . . on a base layer **[1,7]**
5/702 . . . . characterised by the bonding agent **[4]**
5/706 . . . . characterised by the composition of the magnetic material **[4]**
5/708 . . . . characterised by the addition of non-magnetic particles to the magnetic layer **[4]**
5/71 . . . . characterised by the lubricant **[4]**
5/712 . . . . characterised by the surface treatment or coating of magnetic particles **[4]**
5/714 . . . . characterised by the dimension of the magnetic particles **[4]**
5/716 . . . . characterised by two or more magnetic layers **[4]**
5/718 . . . . . at least one on each side of the base layer **[4]**
5/72 . . Protective coatings, e.g. anti-static
5/725 . . . containing a lubricant **[7]**
5/73 . . Base layers **[7]**
5/733 . . . characterised by the addition of non-magnetic particles **[7]**
5/735 . . . characterised by the back layer **[7]**
5/738 . . . characterised by the intermediate layer **[7]**
5/74 . Record carriers characterised by the form, e.g. sheet shaped to wrap around a drum
5/76 . . Drum carriers
5/78 . . Tape carriers
5/80 . . Card carriers
5/82 . . Disc carriers
5/84 . Processes or apparatus specially adapted for manufacturing record carriers
5/842 . . Coating a support with a liquid magnetic dispersion **[4]**
5/845 . . . in a magnetic field **[4]**
5/848 . . Coating a support with a magnetic layer by extrusion **[4]**
5/85 . . Coating a support with a magnetic layer by vapour deposition **[4]**
5/851 . . Coating a support with a magnetic layer by sputtering **[7]**
5/852 . . Orientation in a magnetic field (G11B 5/845 takes precedence) **[4]**
5/855 . . Coating only part of a support with a magnetic layer **[4]**
5/858 . . Producing a magnetic layer by electro-plating or electroless plating **[4]**
5/86 . Re-recording, i.e. transcribing information from one magnetisable record carrier on to one or more similar or dissimilar record carriers

7/00 Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation, reproducing using an optical beam at lower power; **Record carriers therefor** (G11B 11/00, G11B 13/00 take precedence) **[4,7]**

7/002 . Recording, reproducing or erasing systems characterised by the shape of the carrier **[7]**
7/0025 . . with cylinders or cylinder-like carriers, e.g. truncated cones **[7]**
7/003 . . with webs, e.g. belts, spooled tapes or films of quasi-infinite extent **[7]**
7/0033 . . with cards **[7]**
7/0037 . . with discs **[7]**
7/004 . Recording, reproducing or erasing methods; Read, write or erase circuits therefor **[7]**
7/0045 . . Recording (G11B 7/006, G11B 7/0065 take precedence) **[7]**
7/005 . . Reproducing (G11B 7/0065 takes precedence) **[7]**
7/0055 . . Erasing (G11B 7/006, G11B 7/0065 take precedence) **[7]**
7/006 . . Overwriting (G11B 7/0065 takes precedence) **[7]**
7/0065 . . Recording, reproducing or erasing by using optical interference patterns, e.g. holograms **[7]**
7/007 . Arrangement of the information on the record carrier, e.g. form of tracks **[4]**

7/013 . . for discrete information, i.e. where each information unit is stored in a distinct location **[4]**

7/08 . Disposition or mounting of heads or light sources relatively to record carriers

7/085 . . with provision for moving the light beam into, or out of, its operative position (modulating by information signals G11B 7/12) **[4]**

7/09 . . with provision for moving the light beam or focus plane for the purpose of maintaining alignment of the light beam relative to the record carrier during transducing operation, e.g. to compensate for surface irregularities of the latter or for track following **[4]**

7/095 . . . specially adapted for discs, e.g. for compensation of eccentricity or wobble **[4]**

7/10 . . Interchangeable mountings, e.g. for replacement of head without readjustment

7/12 . Heads

7/125 . . Optical beam sources therefor; Modulators, e.g. means for controlling the size or intensity of the optical spot or of the optical trace **[4]**

7/13 . . Optical detectors therefor **[4]**

7/135 . . Means for guiding the beam from source to record carrier or from record carrier to detector **[4]**

7/14 . . adapted to record on, or to reproduce from, more than one track simultaneously (G11B 7/20 takes precedence)

7/16 . . using filters, e.g. colour filter

7/18 . . using optical slits

7/20 . . Dual-recording arrangements, i.e. in which the information is recorded in two different forms simultaneously on the same or related tracks, e.g. recording instantaneous and mean values (sound-recording combined with cinematography G03C 5/14)

7/22 . . Apparatus or processes specially adapted for the manufacture of heads, e.g. assembly

7/24 . Record carriers characterised by the selection of the material or by the structure or form (characterised by the arrangement of information on the carrier G11B 7/007) **[4]**

7/241 . . characterised by the selection of the material **[8]**

7/242 . . . of recording layers **[8]**

7/243 . . . . comprising inorganic material only, e.g. ablative layers **[8]**

7/244 . . . . comprising organic material only **[8]**

7/245 . . . . . containing a polymeric component **[8]**

7/246 . . . . . containing dyes **[8]**

7/247 . . . . . Methine or polymethine dyes **[8]**

7/248 . . . . . Porphines; Azaporphines, e.g. phthalocyanines **[8]**

7/249 . . . . . containing organo-metallic compounds (G11B 7/246 takes precedence) **[8]**

7/25 . . . . . containing liquid crystals **[8]**

7/251 . . . . comprising inorganic material dispersed in an organic matrix **[8]**

7/252 . . . of layers other than recording layers **[8]**

Note

In group G11B 7/252, multi-aspect classification is applied, so that if subject matter is characterised by aspects covered by more than one of its subgroups, the subject matter should be classified in each of those subgroups. **[8]**

7/253 . . . . Base layers **[8]**

7/254 . . . . Protective topcoat layers **[8]**

7/256 . . . . Layers improving adhesion between layers **[8]**

7/257 . . . . Layers having properties involved in recording or reproduction, e.g. optical interference layers or sensitising layers **[8]**

7/258 . . . . Reflective layers **[8]**

7/26 . . Apparatus or processes specially adapted for the manufacture of record carriers

7/28 . Re-recording, i.e. transcribing information from one optical record carrier on to one or more similar or dissimilar record carriers using optical sensing means

7/30 . Rewritable carriers (G11B 7/24 takes precedence) **[7]**

9/00 **Recording or reproducing using a method or means not covered by one of the main groups G11B 3/00 to G11B 7/00**; **Record carriers therefor** (G11B 11/00 takes precedence) **[4]**

Note

Group G11B 9/12 takes precedence over groups G11B 9/02 to G11B 9/10 **[7]**

9/02 . using ferroelectric record carriers; Record carriers therefor

9/04 . using record carriers having variable electric resistance; Record carriers therefor

9/06 . using record carriers having variable electrical capacitance; Record carriers therefor (G11B 9/02 takes precedence)

9/07 . . Heads for reproducing capacitive information **[4]**

9/08 . using electrostatic charge injection; Record carriers therefor

9/10 . using electron beam; Record carriers therefor (G11B 9/08 takes precedence) **[4]**

9/12 . using near-field interactions; Record carriers therefor **[7]**

9/14 . . using microscopic probe means **[7]**

11/00 **Recording on, or reproducing from, the same record carrier wherein for these two operations the methods or means are covered by different main groups of groups G11B 3/00 to G11B 7/00 or by different subgroups of group G11B 9/00**; **Record carriers therefor**

Note

Group G11B 11/24 takes precedence over groups G11B 11/03 to G11B 11/16. **[7]**

11/03 . using recording by deforming with non-mechanical means, e.g. laser, beam of particles **[4]**

11/05 . . with reproducing by capacitive means **[4]**

11/06 . . with reproducing by mechanical sensing **[4]**

11/08 . using recording by electric charge or by variation of electric resistance or capacitance

11/10 . using recording by magnetisation or demagnetisation **[4]**

11/105 . . using a beam of light or a magnetic field for recording and a beam of light for reproducing, e.g. light-induced thermo-magnetic recording, Kerr effect reproducing **[7]**

11/11 . . using a beam other than a beam of light for recording **[7]**

11/115 . . using a beam other than a beam of light for reproducing **[7]**

11/12 . using recording by optical means (G11B 11/03 takes precedence) **[4]**
11/14 . . with reproducing by magnetic means
11/16 . using recording by mechanical cutting, deforming or pressing
11/18 . . with reproducing by optical means
11/20 . . with reproducing by magnetic means
11/22 . . with reproducing by capacitive means **[4]**
11/24 . using recording by near-field interactions **[7]**
11/26 . . using microscopic probe means **[7]**

13/00 Recording simultaneously or selectively by methods or means covered by different main groups; **Record carriers therefor**; **Reproducing simultaneously or selectively therefrom [1,7]**

(1) This group covers arrangements in which there are at least two recordings of information involving two different methods or means or two different physical properties, at the same or different locations, on the same record carrier, the recordings being made or reproduced simultaneously or selectively. **[7]**
(2) Where such combinations of means are used for changing only one main property, classification is only made in one of the relevant main groups G11B 3/00, G11B 5/00, G11B 7/00, G11B 9/00 or G11B 11/00. **[7]**

13/02 . magnetically and by styli (G11B 13/08 takes precedence) **[1,7]**
13/04 . magnetically and optically (G11B 13/08 takes precedence) **[1,7]**
13/06 . optically and by styli (G11B 13/08 takes precedence) **[1,7]**
13/08 . using near-field interactions or transducing means and at least one other method or means for recording or reproducing **[7]**

15/00 Driving, starting or stopping record carriers of filamentary or web form; **Driving both such record carriers and heads**; **Guiding such record carriers or containers therefor**; **Control thereof**; **Control of operating function** (driving or guiding heads G11B 3/00 to G11B 7/00, G11B 21/00) **[2]**

15/02 . Control of operating function, e.g. switching from recording to reproducing
15/03 . . by using counters **[4]**
15/04 . . Preventing, inhibiting, or warning against accidental erasing or double recording (G11B 15/05 takes precedence) **[4]**
15/05 . . by sensing features present on, or derived from, record carrier or container (G11B 15/16 takes precedence) **[4]**
15/06 . . . by sensing auxiliary features on record carriers or containers, e.g. to stop machine near the end of a tape
15/07 . . . . on containers **[4]**
15/08 . . . . by photoelectric sensing (G11B 15/07 takes precedence) **[4]**
15/087 . . . by sensing recorded signals **[4]**
15/093 . . . by sensing driving condition of record carrier, e.g. travel, tape tension **[4]**
15/10 . . Manually-operated control; Solenoid-operated control
15/12 . . Masking of heads; Selecting or switching of heads between operative and inoperative functions; Masking of beams, e.g. of light beams
15/14 . . . Masking or switching periodically, e.g. of rotating heads
15/16 . . by sensing presence, absence or position of record carrier or container
15/17 . . . of container **[4]**
15/18 . Driving; Starting; Stopping; Arrangements for control or regulation thereof
15/20 . . Moving record carrier backwards or forwards by finite amounts, i.e. back-spacing, forward-spacing
15/22 . . Stopping means (slowing-down preparatory to stopping by means which are different from the stopping means G11B 15/48; slowing-down preparatory to stopping by a mechanical linkage which is different from the stopping means G11B 15/50)
15/24 . . Drive-disengaging means
15/26 . . Driving record carriers by members acting directly or indirectly thereon
15/28 . . . through rollers driving by frictional contact with the record carrier, e.g. capstan; Multiple arrangements of capstans or drums coupled to means for controlling the speed of the drive; Multiple capstan systems alternately engageable with record carrier to provide reversal
15/29 . . . . through pinch-rollers (G11B 15/295 takes precedence) **[4]**
15/295 . . . . with single capstan or drum simultaneously driving the record carrier at two separate points of an isolated part thereof, e.g. the capstan acting directly on the tape rollers **[4]**
15/30 . . . through the means for supporting the record carrier, e.g. mandrel, turntable
15/32 . . . through the reels or cores on to which the record carrier is wound
15/34 . . . through non-slip drive means, e.g. sprocket
15/38 . . Driving record carriers by pneumatic means
15/40 . . Driving record carriers otherwise than by electric motor
15/42 . . . manually
15/43 . . Control or regulation of mechanical tension of record carrier, e.g. tape tension
15/44 . . Speed-changing arrangements; Reversing arrangements; Drive-transfer means therefor
15/46 . . Controlling, regulating, or indicating speed
15/467 . . . in arrangements for recording or reproducing wherein both record carriers and heads are driven **[4]**
15/473 . . . . by controlling the speed of the heads **[4]**
15/48 . . . Starting; Accelerating; Decelerating; Arrangements preventing malfunction during drive change
15/50 . . . by mechanical linkage, e.g. clutch
15/52 . . . by using signals recorded on, or derived from, record carrier
15/54 . . . by stroboscope; by tachometer
15/56 . the record carrier having reserve loop, e.g. to minimise inertia during acceleration
15/58 . . with vacuum column
15/60 . Guiding record carriers (guiding devices structurally associated with magazines or cassettes G11B 23/04) **[4]**
15/61 . . on drum, e.g. on drum containing rotating heads **[4]**
15/62 . . Maintaining desired spacing between record carrier and head
15/64 . . . by fluid-dynamic spacing

15/66 . . Threading; Loading; Automatic self-loading
15/665 . . . by extracting loop of record carrier from container **[4]**
15/67 . . . by extracting end of record carrier from container or spool **[4]**
15/675 . Guiding containers **[4]**
15/68 . . Automatic cassette-changing arrangements **[2]**
15/70 . the record carrier being an endless-loop record-carrier **[2]**

17/00 Guiding record carriers not specifically of filamentary or web form, or of supports therefor (guiding cards or sheets G06K 13/00)
17/02 . Details
17/022 . . Positioning or locking of single discs **[4]**
17/025 . . . of discs which are stationary during transducing operation **[4]**
17/028 . . . of discs rotating during transducing operation **[4]**
17/03 . . . . in containers or trays **[4]**
17/032 . . . . Positioning by moving the door or the cover **[4]**
17/035 . . . . Positioning by moving the loading station **[4]**
17/038 . . Centering or locking of a plurality of discs in a single cartridge **[4]**
17/04 . . Feeding or guiding single record carrier to or from transducing unit
17/041 . . . specially adapted for discs contained within cartridges **[8]**
17/043 . . . . Direct insertion, i.e. without external loading means **[8]**
17/044 . . . . Indirect insertion, i.e. with external loading means **[8]**
17/046 . . . . . with pivoting loading means **[8]**
17/047 . . . . . with sliding loading means **[8]**
17/049 . . . . Insertion of discs having to be extracted from the cartridge prior to recording or reproducing **[8]**
17/05 . . . specially adapted for discs not contained within cartridges **[8]**
17/051 . . . . Direct insertion, i.e. without external loading means **[8]**
17/053 . . . . Indirect insertion, i.e. with external loading means **[8]**
17/054 . . . . . with pivoting loading means **[8]**
17/056 . . . . . with sliding loading means **[8]**
17/057 . . . specially adapted for handling both discs contained within cartridges and discs not contained within cartridges **[8]**
17/08 . from consecutive-access magazine of disc records
17/10 . . with horizontal transfer to the turntable from a stack arranged with a vertical axis
17/12 . . with axial transfer to the turntable from a stack with a vertical axis
17/14 . . . by mechanism in rotating centre post, e.g. permitting the playing of both sides of a record
17/16 . . . by mechanism in stationary centre post, e.g. with stepped post, using fingers on post
17/18 . . . by mechanism operating on the edge of the disc record
17/20 . . with transfer away from stack on turntable after playing
17/22 . from random-access magazine of disc records

Note

Group G11B 17/30 takes precedence over groups G11B 17/24 to G11B 17/28.

17/24 . . the magazine having a toroidal or part-toroidal shape
17/26 . . the magazine having a cylindrical shape with vertical axis
17/28 . . the magazine having a cylindrical shape with horizontal axis
17/30 . . wherein the playing unit is moved accordingly to the location of the selected record
17/32 . Maintaining desired spacing between record carrier and head, e.g. by fluid-dynamic spacing **[2]**
17/34 . Guiding record carriers during transducing operation, e.g. for track following (G11B 17/32 takes precedence) **[4]**

19/00 Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; **Control thereof**; **Control of operating function**
19/02 . Control of operating function, e.g. switching from recording to reproducing **[4]**
19/04 . . Arrangements for preventing, inhibiting, or warning against, double recording on the same blank, or against other recording or reproducing malfunctions
19/06 . . by counting or timing of machine operations
19/08 . . by using devices external to the driving mechanisms, e.g. coin-freed switch (coin actuated mechanisms G07F 5/00) **[4]**
19/10 . . by sensing presence or absence of record in accessible stored position or on turntable
19/12 . . by sensing distinguishing features of records, e.g. diameter
19/14 . . by sensing movement or position of head, e.g. means moving in correspondence with head movements
19/16 . . Manual control
19/18 . . . Manual action on one element producing control effect indirectly by consequent action of driving mechanism
19/20 . Driving; Starting; Stopping; Control thereof **[4]**
19/22 . . Brakes other than speed-regulating brakes
19/24 . . Arrangements for providing constant relative speed between record carrier and head
19/247 . . . using electrical means **[4]**
19/253 . . . using mechanical means **[4]**
19/26 . . Speed-changing arrangements; Reversing arrangements; Drive-transfer means therefor **[4]**
19/265 . . . Friction wheel drive **[4]**
19/27 . . . Belt drive **[4]**
19/275 . . . Gear wheel drive **[4]**
19/28 . . Speed controlling, regulating or indicating (G11B 19/24takes precedence)

20/00 Signal processing not specific to the method of recording or reproducing; **Circuits therefor [4]**
20/02 . Analogue recording or reproducing **[4]**
20/04 . . Direct recording or reproducing **[4]**
20/06 . . Angle-modulation recording or reproducing **[4]**
20/08 . . Pulse-modulation recording or reproducing (pulse-code-modulation recording G11B 20/10) **[4]**
20/10 . Digital recording or reproducing **[4]**

20/12 . . Formatting, e.g. arrangement of data block or words on the record carriers **[4]**
20/14 . . using self-clocking codes **[4]**
20/16 . . using non self-clocking codes, i.e. the clock signals being either recorded in a separate clocking track or in a combination of several information tracks **[4]**
20/18 . . Error detection or correction; Testing **[4]**
20/20 . for correction of skew for multitrack recording **[4]**
20/22 . for reducing distortions **[4]**
20/24 . for reducing noise **[4]**

21/00 Head arrangements not specific to the method of recording or reproducing

21/02 . Driving or moving of heads
21/03 . . for correcting time base error **[4]**
21/04 . . Automatic feed mechanism producing a transducing traverse of the head in a direction which cuts across the direction of travel of the recording medium, e.g. helical scan
21/06 . . . the record carrier having means to ensure traverse movement of the head
21/08 . . Track changing or selecting (G11B 21/12 takes precedence)
21/10 . . Track finding or aligning by moving the head
21/12 . . Raising and lowering; Back-spacing or forward-spacing along track; Returning to starting position
21/14 . . . manually
21/16 . Supporting the heads; Supporting the sockets for plug-in heads
21/18 . . while the head is moving
21/20 . . while the head is in operative position but stationary or permitting minor movements to follow irregularities in surface of record carrier
21/21 . . . with provision for maintaining desired spacing of head from record carrier, e.g. fluid-dynamic spacing, slider **[4]**
21/22 . . while the head is out of operative position
21/24 . . Head support adjustments
21/26 . . Means for interchange or replacement of head or head element

23/00 Record carriers not specific to the method of recording or reproducing; **Accessories, e.g. containers, specially adapted for co-operation with the recording or reproducing apparatus [4]**

Note

In group G11B 23/00, recording or reproducing apparatus does not include the record carriers. **[5]**

23/02 . Containers; Storing means (cabinets, cases, stands, modified to store record carriers G11B 33/04) **[4]**
23/023 . . Containers for magazines or cassettes **[4]**
23/027 . . Containers for single reels or spools **[4]**
23/03 . . Containers for flat record carriers **[4]**
23/033 . . . for flexible discs **[4]**
23/037 . . Single reels or spools **[4]**
23/04 . . Magazines; Cassettes (G11B 23/12 takes precedence)
23/06 . . . for housing endless webs or filaments
23/07 . . . . using a single reel or core **[4]**
23/08 . . . for housing webs or filaments having two distinct ends
23/087 . . . . using two different reels or cores **[4]**
23/093 . . . . . the reels or cores being coaxial **[4]**
23/107 . . . . using one reel or core, one end of the record carrier coming out of the magazine or cassette **[4]**
23/113 . . Apparatus or processes specially adapted for the manufacture of magazines or cassettes **[4]**
23/12 . . Bins for random storage of webs or filaments
23/14 . providing ability to repeat location, e.g. using sprocket holes
23/16 . Record carriers with single track for recording at spaced intervals along the track thereof, e.g. for speech or language training
23/18 . Record carriers with multiple tracks, e.g. with complementary and partial tracks such as paired "stereo" tracks
23/20 . with provision for splicing to provide permanent or temporary connections
23/22 . . of endless belts; of tapes forming Möbius loops
23/24 . . of tapes having multiple tracks parallel to edge of record carrier by offset splicing to form endless loop with one or more helical tracks
23/26 . . of leaders for loading or threading, e.g. to form a temporary connection
23/28 . indicating prior or unauthorised use
23/30 . with provision for auxiliary signals
23/32 . . Electrical or mechanical contacting means; Tape stop foils
23/34 . . Signal means additional to the main recording track, e.g. photoelectric sensing of sprocket holes for timing
23/36 . . Signals on record carriers or on containers and recorded by the same method as the main recording
23/38 . Visual features other than those contained in record tracks or represented by sprocket holes
23/40 . . Identifying or analogous means applied to, or incorporated in, the record carrier and not intended for visual display simultaneously with the playing-back of the record carrier, e.g. label, leader, photograph
23/42 . . Marks for indexing, speed-controlling, synchronising, or timing
23/44 . . Information for display simultaneously with playback of the record, e.g. photographic matter (associated working of cameras or projectors with sound-recording or -reproducing means G03B 31/00) **[4]**
23/50 . Reconditioning of record carriers; Cleaning of record carriers (G11B 3/58 takes precedence) **[2]**

25/00 Apparatus characterised by the shape of record carrier employed but not specific to the method of recording or reproducing [4]

25/02 . using cylindrical record carriers
25/04 . using flat record carriers, e.g. disc, card
25/06 . using web-form record carriers, e.g. tape
25/08 . using filamentary record carriers, e.g. wire
25/10 . Apparatus capable of using record carriers defined in more than one of the groups G11B 25/02 to G11B 25/08

27/00 Editing; **Indexing**; **Addressing**; **Timing or synchronising**; **Monitoring**; **Measuring tape travel [2,4]**

27/02 . Editing, e.g. varying the order of information signals recorded on, or reproduced from, record carriers **[5]**
27/022 . . Electronic editing of analogue information signals, e.g. audio or video signals **[5]**

27/024 . . . on tapes (G11B 27/028, G11B 27/029 take precedence) **[5]**
27/026 . . . on discs (G11B 27/028, G11B 27/029 take precedence) **[5]**
27/028 . . . with computer assistance **[5]**
27/029 . . . Insert-editing **[5]**
27/031 . . Electronic editing of digitised analogue information signals, e.g. audio or video signals **[5]**
27/032 . . . on tapes (G11B 27/036, G11B 27/038 take precedence) **[5]**
27/034 . . . on discs (G11B 27/036, G11B 27/038 take precedence) **[5]**
27/036 . . . Insert-editing **[5]**
27/038 . . . Cross-faders therefor **[5]**
27/04 . . using differential drive of record carrier and head
27/06 . . Cutting and rejoining; Notching, or perforating record carriers otherwise than by recording styli (record carriers with provision for splicing G11B 23/20)
27/10 . Indexing; Addressing; Timing or synchronising; Measuring tape travel **[2]**
27/11 . . by using information not detectable on the record carrier **[4]**
27/13 . . . the information being derived from movement of the record carrier, e.g. using tachometer **[4]**
27/15 . . . . using mechanical sensing means **[4]**
27/17 . . . . using electrical sensing means **[4]**
27/19 . . by using information detectable on the record carrier **[4]**
27/22 . . . Means responsive to presence or absence of recorded information signals
27/24 . . . by sensing features on the record carrier other than the transducing track
27/26 . . . . by photoelectric detection, e.g. of sprocket holes
27/28 . . . by using information signals recorded by the same method as the main recording
27/30 . . . . on the same track as the main recording
27/32 . . . . on separate auxiliary tracks of the same or an auxiliary record carrier
27/34 . . Indicating arrangements
27/36 . Monitoring, i.e. supervising the progress of recording or reproducing

31/00 Arrangements for the associated working of recording or reproducing apparatus with related apparatus (with cameras or projectors G03B 31/00) **[1,7]**
31/02 . with automatic musical instruments

33/00 Constructional parts, details or accessories not provided for in the other groups of this subclass [4]
33/02 . Cabinets; Cases; Stands; Disposition of apparatus therein or thereon **[4]**
33/04 . . modified to store record carriers **[4]**
33/06 . . combined with other apparatus having a different main function **[4]**
33/08 . . Insulation or absorption of undesired vibrations or sounds **[4]**
33/10 . Indicating arrangements; Warning arrangements **[4]**
33/12 . Disposition of constructional parts in the apparatus, e.g. of power supply, of modules **[4]**
33/14 . Reducing influence of physical parameters, e.g. temperature change, moisture, dust **[4]**

G11C STATIC STORES (information storage based on relative movement between record carrier and transducer G11B; semiconductor devices for storage H01L, e.g. H01L 27/108 to H01L 27/115; pulse technique in general H03K, e.g. electronic switches H03K 17/00)

(1) This subclass covers devices or arrangements for storage of digital or analogue information:
(i) in which no relative movement takes place between an information storage element and a transducer;
(ii) which incorporate a selecting-device for writing-in or reading-out the information into or from the store.
(2) This subclass does not cover elements not adapted for storage and not provided with such means as referred to in Note (3) below, which elements are classified in the appropriate subclass, e.g. of H01, H03K.
(3) In this subclass, the following terms are used with the meaning indicated: **[8]**
– "storage element" is an element which can hold at least one item of information and is provided with means for writing-in or reading-out this information; **[8]**
– "memory" is a device, including storage elements, which can hold information to be extracted when desired. **[8]**

Subclass index

5/00 Details of stores covered by group G11C 11/00

5/02 . Disposition of storage elements, e.g. in the form of a matrix array

5/04 . . Supports for storage elements; Mounting or fixing of storage elements on such supports

5/05 . . . Supporting of cores in matrix **[2]**

5/06 . Arrangements for interconnecting storage elements electrically, e.g. by wiring

5/08 . . for interconnecting magnetic elements, e.g. toroidal cores

5/10 . . for interconnecting capacitors

5/12 . Apparatus or processes for interconnecting storage elements, e.g. for threading magnetic cores

5/14 . Power supply arrangements (auxiliary circuits for stores using semiconductor devices G11C 11/4063, G11C 11/413, G11C 11/4193; in general G05F, H02J, H02M) **[5,7]**

7/00 Arrangements for writing information into, or reading information out from, a digital store (G11C 5/00 takes precedence; auxiliary circuits for stores using semiconductor devices G11C 11/4063, G11C 11/413, G11C 11/4193) **[2,5]**

7/02 . with means for avoiding parasitic signals

7/04 . with means for avoiding disturbances due to temperature effects

7/06 . Sense amplifiers; Associated circuits (amplifiers per se H03F, H03K) **[1,7]**

7/08 . . Control thereof **[7]**

7/10 . Input/output (I/O) data interface arrangements, e.g. I/O data control circuits, I/O data buffers (level conversion circuits in general H03K 19/0175) **[7]**

7/12 . Bit line control circuits, e.g. drivers, boosters, pull-up circuits, pull-down circuits, precharging circuits, equalising circuits, for bit lines **[7]**

7/14 . Dummy cell management; Sense reference voltage generators **[7]**

7/16 . Storage of analogue signals in digital stores using an arrangement comprising analogue/digital (A/D) converters, digital memories and digital/analogue (D/A) converters **[7]**

7/18 . Bit line organisation; Bit line lay-out **[7]**

7/20 . Memory cell initialisation circuits, e.g. when powering up or down, memory clear, latent image memory **[7]**

7/22 . Read-write (R-W) timing or clocking circuits; Read-write (R-W) control signal generators or management **[7]**

7/24 . Memory cell safety or protection circuits, e.g. arrangements for preventing inadvertent reading or writing; Status cells; Test cells **[7]**

8/00 Arrangements for selecting an address in a digital store (auxiliary circuits for stores using semiconductor devices G11C 11/4063, G11C 11/413, G11C 11/4193) **[2,5]**

8/02 . using selecting matrix **[2]**

8/04 . using a sequential addressing device, e.g. shift register, counter (using first in first out (FIFO) registers for changing speed of digital data flow G06F 5/06; using last in first out (LIFO) registers for processing digital data by operating upon their order G06F 7/00) **[5]**

8/06 . Address interface arrangements, e.g. address buffers (level conversion circuits in general H03K 19/0175) **[7]**

8/08 . Word line control circuits, e.g. drivers, boosters, pull-up circuits, pull-down circuits, precharging circuits, for word lines **[7]**

8/10 . Decoders **[7]**

8/12 . Group selection circuits, e.g. for memory block selection, chip selection, array selection **[7]**

8/14 . Word line organisation; Word line lay-out **[7]**

8/16 . Multiple access memory array, e.g. addressing one storage element via at least two independent addressing line groups **[7]**

8/18 . Address timing or clocking circuits; Address control signal generation or management, e.g. for row address strobe (RAS) or column address strobe (CAS) signals **[7]**

8/20 . Address safety or protection circuits, i.e. arrangements for preventing unauthorized or accidental access **[7]**

11/00 Digital stores characterised by the use of particular electric or magnetic storage elements; **Storage elements therefor** (G11C 14/00 to G11C 21/00 take precedence) **[5]**

Note

Group G11C 11/56 takes precedence over groups G11C 11/02 to G11C 11/54. **[2]**

11/02 . using magnetic elements

11/04 . . using storage elements having cylindrical form, e.g. rod, wire (G11C 11/12, G11C 11/14 take precedence) **[2]**

11/06 . . using single-aperture storage elements, e.g. ring core; using multi-aperture plates in which each individual aperture forms a storage element

11/061 . . . using elements with single aperture or magnetic loop for storage, one element per bit, and for destructive read-out **[2]**

11/063 . . . . bit-organized, such as, 2L/2D-, 3D-organization, i.e. for selection of an element by means of at least two coincident partial currents both for reading and for writing **[2]**

11/065 . . . . word-organized, such as 2D-organization, or linear selection, i.e. for selection of all the elements of a word by means of a single full current for reading **[2]**

11/067 . . . using elements with single aperture or magnetic loop for storage, one element per bit, and for non-destructive read-out **[2]**

11/08 . . using multi-aperture storage elements, e.g. using transfluxors; using plates incorporating several individual multi-aperture storage elements (G11C 11/10 takes precedence; using multi-aperture plates in which each individual aperture forms a storage element G11C 11/06) **[2]**

11/10 . . using multi-axial storage elements

11/12 . . using tensors; using twistors, i.e. elements in which one axis of magnetisation is twisted

11/14 . . using thin-film elements

11/15 . . . using multiple magnetic layers (G11C 11/155 takes precedence) **[2]**

11/155 . . . with cylindrical configuration **[2]**

11/16 . . using elements in which the storage effect is based on magnetic spin effect

11/18 . using Hall-effect devices

11/19 . using non-linear reactive devices in resonant circuits **[2]**

11/20 . . using parametrons **[2]**

11/21 . using electric elements **[2]**
11/22 . . using ferroelectric elements **[2]**
11/23 . . using electrostatic storage on a common layer, e.g. Forrester-Haeff tubes (G11C 11/22 takes precedence) **[2]**
11/24 . . using capacitors (G11C 11/22 takes precedence; using a combination of semiconductor devices and capacitors G11C 11/34, e.g. G11C 11/40) **[2,5]**
11/26 . . using discharge tubes **[2]**
11/28 . . . using gas-filled tubes **[2]**
11/30 . . . using vacuum tubes (G11C 11/23 takes precedence) **[2]**
11/34 . . using semiconductor devices **[2]**
11/35 . . . with charge storage in a depletion layer, e.g. charge coupled devices **[7]**
11/36 . . . using diodes, e.g. as threshold elements **[2]**
11/38 . . . . using tunnel diodes **[2]**
11/39 . . . using thyristors **[5]**
11/40 . . . using transistors **[2]**
11/401 . . . . forming cells needing refreshing or charge regeneration, i.e. dynamic cells **[5]**
11/402 . . . . . with charge regeneration individual to each memory cell, i.e. internal refresh **[5]**
11/403 . . . . . with charge regeneration common to a multiplicity of memory cells, i.e. external refresh **[5]**
11/404 . . . . . with one charge-transfer gate, e.g. MOS transistor, per cell **[5]**
11/405 . . . . . with three charge-transfer gates, e.g. MOS transistors, per cell **[5]**
11/406 . . . . . Management or control of the refreshing or charge-regeneration cycles **[5]**
11/4063 . . . . . Auxiliary circuits, e.g. for addressing, decoding, driving, writing, sensing or timing **[7]**
11/4067 . . . . . for memory cells of the bipolar type **[7]**
11/407 . . . . . for memory cells of the field-effect type **[5]**
11/4072 . . . . . Circuits for initialization, powering up or down, clearing memory or presetting **[7]**
11/4074 . . . . . Power supply or voltage generation circuits, e.g. bias voltage generators, substrate voltage generators, back-up power, power control circuits **[7]**
11/4076 . . . . . Timing circuits (for regeneration management G11C 11/406) **[7]**
11/4078 . . . . . Safety or protection circuits, e.g. for preventing inadvertent or unauthorised reading or writing; Status cells; Test cells (protection of memory contents during checking or testing G11C 29/52) **[7]**
11/408 . . . . . Address circuits **[5]**
11/409 . . . . . Read-write (R-W) circuits **[5]**
11/4091 . . . . . Sense or sense/refresh amplifiers, or associated sense circuitry, e.g. for coupled bit-line precharging, equalising or isolating **[7]**
11/4093 . . . . . Input/output (I/O) data interface arrangements, e.g. data buffers (level conversion circuits in general H03K 19/0175) **[7]**
11/4094 . . . . . Bit-line management or control circuits **[7]**
11/4096 . . . . . Input/output (I/O) data management or control circuits, e.g. reading or writing circuits, I/O drivers, bit-line switches **[7]**
11/4097 . . . . . Bit-line organisation, e.g. bit-line layout, folded bit lines **[7]**
11/4099 . . . . . Dummy cell treatment; Reference voltage generators **[7]**
11/41 . . . . forming cells with positive feedback, i.e. cells not needing refreshing or charge regeneration, e.g. bistable multivibrator or Schmitt trigger **[5]**
11/411 . . . . . using bipolar transistors only **[5]**
11/412 . . . . . using field-effect transistors only **[5]**
11/413 . . . . . Auxiliary circuits, e.g. for addressing, decoding, driving, writing, sensing, timing or power reduction **[5]**
11/414 . . . . . for memory cells of the bipolar type **[5]**
11/415 . . . . . Address circuits **[5]**
11/416 . . . . . Read-write (R-W) circuits **[5]**
11/417 . . . . . for memory cells of the field-effect type **[5]**
11/418 . . . . . Address circuits **[5]**
11/419 . . . . . Read-write (R-W) circuits **[5]**
11/4193 . . . Auxiliary circuits specific to particular types of semiconductor storage devices, e.g. for addressing, driving, sensing, timing, power supply, signal propagation (G11C 11/4063, G11C 11/413 take precedence) **[7]**
11/4195 . . . . Address circuits **[7]**
11/4197 . . . . Read-write (R-W) circuits **[7]**
11/42 . . using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled
11/44 . . using super-conductive elements, e.g. cryotron **[2]**
11/46 . using thermoplastic elements
11/48 . using displaceable coupling elements, e.g. ferromagnetic cores, to produce change between different states of mutual or self-inductance
11/50 . using actuation of electric contacts to store the information (mechanical stores G11C 23/00; switches providing a selected number of consecutive operations of the contacts by a single manual actuation of the operating part H01H 41/00)
11/52 . . using electromagnetic relays
11/54 . using elements simulating biological cells, e.g. neuron
11/56 . using storage elements with more than two stable states represented by steps, e.g. of voltage, current, phase, frequency (counting arrangements comprising multi-stable elements of this type H03K 25/00, H03K 29/00) **[2]**

13/00 Digital stores characterised by the use of storage elements not covered by groups G11C 11/00, G11C 23/00, or G11C 25/00

13/02 . using elements whose operation depends upon chemical change (using electrochemical charge G11C 11/00)
13/04 . using optical elements
13/06 . . using magneto-optical elements (magneto-optics in general G02F) **[2]**

14/00 **Digital stores characterised by arrangements of cells having volatile and non-volatile storage properties for back-up when the power is down [5]**

15/00 **Digital stores in which information comprising one or more characteristic parts is written into the store and in which information is read-out by searching for one or more of these characteristic parts, i.e. associative or content-addressed stores** (in which information is addressed to a specific location G11C 11/00) **[2]**

15/02 . using magnetic elements **[2]**

15/04 . using semiconductor elements **[2]**

15/06 . using cryogenic elements **[2]**

16/00 **Erasable programmable read-only memories** (G11C 14/00 takes precedence) **[5]**

16/02 . electrically programmable **[5]**

16/04 . . using variable threshold transistors, e.g. FAMOS **[5]**

16/06 . . Auxiliary circuits, e.g. for writing into memory (in general G11C 7/00) **[5]**

16/08 . . . Address circuits; Decoders; Word-line control circuits **[7]**

16/10 . . . Programming or data input circuits **[7]**

16/12 . . . . Programming voltage switching circuits **[7]**

16/14 . . . . Circuits for erasing electrically, e.g. erase voltage switching circuits **[7]**

16/16 . . . . . for erasing blocks, e.g. arrays, words, groups **[7]**

16/18 . . . . Circuits for erasing optically **[7]**

16/20 . . . . Initialising; Data preset; Chip identification **[7]**

16/22 . . . Safety or protection circuits preventing unauthorised or accidental access to memory cells **[7]**

16/24 . . . Bit-line control circuits **[7]**

16/26 . . . Sensing or reading circuits; Data output circuits **[7]**

16/28 . . . . using differential sensing or reference cells, e.g. dummy cells **[7]**

16/30 . . . Power supply circuits **[7]**

16/32 . . . Timing circuits **[7]**

16/34 . . . Determination of programming status, e.g. threshold voltage, overprogramming or underprogramming, retention **[7]**

17/00 **Read-only memories programmable only once**; **Semi-permanent stores, e.g. manually-replaceable information cards** (erasable programmable read-only memories G11C 16/00; coding, decoding or code conversion, in general H03M) **[2,5]**

17/02 . using magnetic or inductive elements (G11C 17/14 takes precedence) **[2,5]**

17/04 . using capacitive elements (G11C 17/06, G11C 17/14 take precedence) **[2,5]**

17/06 . using diode elements (G11C 17/14 takes precedence) **[2,5]**

17/08 . using semiconductor devices, e.g. bipolar elements (G11C 17/06, G11C 17/14 take precedence) **[5]**

17/10 . . in which contents are determined during manufacturing by a predetermined arrangement of coupling elements, e.g. mask-programmable ROM **[5]**

17/12 . . . using field-effect devices **[5]**

17/14 . in which contents are determined by selectively establishing, breaking or modifying connecting links by permanently altering the state of coupling elements, e.g. PROM **[5]**

17/16 . . using electrically-fusible links **[5]**

17/18 . . Auxiliary circuits, e.g. for writing into memory (in general G11C 7/00) **[5]**

19/00 **Digital stores in which the information is moved stepwise, e.g. shift registers** (counting chains H03K 23/00)

19/02 . using magnetic elements (G11C 19/14 takes precedence) **[2]**

19/04 . . using cores with one aperture or magnetic loop **[2]**

19/06 . . using structures with a number of apertures or magnetic loops, e.g. transfluxors **[2]**

19/08 . . using thin films in plane structure **[2]**

19/10 . . using thin films on rods; with twistors **[2]**

19/12 . using non-linear reactive devices in resonant circuits **[2]**

19/14 . using magnetic elements in combination with active elements, e.g. discharge tubes, semiconductor elements (G11C 19/34 takes precedence) **[2,7]**

19/18 . using capacitors as main elements of the stages **[2]**

19/20 . using discharge tubes (G11C 19/14 takes precedence) **[2]**

19/28 . using semiconductor elements (G11C 19/14, G11C 19/36 take precedence) **[2,7]**

19/30 . using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled **[2]**

19/32 . using super-conductive elements **[2]**

19/34 . using storage elements with more than two stable states represented by steps, e.g. of voltage, current, phase, frequency **[7]**

19/36 . . using semiconductor elements **[7]**

19/38 . two-dimensional, e.g. horizontal and vertical shift registers **[7]**

21/00 **Digital stores in which the information circulates** (stepwise G11C 19/00)

21/02 . using electromechanical delay lines, e.g. using a mercury tank

23/00 **Digital stores characterised by movement of mechanical parts to effect storage, e.g. using balls**; **Storage elements therefor** (storing by actuating contacts G11C 11/48)

25/00 **Digital stores characterised by the use of flowing media**; **Storage elements therefor**

27/00 **Electric analogue stores, e.g. for storing instantaneous values**

27/02 . Sample-and-hold arrangements (G11C 27/04 takes precedence; sampling electrical signals, in general H03K) **[2,4]**

27/04 . Shift registers (charge coupled devices per se H01L 29/76) **[4]**

29/00 **Checking stores for correct operation**; **Testing stores during standby or offline operation [1,8]**

29/02 . Detection or location of defective auxiliary circuits, e.g. defective refresh counters **[8]**

29/04 . Detection or location of defective memory elements **[8]**

29/06 . . Acceleration testing **[8]**

29/08 . . Functional testing, e.g. testing during refresh, power-on self testing (POST) or distributed testing **[8]**

29/10 . . . Test algorithms, e.g. memory scan (MScan) algorithms; Test patterns, e.g. checkerboard patterns **[8]**

29/12 . . . Built-in arrangements for testing, e.g. built-in self testing (BIST) **[8]**

29/14 . . . . Implementation of control logic, e.g. test mode decoders **[8]**

29/16 . . . . . using microprogrammed units, e.g. state machines **[8]**

29/18 . . . . Address generation devices; Devices for accessing memories, e.g. details of addressing circuits **[8]**

29/20 . . . . . using counters or linear-feedback shift registers (LFSR) **[8]**

29/22 . . . . . Accessing serial memories **[8]**

29/24 . . . . . Accessing extra cells, e.g. dummy cells or redundant cells **[8]**

29/26 . . . . . Accessing multiple arrays (G11C 29/24 takes precedence) **[8]**

29/28 . . . . . Dependent multiple arrays, e.g. multi-bit arrays **[8]**

29/30 . . . . . Accessing single arrays **[8]**

29/32 . . . . . Serial access; Scan testing **[8]**

29/34 . . . . . Accessing multiple bits simultaneously **[8]**

29/36 . . . . Data generation devices, e.g. data inverters **[8]**

29/38 . . . . Response verification devices **[8]**

29/40 . . . . . using compression techniques **[8]**

29/42 . . . . . using error correcting codes (ECC) or parity check **[8]**

29/44 . . . . Indication or identification of errors, e.g. for repair **[8]**

29/46 . . . . Test trigger logic **[8]**

29/48 . . . Arrangements in static stores specially adapted for testing by means external to the store, e.g. using direct memory access (DMA) or using auxiliary access paths (external testing equipment G11C 29/56) **[8]**

29/50 . . Marginal testing, e.g. race, voltage or current testing **[8]**

29/52 . Protection of memory contents; Detection of errors in memory contents **[8]**

29/54 . Arrangements for designing test circuits, e.g. design for test (DFT) tools **[8]**

29/56 . External testing equipment for static stores, e.g. automatic test equipment (ATE); Interfaces therefor **[8]**

99/00 Subject matter not provided for in other groups of this subclass [8]

G12 INSTRUMENT DETAILS

G12B DETAILS OF INSTRUMENTS, OR COMPARABLE DETAILS OF OTHER APPARATUS, NOT OTHERWISE PROVIDED FOR

(1) This subclass covers only details which are not restricted to measuring instruments or to any other apparatus covered by a single class.

(2) This subclass does not cover:
- details covered by any other subclass in section A, F, G or H. In particular, details restricted to the measuring instruments are covered by the relevant subclasses of class G01, e.g. G01D;
- constructional details restricted to electric apparatus, e.g. casings, screenings, which are covered by subclass H05K or the relevant subclass in section H.

(3) Attention is drawn to the Notes following the title of section G, especially as regards to the definition of the term “measuring” in Note (2) following the title of class G01.

Subclass index

1/00 **Sensitive elements capable of producing movement or displacement for purposes not limited to measurement**; **Associated transmission mechanisms therefor**

1/02 . Compound strips or plates, e.g. bimetallic (thermometers using bimetallic elements G01K 5/62)

1/04 . Hollow bodies having parts which are deformable or displaceable under pressure, e.g. Bourdon tube, bellows (bellows in general F16J 3/00)

3/00 **Details of movements not otherwise provided for** (damping of shock or vibrations in general F16F; avoiding out-of-balance forces F16F 15/00; testing balance G01M) **[1,7]**

3/02 . Caging of movements, i.e. locking of movements when not in use

3/04 . Suspensions (bearings F16C)

3/06 . Reducing effects of friction, e.g. by vibration (by lubrication F16N)

3/08 . Damping of movements, e.g. to promote rapid non-oscillatory movement to a final reading

3/10 . . using eddy currents

5/00 **Adjusting position or attitude, e.g. level, of instruments or other apparatus, or of parts thereof** (levels per se G01C 9/00); **Compensating for the effects of tilting or acceleration, e.g. for optical apparatus**

7/00 **Compensating for the effects of temperature** (by cooling G12B 15/00)

9/00 **Housing or supporting of instruments or other apparatus**

9/02 . Casings; Housings; Cabinets (sealing arrangements for transmission members F16J, particularly F16J 15/50)

9/04 . . Details, e.g. cover

9/06 . . . Metal casings

9/08 . Supports; Devices for carrying

9/10 . . Instrument boards; Panels; Desks; Racks; Frameworks

11/00 **Indicating elements**; **Illumination thereof**

11/02 . Scales; Dials

11/04 . Pointers; Setting-mechanisms therefor

13/00 **Calibrating of instruments or apparatus** (calibrating of measuring instruments G01)

15/00 **Cooling** (by refrigeration, e.g. circulation of refrigerated fluid, F25D; heat-exchange or heat-transfer details of general application F28F)

15/02 . by closed-cycle fluid-circulating systems

15/04 . by currents of fluid, e.g. air, in open cycle

15/06 . by contact with heat-absorbing or radiating masses, e.g. heat-sink

17/00 **Screening** (insulation or other protection of buildings E04B; emergency protection of apparatus in general F16P 7/00; in connection with acoustic waves G10K 11/00; in connection with nuclear radiation G21F)

Note

This group covers:
- the protection of instruments or other apparatus from external radiation or other influences;
- the prevention of the emission of undesirable radiation or other influences by instruments or other apparatus.

17/02 . from electric or magnetic fields, e.g. radio waves

17/04 . from ultra-violet, visible, or infra-red light (screening of lighting devices F21V; optical filters G02B 5/20)

17/06 . from heat (G12B 17/04 takes precedence; cooling G12B 15/00)

17/08 . from influences producing mechanical damage, e.g. caused by blast, by external object, by person (G12B 17/02 to G12B 17/06 take precedence)

NUCLEONICS

G21 NUCLEAR PHYSICS; NUCLEAR ENGINEERING

G21B FUSION REACTORS (uncontrolled fusion, applications thereof G21J)

Subclass index

1/00 Thermonuclear fusion reactors [1,8]
1/01 . Hybrid fission-fusion nuclear reactors **[8]**
1/03 . with inertial plasma confinement **[8]**
1/05 . with magnetic or electric plasma confinement **[8]**
1/11 . Details **[8]**
1/13 . . First wall; Blanket; Divertor **[8]**
1/15 . . Particle injectors for producing thermonuclear fusion reactions, e.g. pellet injectors **[8]**
1/17 . . Vacuum chambers; Vacuum systems **[8]**
1/19 . . Targets for producing thermonuclear fusion reactions **[8]**
1/21 . . Electric power supply systems, e.g. for magnet systems **[8]**
1/23 . . Optical systems, e.g. for irradiating targets, for heating plasma or for plasma diagnostics **[8]**
1/25 . Maintenance, e.g. repair or remote inspection **[8]**

3/00 Low-temperature nuclear fusion reactors, e.g. alleged cold fusion reactors [8]

G21C NUCLEAR REACTORS (analogue computers therefor G06G 7/54; fusion reactors, hybrid fission-fusion reactors G21B; nuclear explosives G21J)

Subclass index

1/00 Reactors
1/01 . General details not provided for in groups G21C 3/00 to G21C 19/00 **[3]**
1/02 . Fast fission reactors, i.e. reactors not using a moderator
1/03 . . cooled by a coolant not essentially pressurised, e.g. pool-type reactors **[5]**
1/04 . Thermal reactors
1/06 . . Heterogeneous reactors, i.e. in which fuel and moderator are separated
1/07 . . . Pebble-bed reactors; Reactors with granular fuel **[5]**
1/08 . . . moderator being highly pressurised, e.g. boiling-water reactor, integral-superheat reactor, pressurised-water reactor (G21C 1/22 takes precedence)
1/09 . . . . Pressure regulating arrangements, i.e. pressurisers **[5]**
1/10 . . . . moderator and coolant being different or separated
1/12 . . . . . moderator being solid, e.g. Magnox reactor
1/14 . . . moderator being substantially not pressurised, e.g. swimming-pool reactor (G21C 1/22 takes precedence)
1/16 . . . . moderator and coolant being different or separated, e.g. sodium-graphite reactor
1/18 . . . . . coolant being pressurised
1/20 . . . . . moderator being liquid, e.g. pressure-tube reactor
1/22 . . . using liquid or gaseous fuel
1/24 . . Homogeneous reactors, i.e. in which fuel and moderator present an effectively homogeneous medium to the neutrons
1/26 . . . Single-region reactors
1/28 . . . Two-region reactors
1/30 . Subcritical reactors
1/32 . Integral reactors, i.e. reactors wherein parts functionally associated with the reactor but not essential to the reaction, e.g. heat exchangers, are disposed inside the enclosure with the core (G21C 1/02 to G21C 1/30 take precedence) **[3]**

3/00 Reactor fuel elements or their assemblies; Selection of substances for use as reactor fuel elements
3/02 . Fuel elements
3/04 . . Constructional details
3/06 . . . Casings; Jackets
3/07 . . . . characterised by their material, e.g. alloys **[5]**

3/08 . . . . provided with external means to promote heat-transfer, e.g. fins, baffles, corrugations
3/10 . . . . End closures
3/12 . . . . Means forming part of the element for locating it within the reactor core; External spacers for this purpose
3/14 . . . . Means forming part of the element for inserting it into, or removing it from, the core; Means for coupling adjacent elements
3/16 . . . Details of the construction within the casing
3/17 . . . . Means for storage or immobilisation of gases in fuel elements **[5]**
3/18 . . . . Internal spacers or other non-active material within the casing, e.g. compensating for expansion of fuel rods or for compensating excess reactivity (interlayers G21C 3/20)
3/20 . . . . with coating on fuel or on inside of casing; with non-active interlayer between casing and active material
3/22 . . with fissile or breeder material in contact with coolant
3/24 . . with fissile or breeder material in fluid form within a non-active casing
3/26 . . with fissile or breeder material in powder form within a non-active casing
3/28 . . with fissile or breeder material in solid form within a non-active casing
3/30 . Assemblies of a number of fuel elements in the form of a rigid unit
3/32 . . Bundles of parallel pin-, rod-, or tube-shaped fuel elements
3/322 . . . Means to influence the coolant flow through or around the bundles **[5]**
3/324 . . . Coats or envelopes for the bundles **[5]**
3/326 . . . comprising fuel elements of different composition; Comprising, in addition to the fuel elements, other pin-, rod-, or tube-shaped elements, e.g. control rods, grid support rods, fertile rods, poison rods or dummy rods **[5]**
3/328 . . . . Relative disposition of the elements in the bundle lattice **[5]**
3/33 . . . Supporting or hanging of elements in the bundle (spacer grids G21C 3/34); Means forming part of the bundle for inserting it into, or removing it from, the core; Means for coupling adjacent bundles **[5]**
3/332 . . . . Supports for spacer grids **[5]**
3/334 . . . Assembling the bundles **[5]**
3/335 . . . Exchanging elements in irradiated bundles **[5]**
3/336 . . . Spacer elements for fuel rods in the bundle (spacer grids G21C 3/34) **[5]**
3/338 . . . . Helicoidal spacer elements **[5]**
3/34 . . . Spacer grids
3/344 . . . . formed of assembled tubular elements **[5]**
3/348 . . . . formed of assembled non-intersecting strips **[5]**
3/352 . . . . formed of assembled intersecting strips **[5]**
3/356 . . . . being provided with fuel element supporting members **[5]**
3/36 . . Assemblies of plate-shaped fuel elements or coaxial tubes
3/38 . Fuel units consisting of a single fuel element in a supporting sleeve
3/40 . Structural combination of fuel element with thermoelectric element for direct production of electric energy from fission heat (for temperature measurement G21C 17/10)
3/42 . Selection of substances for use as reactor fuel
3/44 . . Fluid or fluent reactor fuel
3/46 . . . Aqueous compositions
3/48 . . . . True or colloidal solutions of the active constituent
3/50 . . . . Suspensions of the active constituent; Slurries
3/52 . . . Liquid metal compositions
3/54 . . . Fused salt, oxide, or hydroxide compositions
3/56 . . . Gaseous compositions; Suspensions in a gaseous carrier
3/58 . . Solid reactor fuel
3/60 . . . Metallic fuel; Intermetallic dispersions
3/62 . . . Ceramic fuel
3/64 . . . . Ceramic dispersion fuel, e.g. cermet

5/00 Moderator or core structure; **Selection of materials for use as moderator**

5/02 . Details
5/04 . . Spatial arrangements allowing for Wigner growth
5/06 . . Means for locating or supporting fuel elements
5/08 . . Means for preventing undesired asymmetric expansion of the complete structure
5/10 . . Means for supporting the complete structure
5/12 . characterised by composition, e.g. the moderator containing additional substances which ensure improved heat resistance of the moderator
5/14 . characterised by shape
5/16 . . Shape of its constituent parts
5/18 . characterised by the provision of more than one active zone
5/20 . . wherein one zone contains fissile material and another zone contains breeder material
5/22 . . wherein one zone is a superheating zone

7/00 Control of nuclear reaction

7/02 . by using self-regulating properties of reactor materials (arrangements that involve temperature stability G21C 7/32)
7/04 . . of burnable poisons (burnable poisons in fuel rods G21C 3/326) **[5]**
7/06 . by application of neutron-absorbing material, i.e. material with absorption cross-section very much in excess of reflection cross-section
7/08 . . by displacement of solid control elements, e.g. control rods
7/10 . . . Construction of control elements
7/103 . . . . Control assemblies containing one or more absorbants as well as other elements, e.g. fuel or moderator elements **[5]**
7/107 . . . . Control elements adapted for pebble-bed reactors **[5]**
7/11 . . . . Deformable control elements, e.g. flexible, telescopic, articulated **[5]**
7/113 . . . . Control elements made of flat elements; Control elements having cruciform cross-section **[5]**
7/117 . . . . Clusters of control rods; Spider construction **[5]**
7/12 . . . Means for moving control elements to desired position (dropping rods in an emergency G21C 9/02)
7/14 . . . . Mechanical drive arrangements
7/16 . . . . Hydraulic or pneumatic drive arrangements
7/18 . . . Means for obtaining differential movement of control elements

7/20 . . . Disposition of shock-absorbing devices (shock-absorbers in general F16F)
7/22 . . by displacement of a fluid or fluent neutron-absorbing material
7/24 . . Selection of substances for use as neutron-absorbing material
7/26 . by displacement of the moderator or parts thereof
7/27 . . Spectral shift control **[5]**
7/28 . by displacement of the reflector or parts thereof
7/30 . by displacement of reactor fuel or fuel elements
7/32 . by varying flow of coolant through the core
7/34 . by utilisation of a primary neutron source
7/36 . Control circuits

9/00 Emergency protection arrangements structurally associated with the reactor (emergency cooling arrangements G21C 15/18)
9/004 . Pressure suppression **[5]**
9/008 . . by rupture-discs or -diaphragms **[5]**
9/012 . . by thermal accumulation or by steam condensation, e.g. ice condensers **[5]**
9/016 . Core catchers **[5]**
9/02 . Means for effecting very rapid reduction of the reactivity factor under fault conditions, e.g. reactor fuse
9/027 . . by fast movement of a solid, e.g. pebbles **[5]**
9/033 . . by an absorbent fluid **[5]**
9/04 . Means for suppressing fires
9/06 . . Means for preventing accumulation of explosives gases, e.g. recombiners **[5]**

11/00 Shielding structurally associated with the reactor
11/02 . Biological shielding (in general G21F)
11/04 . . on waterborne craft
11/06 . Reflecting shields, i.e. for minimising loss of neutrons
11/08 . Thermal shields; Thermal linings, i.e. for dissipating heat from gamma radiation which would otherwise heat an outer biological shield

13/00 Pressure vessels; **Containment vessels**; **Containment in general** (for chemical or physical processes B01J 3/00; pressure vessels in general F16J 12/00)
13/02 . Details
13/024 . . Supporting constructions for pressure vessels or containment vessels **[5]**
13/028 . . Seals, e.g. for pressure vessels or containment vessels **[5]**
13/032 . . Joints between tubes and vessel walls, e.g. taking into account thermal stresses **[5]**
13/036 . . . the tube passing through the vessel wall, i.e. continuing on both sides of the wall **[5]**
13/04 . . Arrangements for expansion and contraction
13/06 . . Sealing-plugs (for pressure vessels in general F16J 13/00)
13/067 . . . for tubes, e.g. standpipes; Locking devices for plugs **[5]**
13/073 . . . Closures for reactor-vessels, e.g. rotatable **[5]**
13/08 . Vessels characterised by the material; Selection of materials for pressure vessels
13/087 . . Metallic vessels **[5]**
13/093 . . Concrete vessels **[5]**
13/10 . Means for preventing contamination in event of leakage

15/00 Cooling arrangements within the pressure vessel containing the core; **Selection of specific coolants**
15/02 . Arrangement or disposition of passages in which heat is transferred to the coolant, e.g. for coolant circulation through the supports of the fuel elements
15/04 . . from fissile or breeder material
15/06 . . . in fuel elements
15/08 . . from moderating material
15/10 . . from reflector or thermal shield
15/12 . . from pressure vessel; from containment vessel
15/14 . . from ducts conducting a hot fluid; from ducts comprising auxiliary apparatus, e.g. pumps, cameras
15/16 . comprising means for separating liquid and steam (separating in general B01D; steam traps F16T)
15/18 . Emergency cooling arrangements; Removing shut-down heat
15/20 . Partitions or thermal insulation between fuel channel and moderator, e.g. in pressure tube reactors
15/22 . Structural association of coolant tubes with headers or other pipes, e.g. in pressure tube reactors (joints of tubes in general F16L) **[4]**
15/24 . Promoting flow of the coolant (electrodynamic pumps H02K 44/02)
15/243 . . for liquids **[5]**
15/247 . . . for liquid metals **[5]**
15/25 . . . using jet pumps **[5]**
15/253 . . for gases, e.g. blowers **[5]**
15/257 . . using heat-pipes **[5]**
15/26 . . by convection, e.g. using chimneys, using divergent channels
15/28 . Selection of specific coolants (if serving as the moderator G21C 5/12; heat-transfer or heat-exchange materials C09K 5/00)

17/00 Monitoring; **Testing** (measuring in general G01)
17/003 . Remote inspection of vessels, e.g. pressure vessels **[5]**
17/007 . . Inspection of the outer surfaces of vessels **[5]**
17/01 . . Inspection of the inner surfaces of vessels **[5]**
17/013 . . Inspection vehicles **[5]**
17/017 . Inspection or maintenance of pipe-lines or tubes in nuclear installations **[5]**
17/02 . Devices or arrangements for monitoring coolant or moderator
17/022 . . for monitoring liquid coolants or moderators **[5]**
17/025 . . . for monitoring liquid metal coolants **[5]**
17/028 . . for monitoring gaseous coolants **[5]**
17/032 . . Reactor-coolant flow measuring or monitoring **[5]**
17/035 . . Moderator- or coolant-level detecting devices **[5]**
17/038 . . Boiling detection in moderator or coolant **[5]**
17/04 . . Detecting burst slugs
17/06 . Devices or arrangements for monitoring or testing fuel or fuel elements outside the reactor core, e.g. for burn-up, for contamination (G21C 17/08, G21C 17/10 take precedence; detecting leaking fuel elements during reactor operation G21C 17/04)
17/07 . . Leak testing **[5]**
17/08 . Structural combination of reactor core or moderator structure with viewing means, e.g. with television camera, periscope, window
17/10 . Structural combination of fuel element, control rod, reactor core, or moderator structure with sensitive instruments, e.g. for measuring radioactivity, strain
17/104 . . Measuring reactivity **[5]**
17/108 . . Measuring reactor flux **[5]**

17/112 . . Measuring temperature **[5]**
17/116 . . Passages or insulators, e.g. for electric cables **[5]**
17/12 . . Sensitive element forming part of control element
17/14 . Period meters

19/00 Arrangements for treating, for handling, or for facilitating the handling of, fuel or other materials which are used within the reactor, e.g. within its pressure vessel [2]
19/02 . Details of handling arrangements
19/04 . . Means for controlling flow of coolant over objects being handled; Means for controlling flow of coolant through channel being serviced
19/06 . . Means for supporting or storing fuel elements or control elements **[4]**
19/07 . . . Storage racks; Storage pools **[5]**
19/08 . . Means for heating fuel elements before introduction into the core; Means for heating or cooling fuel elements after removal from the core
19/10 . . Lifting devices or pulling devices adapted for co-operation with fuel elements or with control elements (manipulators B25J)
19/105 . . . with grasping or spreading coupling elements **[5]**
19/11 . . . with revolving coupling elements, e.g. socket coupling **[5]**
19/115 . . . with latching devices and ball couplings **[5]**
19/12 . . Arrangements for exerting direct hydraulic or pneumatic force on fuel element or on control element
19/14 . characterised by their adaptation for use with horizontal channels in the reactor core
19/16 . Articulated or telescopic chutes or tubes for connection to channels in the reactor core
19/18 . Apparatus for bringing fuel elements to the reactor charge area, e.g. from a storage place
19/19 . Reactor parts specifically adapted to facilitate handling, e.g. to facilitate charging or discharging of fuel elements **[3]**
19/20 . Arrangements for introducing objects into the pressure vessel; Arrangements for handling objects within the pressure vessel; Arrangements for removing objects from the pressure vessel
19/22 . . Arrangements for obtaining access to the interior of a pressure vessel whilst the reactor is operating
19/24 . . . by using an auxiliary vessel which is temporarily sealed to the pressure vessel
19/26 . Arrangements for removing jammed or damaged fuel elements or control elements; Arrangements for moving broken parts thereof
19/28 . Arrangements for introducing fluent material into the reactor core; Arrangements for removing fluent material from the reactor core (pumping coolant G21D)
19/30 . . with continuous purification of circulating fluent material, e.g. by extraction of fission products
19/303 . . . specially adapted for gases (decontamination of gases G21F 9/02) **[5]**
19/307 . . . specially adapted for liquids (decontamination of liquids G21F 9/04) **[5]**
19/31 . . . . for molten metals **[5]**
19/313 . . . . . using cold traps **[5]**
19/317 . . . Recombination devices for radiolytic dissociation products **[5]**
19/32 . Apparatus for removing radioactive objects or materials from the reactor discharge area, e.g. to a storage place; Apparatus for handling radioactive objects or materials within a storage place or removing them therefrom (disposal of waste material G21F 9/00)
19/33 . Apparatus or processes for dismantling strings of spent fuel elements (G21C 19/34 takes precedence) **[2]**
19/34 . Apparatus or processes for dismantling nuclear fuel, e.g. before reprocessing (shielded cells G21F 7/00) **[5]**
19/36 . . Mechanical means only
19/365 . . . Removing cannings or casings from fuel **[5]**
19/37 . . . . by separating into pieces both the canning or the casing and the fuel element, e.g. by cutting or shearing **[5]**
19/375 . . . Compacting devices, e.g. for fuel assemblies **[5]**
19/38 . . Chemical means only
19/40 . Arrangements for preventing occurrence of critical conditions, e.g. during storage
19/42 . Reprocessing of irradiated fuel
19/44 . . of irradiated solid fuel
19/46 . . . Aqueous processes
19/48 . . . Non-aqueous processes
19/50 . . of irradiated fluid fuel

21/00 Apparatus or processes specially adapted to the manufacture of reactors or parts thereof (in general, section B, e.g. B23)
21/02 . Manufacture of fuel elements or breeder elements contained in non-active casings
21/04 . . by vibrational compaction or tamping
21/06 . . by swaging
21/08 . . by a slip-fit cladding process
21/10 . . by extrusion, drawing, or stretching
21/12 . . by hydrostatic or thermo-pneumatic canning
21/14 . . by plating in a fluid
21/16 . . by casting or dipping techniques
21/18 . Manufacture of control elements covered by group G21C 7/00

23/00 Adaptations of reactors to facilitate experimentation or irradiation [3]

G21D NUCLEAR POWER PLANT

1/00 Details of nuclear power plant (control G21D 3/00)
1/02 . Arrangements of auxiliary equipment
1/04 . Pumping arrangements (by means within the reactor pressure vessel G21C 15/24)

3/00 Control of nuclear power plant (control of nuclear reaction G21C 7/00)
3/02 . Manual control
3/04 . Safety arrangements (emergency protection of reactor G21C 9/00)

3/06 . . responsive to faults within the plant (in the reactor G21C 9/02)
3/08 . Regulation of any parameters in the plant
3/10 . . by a combination of a variable derived from neutron flux with other controlling variables, e.g. derived from temperature, cooling flow, pressure
3/12 . . by adjustment of the reactor in response only to changes in engine demand
3/14 . . . Varying flow of coolant
3/16 . . . Varying reactivity
3/18 . . by adjustment of plant external to the reactor only in response to change in reactivity

5/00 Arrangements of reactor and engine in which reactor-produced heat is converted into mechanical energy
5/02 . Reactor and engine structurally combined, e.g. portable
5/04 . Reactor and engine not structurally combined
5/06 . . with engine working medium circulating through reactor core
5/08 . . with engine working medium heated in a heat exchanger by the reactor coolant
5/10 . . . Liquid working medium partially heated by reactor and vaporised by heat source external to the core, e.g. with oil heating
5/12 . . . Liquid working medium vaporised by reactor coolant
5/14 . . . . and also superheated by reactor coolant
5/16 . . . . superheated by separate heat source

7/00 Arrangements for direct production of electric energy from fusion or fission reactions (obtaining electric energy from radioactive sources G21H 1/00)
7/02 . using magneto-hydrodynamic generators
7/04 . using thermoelectric elements (structural combination of fuel element with thermoelectric element G21C 3/40)

9/00 Arrangements to provide heat for purposes other than conversion into power, e.g. for heating buildings

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G21F PROTECTION AGAINST X-RADIATION, GAMMA RADIATION, CORPUSCULAR RADIATION OR PARTICLE BOMBARDMENT; TREATING RADIOACTIVELY CONTAMINATED MATERIAL; DECONTAMINATION ARRANGEMENTS THEREFOR (radiation protection by pharmaceutical means A61K 8/00, A61Q 17/04; in cosmonautic vehicles B64G 1/54; combined with a reactor G21C 11/00; combined with X-ray tubes H01J 35/16; combined with X-ray apparatus H05G 1/02)

1/00 Shielding characterised by the composition of the material
1/02 . Selection of uniform shielding materials
1/04 . . Concretes; Other hydraulic hardening materials
1/06 . . Ceramics; Glasses; Refractories (cermets G21F 1/08)
1/08 . . Metals; Alloys; Cermets, i.e. sintered mixtures of ceramics and metals
1/10 . . Organic substances; Dispersions in organic carriers
1/12 . Laminated shielding materials

3/00 Shielding characterised by its physical form, e.g. granules, or shape of the material
3/02 . Clothing
3/025 . . Clothing completely surrounding the wearer **[5]**
3/03 . . Aprons **[5]**
3/035 . . Gloves (mounting means on glove boxes G21F 7/053) **[5]**
3/04 . Bricks; Shields made up therefrom

5/00 Transportable or portable shielded containers
5/002 . Containers for fluid radioactive wastes **[5]**
5/005 . Containers for solid radioactive wastes, e.g. for ultimate disposal **[5]**
5/008 . . Containers for fuel elements **[5]**
5/012 . . . Fuel element racks in the containers **[5]**
5/015 . for storing radioactive sources, e.g. source carriers for irradiation units; Radioisotope containers **[5]**
5/018 . . Syringe shields or holders (syringe shielding for applying radioactive material to the body A61M 36/08) **[5]**
5/02 . with provision for restricted exposure of a radiation source within the container
5/04 . . Means for controlling exposure, e.g. time, size of aperture (controlling exposure to X-radiation H05G 1/30)
5/06 . Details of, or accessories to, the containers **[5]**
5/08 . . Shock-absorbers, e.g. impact buffers for containers **[5]**
5/10 . . Heat-removal systems, e.g. using circulating fluid or cooling fins **[5]**
5/12 . . Closures for containers; Sealing arrangements **[5]**
5/14 . . Devices for handling containers or shipping-casks, e.g. transporting devices **[5]**

7/00 Shielded cells or rooms
7/005 . Shielded passages through walls; Locks; Transferring devices between rooms (between glove-boxes G21F 7/047) **[5]**
7/01 . . Transferring by fluidic means **[5]**
7/015 . Room atmosphere, temperature or pressure control devices **[5]**
7/02 . Observation devices permitting vision but shielding the observer
7/03 . . Windows, e.g. shielded **[5]**
7/04 . Shielded glove-boxes
7/047 . . Shielded passages; Closing or transferring means between glove-boxes **[5]**
7/053 . . Glove mounting means **[5]**
7/06 . Structural combination with remotely-controlled apparatus, e.g. with manipulators

9/00 Treating radioactively contaminated material; Decontamination arrangements therefor [2,5]
9/02 . Treating gases **[2]**
9/04 . Treating liquids **[2]**
9/06 . . Processing
9/08 . . . by evaporation; by distillation
9/10 . . . by flocculation

9/12 . . . by absorption; by adsorption; by ion-exchange
9/14 . . . by incineration; by calcination, e.g. desiccation
9/16 . . . by fixation in stable solid media
9/18 . . . by biological processes
9/20 . . Disposal of liquid waste
9/22 . . . by storage in a tank or other container
9/24 . . . by storage in the ground; by storage under water, e.g. in ocean
9/26 . . . by dilution in water, e.g. in ocean, in stream
9/28 . Treating solids **[2]**
9/30 . . Processing
9/32 . . . by incineration
9/34 . . Disposal of solid waste
9/36 . . . by packaging; by baling

G21G CONVERSION OF CHEMICAL ELEMENTS; RADIOACTIVE SOURCES [2]

1/00 Arrangements for converting chemical elements by electromagnetic radiation, corpuscular radiation, or particle bombardment, e.g. producing radioactive isotopes (by thermonuclear reactions in nuclear reactors G21B; conversion of nuclear fuel in nuclear reactors G21C) **[2]**
1/02 . in nuclear reactors
1/04 . outside of nuclear reactors or particle accelerators **[2]**
1/06 . . by neutron irradiation **[2]**
1/08 . . . accompanied by nuclear fission **[2]**
1/10 . . by bombardment with electrically-charged particles (irradiation devices G21K 5/00) **[2]**
1/12 . . by electromagnetic irradiation, e.g. with gamma or X-rays (irradiation devices G21K 5/00) **[2]**

4/00 Radioactive sources [2]
4/02 . Neutron sources **[2]**
4/04 . Radioactive sources other than neutron sources (radioactive dressings A61M 36/14) **[2]**
4/06 . . characterised by constructional features **[2]**
4/08 . . . specially adapted for medical applications (radiation therapy using radioactive sources A61N 5/10) **[2]**
4/10 . . with radium emanation **[2]**

5/00 Alleged conversion of chemical elements by chemical reaction

7/00 Conversion of chemical elements not provided for in other groups of this subclass [2009.01]

G21H OBTAINING ENERGY FROM RADIOACTIVE SOURCES; APPLICATIONS OF RADIATION FROM RADIOACTIVE SOURCES; UTILISING COSMIC RADIATION (fusion reactors G21B; nuclear reactors G21C)

1/00 Arrangements for obtaining electrical energy from radioactive sources, e.g. from radioactive isotopes
1/02 . Cells charged directly by beta radiation
1/04 . Cells using secondary emission induced by alpha radiation, beta radiation, or gamma radiation
1/06 . Cells wherein radiation is applied to the junction of different semiconductor materials
1/08 . Cells in which radiation ionises a gas in the presence of a junction of two dissimilar metals, i.e. contact potential-difference cells
1/10 . Cells in which radiation heats a thermoelectric junction or a thermionic converter **[2]**
1/12 . Cells using conversion of the radiation into light combined with subsequent photoelectric conversion into electric energy

3/00 Arrangements for direct conversion of radiation energy from radioactive sources into forms of energy other than electric energy, e.g. light
3/02 . in which material is excited to luminesce by the radiation (lamps in which a gas filling or screen or coating is excited to luminesce by radioactive material structurally associated with the lamp H01J 65/00)

5/00 Applications of radiation from radioactive sources or arrangements therefor (producing mutation in plants A01H 1/06; preservation of dairy products A23C 3/07; preservation of foodstuffs A23L 3/26; for therapeutic purposes A61N 5/10; in chemical, physical or physicochemical processes in general B01J 19/08; in electrostatic separation B03C 3/38; for after-treatment of coatings applied as liquids or other fluent materials B05D 3/06; for action between electric vehicles and tracked apparatus B61L 1/10, B61L 3/06; for preparation of organic chemical compounds C07, C08F 2/46; for treating macromolecular substances or articles made therefrom B29C 71/04, C08J 3/28, C08J 7/18; for cracking of hydrocarbon oils C10G 15/10, C10G 32/04; for reforming naphtha C10G 35/16; preservation or ageing of products obtained from fermentation processes C12H 1/06, C12H 1/16; for bleaching fibres D06L 3/04; measuring G01T; irradiation devices, gamma- or X-ray microscopes G21K; in discharge tubes H01J; apparatus for generating ions to be introduced into non-enclosed gases, e.g. into the atmosphere, H01T 23/00; for carrying-off electrostatic charges H05F 3/06)
5/02 . as tracers

7/00 Use of effects of cosmic radiation

G21J NUCLEAR EXPLOSIVES; APPLICATIONS THEREOF

Note

This subclass covers uncontrollable fission or fusion reactions.

1/00 Nuclear explosive devices

3/00 Peaceful applications of nuclear explosive devices

3/02 . for excavation

5/00 Detection arrangements for nuclear explosions

G21K TECHNIQUES FOR HANDLING PARTICLES OR ELECTROMAGNETIC RADIATION NOT OTHERWISE PROVIDED FOR; IRRADIATION DEVICES; GAMMA- OR X-RAY MICROSCOPES (X-ray technique H05G; plasma technique H05H) **[2]**

1/00 Arrangements for handling radiation or particles, e.g. focusing, moderating (radiation filters G21K 3/00) **[2]**

1/02 . using diaphragms, collimators **[2]**

1/04 . . using variable diaphragms, shutters, choppers **[2]**

1/06 . using diffraction, refraction, or reflection, e.g. monochromators (G21K 1/10, G21K 7/00 take precedence) **[2]**

1/08 . Deviation, concentration, or focusing of the beam by electric or magnetic means (electron-optical arrangements in electric discharge tubes H01J 29/46) **[2]**

1/087 . . by electrical means **[4]**

1/093 . . by magnetic means **[4]**

1/10 . Scattering devices; Absorbing devices **[2]**

1/12 . . Resonant absorbers or driving arrangements therefor, e.g. for Mössbauer-effect devices **[3]**

1/14 . using charge exchange devices, e.g. for neutralising or changing the sign of the electrical charges of beams (producing or accelerating neutral particle beams H05H 3/00) **[3]**

1/16 . using polarising devices, e.g. for obtaining a polarised ion beam **[3]**

3/00 Radiation filters, e.g. X-ray filters [2]

4/00 Conversion screens for the conversion of the spatial distribution of X-rays or particle radiation into visible images, e.g. fluoroscopic screens (photographic processes using X-ray intensifiers G03C 5/17; discharge tubes comprising luminescent screens H01J 1/62; cathode ray tubes for X-ray conversion with optical output H01J 31/50) **[3]**

5/00 Irradiation devices (adaptations of reactors to facilitate irradiation G21C 23/00; discharge tubes for irradiating H01J 33/00, H01J 37/00) **[2]**

5/02 . having no beam-forming means **[2]**

5/04 . with beam-forming means **[2]**

5/08 . Holders for targets or for objects to be irradiated **[2]**

5/10 . with provision for relative movement of beam source and object to be irradiated **[3]**

7/00 Gamma- or X-ray microscopes [2]

G99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

G99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]

SECTION H – ELECTRICITY

Note

These Notes cover the basic principles and general instructions for use of section H.

(I) Section H covers:
- (a) basic electric elements, which cover all electric units and the general mechanical structure of apparatus and circuits, including the assembly of various basic elements into what are called printed circuits and also cover to a certain extent the manufacture of these elements (when not covered elsewhere);
- (b) generation of electricity, which covers the generation, conversion and distribution of electricity together with the controlling of the corresponding gear;
- (c) applied electricity, which covers:
  - (i) general utilisation techniques, viz. those of electric heating and electric lighting circuits;
  - (ii) some special utilisation techniques, either electric or electronic in the strict sense, which are not covered by other sections of the Classification, including:
    - (1) electric light sources, including lasers;
    - (2) electric X-ray technique;
    - (3) electric plasma technique and the generation and acceleration of electrically charged particles or neutrons;
- (d) basic electronic circuits and their control;
- (e) radio or electric communication technique;
- (f) the use of a specified material for the manufacture of the article or element described. In this connection, paragraphs 88 to 90 of the Guide should be referred to.

(II) In this section, the following general rules apply:
- (a) Subject to the exceptions stated in I(c), above, any electric aspect or part peculiar to a particular operation, process, apparatus, object or article, classified in one of the sections of the Classification other than section H, is always classified in the subclass for that operation, process, apparatus, object or article. Where common characteristics concerning technical subjects of similar nature have been brought out at class level, the electric aspect or part is classified, in conjunction with the operation, process, apparatus, object or article, in a subclass which covers entirely the general electrical applications for the technical subject in question;
- (b) The electrical applications referred to under (a), above, either general or particular, include:
  - (i) the therapeutic processes and apparatus, in class A61;
  - (ii) the electric processes and apparatus used in various laboratory or industrial operations, in classes B01 and B03 and in subclass B23K;
  - (iii) the electricity supply, electric propulsion and electric lighting of vehicles in general and of particular vehicles, in the subsection “Transporting” of section B;
  - (iv) the electric ignition systems of internal-combustion engines, in subclass F02P, and of combustion apparatus in general, in subclass F23Q;
  - (v) the whole electrical part of section G, i.e. measuring devices including apparatus for measuring electric variables, checking, signalling and calculating. Electricity in that section is generally dealt with as a means and not as an end in itself;
- (c) All electrical applications, both general and particular, presuppose that the “basic electricity” aspect appears in section H (see I(a) above) as regards the electric “basic elements” which they comprise. This rule is also valid for applied electricity, referred to in I(c), above, which appears in section H itself.

(III) In this section, the following special cases occur:
- (a) Among the general applications covered by sections other than section H, it is worth noting that electric heating in general is covered by subclasses F24D or F24H or class F27, and that electric lighting in general is partly covered by class F21, since in section H (see I(c), above) there are places in H05B which cover the same technical subjects;
- (b) In the two cases referred to under (a), above, the subclasses of section F, which deal with the respective subjects, essentially cover in the first place the whole mechanical aspect of the apparatus or devices, whereas the electrical aspect, as such, is covered by subclass H05B;
- (c) In the case of lighting, this mechanical aspect should be taken to cover the material arrangement of the various electric elements, i.e., their geometrical or physical position in relation to one another; this aspect is covered by subclass F21V, the elements themselves and the primary circuits remaining in section H. The same applies to electric light sources, when combined with light sources of a different kind. These are covered by subclass H05B, whereas the physical arrangement which their combination constitutes is covered by the various subclasses of class F21;
- (d) As regards heating, not only the electric elements and circuitry designs, as such, are covered by subclass H05B, but also the electric aspects of their arrangement, where these concern cases of general application; electric furnaces being considered as such. The physical disposition of the electric elements in furnaces is covered by section F. If a comparison is made with electric welding circuits, which are covered by subclass B23K in connection with welding, it can be seen that electric heating is not covered by the general rule stated in II, above.

H01 BASIC ELECTRIC ELEMENTS

(1) Processes involving only a single technical art, e.g. drying, coating, for which provision exists elsewhere are classified in the relevant class for that art.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

H01B CABLES; **CONDUCTORS**; **INSULATORS**; **SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING, OR DIELECTRIC PROPERTIES** (selection for magnetic properties H01F 1/00; waveguides H01P; installation of cables or lines, or of combined optical and electric, cables or lines H02G)

Subclass index

1/00 Conductors or conductive bodies characterised by the conductive materials; **Selection of materials as conductors** (superconductive or hyperconductive conductors, cables, or transmission lines characterised by the materials H01B 12/00; resistors H01C; details of devices using superconductivity or hyperconductivity, characterised by the material H01L 39/12) **[4]**

Note

Groups H01B 1/14 to H01B 1/24 take precedence over groups H01B 1/02 to H01B 1/06. **[3]**

1/02 . mainly consisting of metals or alloys
1/04 . mainly consisting of carbon-silicon compounds, carbon, or silicon
1/06 . mainly consisting of other non-metallic substances
1/08 . . oxides
1/10 . . sulfides
1/12 . . organic substances **[3]**
1/14 . Conductive material dispersed in non-conductive inorganic material **[3]**
1/16 . . the conductive material comprising metals or alloys **[3]**
1/18 . . the conductive material comprising carbon-silicon compounds, carbon, or silicon **[3]**
1/20 . Conductive material dispersed in non-conductive organic material **[3]**
1/22 . . the conductive material comprising metals or alloys **[3]**
1/24 . . the conductive material comprising carbon-silicon compounds, carbon, or silicon **[3]**

3/00 Insulators or insulating bodies characterised by the insulating materials; **Selection of materials for their insulating or dielectric properties** (selection of piezo-electric or electrostrictive materials H01L 41/00)

3/02 . mainly consisting of inorganic substances
3/04 . . mica
3/06 . . asbestos
3/08 . . quartz; glass; glass wool; slag wool; vitreous enamels
3/10 . . metallic oxides (ceramics H01B 3/12)
3/12 . . ceramics
3/14 . . cements
3/16 . . gases
3/18 . mainly consisting of organic substances
3/20 . . liquids, e.g. oils (silicone oils H01B 3/46)
3/22 . . . hydrocarbons
3/24 . . . containing halogen in the molecules, e.g. halogenated oils
3/26 . . asphalts; bitumens; pitches
3/28 . . natural or synthetic rubbers
3/30 . . plastics; resins; waxes

Note

Group H01B 3/47 takes precedence over groups H01B 3/32 to H01B 3/46. **[8]**

3/32 . . . natural resins
3/34 . . . waxes (silicone waxes H01B 3/46)
3/36 . . . condensation products of phenols with aldehydes or ketones
3/38 . . . condensation products of aldehydes with amines or amides
3/40 . . . epoxy resins
3/42 . . . polyesters; polyethers; polyacetals
3/44 . . . vinyl resins; acrylic resins (silicones H01B 3/46)
3/46 . . . silicones
3/47 . . . fibre-reinforced plastics, e.g. glass-reinforced plastics **[8]**
3/48 . . fibrous materials (fibre-reinforced plastics H01B 3/47) **[1,8]**
3/50 . . . fabric
3/52 . . . wood; paper; pressboard (insulating paper per se D21H 27/12)
3/54 . . . hard paper; hard fabrics
3/56 . . gases

Note

Group H01B 12/00 takes precedence over groups H01B 5/00 to H01B 11/00.

5/00 Non-insulated conductors or conductive bodies characterised by their form

5/02 . Single bars, rods, wires or strips; Bus-bars (aspects of connection with their counterparts H01R 25/00; bus-bar layouts H02B 1/20; installations of bus-bars H02G 5/00) **[1,7]**
5/04 . . wound or coiled
5/06 . Single tubes
5/08 . Several wires or the like stranded in the form of a rope

5/10 . . stranded around a space, insulating material, or dissimilar conducting material
5/12 . Braided wires or the like
5/14 . comprising conductive layers or films on insulating-supports (insulating-layers or insulating-films on metal bodies H01B 17/62)
5/16 . comprising conductive material in insulating or poorly conductive material, e.g. conductive rubber (H01B 1/14, H01B 1/20 take precedence; insulating bodies with conductive admixtures H01B 17/64; conductive paints C09D 5/24) **[3]**

7/00 Insulated conductors or cables characterised by their form
7/02 . Disposition of insulation (materials H01B 3/00; insulators H01B 17/00)
7/04 . Flexible cables, conductors, or cords, e.g. trailing cables
7/06 . Extensible conductors or cables, e.g. self-coiling cords (arrangements for storing and repeatedly paying-out and re-storing lengths of conductors or cables B65H 75/34)
7/08 . Flat or ribbon cables
7/10 . Contact cables, i.e. having conductors which may be brought into contact by distortion of the cable
7/12 . Floating cables (installations of cables supported on or from floats H02G 9/12)
7/14 . Submarine cables
7/16 . Rigid-tube cables (heating elements of similar construction H05B)
7/17 . Protection against damage caused by external factors, e.g. sheaths or armouring (power cables with screens H01B 9/02; communication cables with screens H01B 11/06; installation of conduits H02G) **[7]**
7/18 . . by wear, mechanical force or pressure **[1,7]**
7/20 . . . Metal tubes, e.g. lead sheaths **[1,7]**
7/22 . . . Metal wires or tapes, e.g. made of steel **[1,7]**
7/24 . . . Devices affording localised protection against mechanical force or pressure **[1,7]**
7/26 . . . Reduction of losses in sheaths or armouring **[1,7]**
7/28 . . by moisture, corrosion, chemical attack or weather **[1,7]**
7/282 . . . Preventing penetration of fluid into conductor or cable (insulators or insulating bodies with surfaces specially treated for preserving insulating properties, e.g. for protection against moisture, dirt, or the like, H01B 17/50) **[7]**
7/285 . . . . by completely or partially filling interstices in the cable **[7]**
7/288 . . . . . using hygroscopic material or material swelling in the presence of liquid **[7]**
7/29 . . by extremes of temperature or by flame (H01B 7/42 takes precedence) **[7]**
7/295 . . . using material resistant to flame **[7]**
7/30 . with arrangements for reducing conductor losses when carrying ac, e.g. due to skin effect
7/32 . with arrangements for indicating defects, e.g. breaks, leaks (locating defects by measuring G01)
7/36 . with distinguishing or length marks
7/38 . with arrangements for facilitating removal of insulation **[7]**
7/40 . with arrangements for facilitating mounting or securing **[7]**
7/42 . with arrangements for heat dissipation or conduction (insulators or insulating bodies having heating or cooling devices H01B 17/54) **[7]**

9/00 Power cables
9/02 . with screens or conductive layers, e.g. for avoiding large potential gradients
9/04 . Concentric cables
9/06 . Gas-pressure cables; Oil-pressure cables; Cables for use in conduits under fluid pressure

11/00 Communication cables or conductors (waveguides H01P)
11/02 . Cables with twisted pairs or quads (transposing, crossing, or twisting at joints H04B; balancing of earth capacitance H04B)
11/04 . . with pairs or quads mutually positioned to reduce cross-talk (balancing by making use of additional capacitors or coils H04B)
11/06 . . with means for reducing effects of electromagnetic or electrostatic disturbances, e.g. screen (screening in general H05K 9/00)
11/08 . . . Screens specially adapted for reducing cross-talk
11/10 . . . Screens specially adapted for reducing interference from external sources
11/12 . . Arrangements for exhibiting specific transmission characteristics (loading coils per se H01F 17/08; coil-loaded circuits H04B)
11/14 . . . Continuously inductively loaded cables, e.g. Krarup cables
11/16 . . . Cables, e.g. submarine cable, with coils or other devices incorporated during cable manufacture (junction boxes for cables H02G 15/10)
11/18 . Coaxial cables; Analogous cables having more than one inner conductor within a common outer conductor (suitable for handling frequencies considerably beyond the audio range H01P 3/06)
11/20 . . Cables having a multiplicity of coaxial lines **[3]**
11/22 . Cables including at least one electrical conductor together with optical fibres **[4]**

12/00 Superconductive or hyperconductive conductors, cables, or transmission lines (superconductors characterised by the ceramic-forming technique or the ceramic composition C04B 35/00; details or devices using superconductivity or hyperconductivity characterised by the material H01L 39/12) **[2,4]**
12/02 . characterised by their form **[4]**

Note

Group H01B 12/12 takes precedence over groups H01B 12/04 to H01B 12/10. **[4]**

12/04 . . Single wire **[4]**
12/06 . . Films or wires on bases or cores **[4]**
12/08 . . Stranded or braided wires **[4]**
12/10 . . Multi-filaments embedded in normal conductors **[4]**
12/12 . . Hollow conductors **[4]**
12/14 . characterised by the disposition of thermal insulation **[4]**
12/16 . characterised by cooling **[4]**

13/00 Apparatus or processes specially adapted for manufacturing conductors or cables
13/004 . for manufacturing rigid-tube cables **[7]**
13/008 . for manufacturing extensible conductors or cables **[7]**
13/012 . for manufacturing wire harnesses **[7]**
13/016 . for manufacturing co-axial cables (applying discontinuous insulation H01B 13/20) **[7]**

13/02 . Stranding-up (stranding-up ropes D07B)
13/04 . . Mutually-positioning pairs or quads to reduce cross-talk
13/06 . Insulating conductors or cables (H01B 13/32 takes precedence) **[4]**
13/08 . . by winding
13/10 . . by longitudinal lapping
13/12 . . by applying loose fibres
13/14 . . by extrusion
13/16 . . by passing through, or dipping in, a liquid bath; by spraying
13/18 . . Applying discontinuous insulation, e.g. discs, beads
13/20 . . . for concentric or coaxial cables
13/22 . Sheathing; Armouring; Screening; Applying other protective layers (H01B 13/32 takes precedence) **[4]**
13/24 . . by extrusion
13/26 . . by winding, braiding, or longitudinal lapping (winding in general B65H)
13/28 . Applying continuous inductive loading, e.g. Krarup loading
13/30 . Drying (in general F26B); Impregnating (H01B 13/32 takes precedence) **[4]**
13/32 . Filling or coating with impervious material (for cable installations H02G 15/00) **[4]**
13/34 . for marking conductors or cables **[7]**

15/00 Apparatus or processes for salvaging material from cables (insulated conductors or cables with arrangements for facilitating removal of insulation H01B 7/38; methods or apparatus specially adapted for removing insulation from conductors H02G 1/12)

17/00 Insulators or insulating bodies characterised by their form (section insulators for electric traction B60M 1/18; insulating rail-joints E01B 11/54)
17/02 . Suspension insulators; Strain insulators
17/04 . . Chains; Multiple chains
17/06 . . Fastening of insulator to support, to conductor, or to adjoining insulator
17/08 . . . by cap-and-bolt
17/10 . . . by intermediate link
17/12 . . Special features of strain insulators (devices for relieving mechanical tension of electric lines or cables H02G 7/04)
17/14 . Supporting insulators (pin insulators H01B 17/20; apertured insulators H01B 17/24)
17/16 . . Fastening of insulators to support, to conductor, or to adjoining insulator
17/18 . . for very heavy conductors, e.g. bus-bars, rails
17/20 . Pin insulators
17/22 . . Fastening of conductors to insulator
17/24 . Insulators apertured for fixing by nail, screw, wire, or bar, e.g. diabolo, bobbin
17/26 . Lead-in insulators; Lead-through insulators
17/28 . . Capacitor type (capacitors H01G)
17/30 . . Sealing (packings in general F16J)
17/32 . Single insulators consisting of two or more dissimilar insulating bodies
17/34 . Insulators containing liquid, e.g. oil
17/36 . Insulators having evacuated or gas-filled spaces
17/38 . Fittings, e.g. caps; Fastenings therefor
17/40 . . Cementless fittings
17/42 . Means for obtaining improved distribution of voltage (capacitor-type lead-through insulators H01B 17/28); Protection against arc discharges
17/44 . . Structural association of insulators with corona rings (corona rings H01T 19/02)
17/46 . . Means for providing an external arc-discharge path (spark-gap arresters H01T)
17/48 . . over chains or other serially-arranged insulators
17/50 . with surfaces specially treated for preserving insulating properties, e.g. for protection against moisture, dirt, or the like
17/52 . having cleaning devices (H01B 17/54 takes precedence)
17/54 . having heating or cooling devices
17/56 . Insulating bodies
17/58 . . Tubes, sleeves, beads, or bobbins through which the conductor passes (protective tubings for the installation of lines or cables in buildings H02G 3/04)
17/60 . . Composite insulating bodies (cables or conductors H01B 7/00, H01B 9/00; resistors H01C; capacitors H01G)
17/62 . . Insulating-layers or insulating-films on metal bodies (conductive layers or films on insulating bodies H01B 5/14)
17/64 . . with conductive admixtures, inserts, or layers (conductive bodies comprising conductive material dispersed in insulating material H01B 5/16)
17/66 . . Joining insulating bodies together, e.g. by bonding

19/00 Apparatus or processes specially adapted for manufacturing insulators or insulating bodies
19/02 . Drying (in general F26B); Impregnating
19/04 . Treating the surfaces, e.g. applying coatings

H01C RESISTORS

(1) In this subclass, the following term is used with the meaning indicated:
– "adjustable" means mechanically adjustable. **[2]**
(2) Variable resistors, the value of which is changed non-mechanically, e.g. by voltage or temperature, are classified in group H01C 7/00. **[2]**

Subclass index

1/00 Details

1/01 . Mounting; Supporting **[2]**

1/012 . . the base extending along, and imparting rigidity or reinforcement to, the resistive element (H01C 1/016 takes precedence; the resistive element being formed in two or more coils or loops as a spiral, helical, or toroidal winding H01C 3/18, H01C 3/20; the resistive element being formed as one or more layers or coatings on a base H01C 7/00) **[2]**

1/014 . . the resistor being suspended between, and being supported by, two supporting sections (H01C 1/016 takes precedence) **[2]**

1/016 . . with compensation for resistor expansion or contraction **[2]**

1/02 . Housing; Enclosing; Embedding; Filling the housing or enclosure **[2]**

1/022 . . the housing or enclosure being openable or separable from the resistive element **[2]**

1/024 . . the housing or enclosure being hermetically sealed (H01C 1/028, H01C 1/032, H01C 1/034 take precedence) **[2]**

1/026 . . . with gaseous or vacuum spacing between the resistive element and the housing or casing **[2]**

1/028 . . the resistive element being embedded in insulation with outer enclosing sheath **[2]**

1/03 . . . with powdered insulation **[2]**

1/032 . . plural layers surrounding the resistive element (H01C 1/028 takes precedence) **[2]**

1/034 . . the housing or enclosure being formed as coating or mould without outer sheath (H01C 1/032 takes precedence) **[2]**

1/036 . . . on wound resistive element **[2]**

1/04 . Arrangements of distinguishing marks, e.g. colour coding

1/06 . Electrostatic or electromagnetic shielding arrangements

1/08 . Cooling, heating, or ventilating arrangements

1/082 . . using forced fluid flow **[2]**

1/084 . . using self-cooling, e.g. fins, heat sinks **[2]**

1/12 . Arrangements of current collectors

1/125 . . of fluid contacts **[2]**

1/14 . Terminals or tapping points specially adapted for resistors (in general H01R); Arrangements of terminals or tapping points on resistors

1/142 . . the terminals or tapping points being coated on the resistive element **[2]**

1/144 . . the terminals or tapping points being welded or soldered **[2]**

1/146 . . the resistive element surrounding the terminal **[2]**

1/148 . . the terminals embracing or surrounding the resistive element (H01C 1/142 takes precedence) **[2]**

1/16 . Resistor networks not otherwise provided for

3/00 Non-adjustable metal resistors made of wire or ribbon, e.g. coiled, woven, or formed as grids

3/02 . arranged or constructed for reducing self-induction, capacitance, or variation with frequency

3/04 . Iron-filament ballast resistors; Other resistors having variable temperature coefficient

3/06 . Flexible or folding resistors, whereby such a resistor can be looped or collapsed upon itself **[2]**

3/08 . Dimension or characteristic of resistive element changing gradually or in discrete steps from one terminal to another **[2]**

3/10 . the resistive element having zig-zag or sinusoidal configuration **[2]**

3/12 . . lying in one plane **[2]**

3/14 . the resistive element being formed in two or more coils or loops continuously wound as a spiral, helical, or toroidal winding (H01C 3/02 to H01C 3/12 take precedence) **[2]**

3/16 . . including two or more distinct wound elements, or two or more winding patterns **[2]**

3/18 . . wound on a flat or ribbon base (H01C 3/16 takes precedence) **[2]**

3/20 . . wound on cylindrical or prismatic base (H01C 3/16 takes precedence) **[2]**

7/00 Non-adjustable resistors formed as one or more layers or coatings; **Non-adjustable resistors made from powdered conducting material or powdered semi-conducting material with or without insulating material** (consisting of loose powdered or granular material H01C 8/00; resistors with a potential-jump barrier or surface barrier, e.g. field effect resistors, H01L 29/00; semiconductor devices sensitive to electromagnetic or corpuscular radiation, e.g. photoresistors, H01L 31/00; devices using superconductivity or hyperconductivity H01L 39/00; devices using galvano-magnetic or similar magnetic effects, e.g. magnetic-field-controlled resistors, H01L 43/00; solid state devices for rectifying, amplifying, oscillating, or switching without a potential-jump barrier or surface barrier H01L 45/00; bulk negative resistance effect devices H01L 47/00) **[2]**

7/02 . having positive temperature coefficient

7/04 . having negative temperature coefficient

7/06 . including means to minimise changes in resistance with changes in temperature

7/10 . voltage responsive, i.e. varistors **[6]**

7/102 . . Varistor boundary, e.g. surface layers (H01C 7/12 takes precedence) **[6]**

7/105 . . Varistor cores (H01C 7/12 takes precedence) **[6]**

7/108 . . . Metal oxide **[6]**

7/112 . . . . ZnO type **[6]**

7/115 . . . . Titanium dioxide- or titanate type **[6]**

7/118 . . . Carbide, e.g. SiC type **[6]**

7/12 . . Overvoltage protection resistors; Arresters **[3]**

7/13 . current-responsive **[2]**

Note

Groups H01C 7/02 to H01C 7/13 take precedence over groups H01C 7/18 to H01C 7/22. **[2]**

7/18 . comprising a plurality of layers stacked between terminals **[2]**

7/20 . the resistive layer or coating being tapered **[2]**

7/22 . Elongated resistive element being bent or curved, e.g. sinusoidal, helical **[2]**

8/00 Non-adjustable resistors consisting of loose powdered or granular conducting, or powdered or granular semi-conducting material [2]

8/02 . Coherers or like imperfect resistors for detecting electromagnetic waves **[2]**

8/04 . Overvoltage protection resistors; Arresters **[2,3]**

10/00 Adjustable resistors [2]

10/02 . Liquid resistors **[2]**

10/04 . with specified mathematical relationship between movement of resistor actuating means and value of resistance, other than direct proportional relationship **[2]**

10/06 . adjustable by short-circuiting different amounts of the resistive element **[2]**

10/08 . . with intervening conducting structure between the resistive element and the short-circuiting means, e.g. taps **[2]**

10/10 . adjustable by mechanical pressure or force **[2]**

10/12 . . by changing surface pressure between resistive masses or resistive and conductive masses, e.g. pile type **[2]**

10/14 . adjustable by auxiliary driving means **[2]**

10/16 . including plural resistive elements **[2]**

10/18 . . including coarse and fine resistive elements **[2]**

10/20 . . Contact structure or movable resistive elements being ganged **[2]**

10/22 . resistive-element dimensions changing gradually in one direction, e.g. tapered resistive element (H01C 10/04 takes precedence) **[2]**

10/23 . resistive-element dimensions changing in a series of discrete, progressive steps **[2]**

10/24 . the contact moving along turns of a helical resistive element, or vice versa **[2]**

10/26 . resistive element moving (H01C 10/16, H01C 10/24 take precedence) **[2]**

Note

Groups H01C 10/02 to H01C 10/26 take precedence over groups H01C 10/28 to H01C 10/50. **[2]**

10/28 . the contact rocking or rolling along resistive element or taps **[2]**

10/30 . the contact sliding along resistive element **[2]**

10/32 . . the contact moving in an arcuate path **[2]**

10/34 . . . the contact or the associated conducting structure riding on collector formed as a ring or portion thereof **[2]**

10/36 . . . structurally combined with switching arrangements **[2]**

10/38 . . the contact moving along a straight path **[2]**

10/40 . . . screw-operated **[2]**

10/42 . . . . the contact bridging and sliding along resistive element and parallel conducting bar or collector **[2]**

10/44 . . . the contact bridging and sliding along resistive element and parallel conducting bar or collector (H01C 10/42 takes precedence) **[2]**

10/46 . Arrangements of fixed resistors with intervening connectors, e.g. taps (H01C 10/28, H01C 10/30 take precedence) **[2]**

10/48 . . including contact movable in an arcuate path **[2]**

10/50 . structurally combined with switching arrangement (H01C 10/36 takes precedence) **[2]**

11/00 Non-adjustable liquid resistors [2]

13/00 Resistors not provided for elsewhere

13/02 . Structural combinations of resistors (impedance networks H03H) **[2]**

17/00 Apparatus or processes specially adapted for manufacturing resistors (providing fillings for housings or enclosures H01C 1/02; reducing insulation surrounding a resistor to powder H01C 1/03; manufacture of thermally variable resistors H01C 7/02, H01C 7/04) **[2]**

17/02 . adapted for manufacturing resistors with envelope or housing (apparatus or processes for filling or compressing insulating material in heating element tubes H05B 3/52) **[2]**

17/04 . adapted for winding the resistive element **[2]**

17/06 . adapted for coating resistive material on a base **[2]**

17/065 . . by thick-film techniques, e.g. serigraphy **[6]**

17/07 . . by resistor foil bonding, e.g. cladding **[6]**

17/075 . . by thin-film techniques **[6]**

17/08 . . . by vapour deposition **[2]**

17/10 . . . by flame spraying **[2]**

17/12 . . . by sputtering **[2]**

17/14 . . . by chemical deposition **[2]**

17/16 . . . . using electric current **[2]**

17/18 . . . . without using electric current **[2]**

17/20 . . by pyrolytic processes **[2]**

17/22 . adapted for trimming **[2]**

17/23 . . by opening or closing resistor tracks of predetermined resistive values **[6]**

17/232 . . Adjusting the temperature coefficient; Adjusting value of resistance by adjusting temperature coefficient **[6]**

17/235 . . Initial adjustment of potentiometer parts for calibration **[6]**

17/24 . . by removing or adding resistive material (H01C 17/23, H01C 17/232, H01C 17/235 take precedence) **[2,6]**

17/242 . . . by laser **[6]**

17/245 . . . by mechanical means, e.g. sand-blasting, cutting, ultrasonic treatment **[6]**

17/26 . . by converting resistive material **[2]**

17/28 . adapted for applying terminals **[2]**

17/30 . adapted for baking **[2]**

H01F MAGNETS; **INDUCTANCES**; **TRANSFORMERS**; **SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES** (ceramics based on ferrites C04B 35/26; alloys C22C; thermomagnetic devices H01L 37/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R) **[2]**

Subclass index

1/00 **Magnets or magnetic bodies characterised by the magnetic materials therefor**; **Selection of materials for their magnetic properties** (thin magnetic films characterised by their composition H01F 10/10)

Note

Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**

1/01 . of inorganic materials (H01F 1/44 takes precedence) **[6]**
1/03 . . characterised by their coercivity **[6]**

Note

Group H01F 1/40 takes precedence over H01F 1/03 **[6]**

1/032 . . . of hard-magnetic materials **[6]**
1/04 . . . . metals or alloys **[6]**
1/047 . . . . . Alloys characterised by their composition **[5,6]**
1/053 . . . . . containing rare earth metals **[5,6]**
1/055 . . . . . and magnetic transition metals, e.g. $SmCo_5$ **[6]**
1/057 . . . . . and IIIa elements, e.g. $Nd_2Fe_{14}B$ **[6]**
1/058 . . . . . and IVa elements, e.g. $Gd_2Fe_{14}C$ **[6]**
1/059 . . . . . and Va elements, e.g. $Sm_2Fe_{17}N_2$ **[6]**
1/06 . . . . . in the form of particles, e.g. powder (H01F 1/047 takes precedence) **[5,6]**
1/08 . . . . . pressed, sintered, or bound together **[6]**
1/09 . . . . mixtures of metallic and non-metallic particles; metallic particles having oxide skin **[6]**
1/10 . . . . non-metallic substances, e.g. ferrites **[6]**
1/11 . . . . . in the form of particles **[6]**
1/113 . . . . . in a bonding agent **[6]**
1/117 . . . . . Flexible bodies **[6]**
1/12 . . . of soft-magnetic materials **[6]**
1/14 . . . . metals or alloys **[6]**
1/147 . . . . . Alloys characterised by their composition **[5,6]**
1/153 . . . . . Amorphous metallic alloys, e.g. glassy metals **[5,6]**
1/16 . . . . . in the form of sheets (H01F 1/147 takes precedence) **[5,6]**
1/18 . . . . . with insulating coating **[6]**
1/20 . . . . . in the form of particles, e.g. powder (H01F 1/147 takes precedence) **[5,6]**
1/22 . . . . . pressed, sintered, or bound together **[6]**
1/24 . . . . . the particles being insulated **[6]**
1/26 . . . . . by macromolecular organic substances **[6]**
1/28 . . . . . dispersed or suspended in a bonding agent **[6]**
1/33 . . . . mixtures of metallic and non-metallic particles; metallic particles having oxide skin **[6]**
1/34 . . . . non-metallic substances, e.g. ferrites **[6]**
1/36 . . . . . in the form of particles **[6]**
1/37 . . . . . in a bonding agent **[6]**
1/375 . . . . . Flexible bodies **[6]**
1/38 . . . . . amorphous, e.g. amorphous oxides **[6]**
1/40 . . of magnetic semiconductor materials, e.g. $CdCr_2S_4$ (devices using galvano-magnetic or similar effects H01L 43/00) **[6]**
1/42 . of organic or organo-metallic materials (H01F 1/44 takes precedence) **[6]**
1/44 . of magnetic liquids, e.g. ferrofluids (particles in a bonding agent H01F 1/28, H01F 1/36) **[6]**

3/00 **Cores, yokes, or armatures** (magnetic materials H01F 1/00; permanent magnets H01F 7/02)
3/02 . made from sheets
3/04 . made from strips or ribbons
3/06 . made from wires
3/08 . made from powder (powder coatings on sheets H01F 3/02, on strips or ribbons H01F 3/04, on wires H01F 3/06)
3/10 . Composite arrangements of magnetic circuits
3/12 . . Magnetic shunt paths
3/14 . . Constrictions; Gaps, e.g. air-gaps (in magnetic shunt paths H01F 3/12)

5/00 **Coils** (superconducting coils H01F 6/06; fixed inductances of the signal type H01F 17/00)
5/02 . wound on non-magnetic supports, e.g. formers
5/04 . Arrangements of electric connections to coils, e.g. leads
5/06 . Insulation of windings

6/00 **Superconducting magnets**; **Superconducting coils [6]**
6/02 . Quenching; Protection arrangements during quenching **[6]**
6/04 . Cooling **[6]**
6/06 . Coils, e.g. winding, insulating, terminating or casing arrangements therefor **[6]**

7/00 **Magnets** (superconducting magnets H01F 6/00; for separation of solid materials from solid materials or fluids B03C 1/00; for bench or like work-holders B23B 31/28, B23Q 3/00; work-holding devices B25B 11/00; lifting magnets B66C 1/00; for electric meters G01R; for relays H01H; for dynamo-electric machines H02K)

7/02 . Permanent magnets

7/04 . . Means for releasing the attractive force

7/06 . Electromagnets; Actuators including electromagnets **[6]**

7/08 . . with armatures

7/10 . . . specially adapted for ac

7/11 . . . . reducing or eliminating the effects of eddy currents **[6]**

7/12 . . . . having anti-chattering arrangements

7/121 . . . Guiding or setting position of armatures, e.g. retaining armatures in their end position **[6]**

7/122 . . . . by permanent magnet **[6]**

7/123 . . . . by ancillary coil **[6]**

7/124 . . . . by mechanical latch, e.g. detent **[6]**

7/126 . . . Supporting or mounting **[6]**

7/127 . . . Assembling **[6]**

7/128 . . . Encapsulating, encasing or sealing **[6]**

7/129 . . . . of armatures **[6]**

7/13 . . . characterised by pulling-force characteristic

7/14 . . . Pivoting armatures (H01F 7/17 takes precedence) **[6]**

7/16 . . . Rectilinearly-movable armatures (H01F 7/17 takes precedence) **[6]**

7/17 . . . Pivoting and rectilinearly-movable armatures **[6]**

7/18 . . . Circuit arrangements for obtaining desired operating characteristics, e.g. for slow operation, for sequential energisation of windings, for high-speed energisation of windings

7/20 . . without armatures (cores H01F 3/00; coils H01F 5/00)

10/00 **Thin magnetic films, e.g. of one-domain structure** (magnetic record carriers G11B 5/00; thin-film magnetic stores G11C)

10/06 . characterised by the coupling or physical contact with connecting or interacting conductors

10/08 . characterised by magnetic layers (applying magnetic films to substrates H01F 41/14) **[3]**

10/10 . . characterised by the composition **[3]**

10/12 . . . being metals or alloys (intermetallic compounds H01F 10/18) **[3]**

10/13 . . . . Amorphous metallic alloys, e.g. glassy metals **[7]**

10/14 . . . . containing iron or nickel (H01F 10/13, H01F 10/16 take precedence) **[3,7]**

10/16 . . . . containing cobalt (H01F 10/13 takes precedence) **[3,7]**

10/18 . . . being compounds **[3]**

10/187 . . . . Amorphous compounds **[7]**

10/193 . . . . Magnetic semiconductor compounds **[7]**

10/20 . . . . Ferrites **[3]**

10/22 . . . . . Orthoferrites **[3]**

10/24 . . . . . Garnets **[3]**

10/26 . characterised by the substrate or intermediate layers (H01F 10/32 takes precedence) **[3,7]**

10/28 . . characterised by the composition of the substrate **[3]**

10/30 . . characterised by the composition of intermediate layers **[3]**

10/32 . Spin-exchange-coupled multilayers, e.g. nanostructured superlattices **[7]**

13/00 **Apparatus or processes for magnetising or demagnetising** (for degaussing ships B63G 9/06; for clocks or watches G04D 9/00; demagnetising arrangements for colour television H04N 9/29)

Note

Groups H01F 17/00 to H01F 38/00, with the exception of groups H01F 27/42 and H01F 38/32, cover only structural or constructional aspects of transformers, inductive reactors, chokes or the like. These groups do not cover circuit arrangement of such devices, which are covered by the appropriate functional places. **[6]**

17/00 **Fixed inductances of the signal type** (coils in general H01F 5/00)

17/02 . without magnetic core

17/03 . . with ceramic former

17/04 . with magnetic core

17/06 . . with core substantially closed in itself, e.g. toroid

17/08 . . . Loading coils for telecommunication circuits

19/00 **Fixed transformers or mutual inductances of the signal type** (H01F 36/00 takes precedence) **[3]**

19/02 . Audio-frequency transformers or mutual inductances, i.e. not suitable for handling frequencies considerably beyond the audio range

19/04 . Transformers or mutual inductances suitable for handling frequencies considerably beyond the audio range (resonant circuits H03H)

19/06 . . Broad-band transformers, e.g. suitable for handling frequencies well down into the audio range

19/08 . . Transformers having magnetic bias, e.g. for handling pulses

21/00 **Variable inductances or transformers of the signal type** (H01F 36/00 takes precedence) **[3]**

21/02 . continuously variable, e.g. variometers

21/04 . . by relative movement of turns or parts of windings

21/06 . . by movement of core or part of core relative to the windings as a whole

21/08 . . by varying the permeability of the core, e.g. by varying magnetic bias

21/10 . . by means of a movable shield

21/12 . discontinuously variable, e.g. tapped

27/00 **Details of transformers or inductances, in general [6]**

27/02 . Casings

27/04 . . Leading of conductors or axles through casings, e.g. for tap-changing arrangements

27/06 . Mounting, supporting, or suspending transformers, reactors, or choke coils

27/08 . Cooling (heat-transfer elements F28F); Ventilating (structural details of casings H01F 27/02)

27/10 . . Liquid cooling

27/12 . . . Oil cooling

27/14 . . . . Expansion chambers; Oil conservators; Gas cushions; Arrangements for purifying, drying, or filling

27/16 . . . Water cooling

27/18 . . . by evaporating liquids

27/20 . . Cooling by special gases or non-ambient air

27/22 . . Cooling by heat conduction through solid or powdered fillings
27/23 . Corrosion protection **[6]**
27/24 . Magnetic cores
27/245 . . made from sheets, e.g. grain-oriented (H01F 27/26 takes precedence) **[5]**
27/25 . . made from strips or ribbons (H01F 27/26 takes precedence) **[5]**
27/255 . . made from particles (H01F 27/26 takes precedence) **[5]**
27/26 . . Fastening parts of the core together; Fastening or mounting the core on casing or support (on coil H01F 27/30)
27/28 . Coils; Windings; Conductive connections
27/29 . . Terminals; Tapping arrangements **[6]**
27/30 . . Fastening or clamping coils, windings, or parts thereof together; Fastening or mounting coils or windings on core, casing, or other support
27/32 . . Insulating of coils, windings, or parts thereof
27/33 . Arrangements for noise damping
27/34 . Special means for preventing or reducing unwanted electric or magnetic effects, e.g. no-load losses, reactive currents, harmonics, oscillations, leakage fields
27/36 . . Electric or magnetic shields or screens (movable for varying inductance H01F 21/10) **[6]**
27/38 . . Auxiliary core members; Auxiliary coils or windings
27/40 . Structural association with built-in electric component, e.g. fuse
27/42 . Circuits specially adapted for the purpose of modifying, or compensating for, electric characteristics of transformers, reactors, or choke coils (circuits for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output H02P 13/00; impedance networks H03H) **[6]**

29/00 Variable transformers or inductances not covered by group H01F 21/00

29/02 . with tappings on coil or winding; with provision for rearrangement or interconnection of windings
29/04 . . having provision for tap-changing without interrupting the load current
29/06 . with current collector gliding or rolling on or along winding
29/08 . with core, coil, winding, or shield movable to offset variation of voltage or phase shift, e.g. induction regulators
29/10 . . having movable part of magnetic circuit
29/12 . . having movable coil, winding, or part thereof; having movable shield
29/14 . with variable magnetic bias (magnetic amplifiers H03F)

30/00 Fixed transformers not covered by group H01F 19/00 [6]

30/02 . Auto-transformers **[6]**
30/04 . having two or more secondary windings, each supplying a separate load, e.g. for radio set power supplies **[6]**
30/06 . characterised by the structure **[6]**
30/08 . . without magnetic core **[6]**
30/10 . . Single-phase transformers (H01F 30/16 takes precedence) **[6]**
30/12 . . Two-phase, three-phase or polyphase transformers **[6]**
30/14 . . . for changing the number of phases **[6]**
30/16 . . Toroidal transformers **[6]**

36/00 Transformers with superconductive windings or with windings operating at cryogenic temperatures (superconducting magnets or superconducting coils H01F 6/00) **[3]**

37/00 Fixed inductances not covered by group H01F 17/00 [6]

38/00 Adaptations of transformers or inductances for specific applications or functions [6]

38/02 . for non-linear operation **[6]**
38/04 . . for frequency changing **[6]**
38/06 . . for changing the wave shape **[6]**
38/08 . High-leakage transformers or inductances **[6]**
38/10 . . Ballasts, e.g. for discharge lamps **[6]**
38/12 . Ignition, e.g. for IC engines **[6]**
38/14 . Inductive couplings **[6]**
38/16 . Cascade transformers, e.g. for use with extra high tension **[6]**
38/18 . Rotary transformers **[6]**
38/20 . Instrument transformers **[6]**
38/22 . . for single phase ac **[6]**
38/24 . . . Voltage transformers **[6]**
38/26 . . . . Constructions **[6]**
38/28 . . . Current transformers **[6]**
38/30 . . . . Constructions **[6]**
38/32 . . . . Circuit arrangements **[6]**
38/34 . . . Combined voltage and current transformers **[6]**
38/36 . . . . Constructions **[6]**
38/38 . . for polyphase ac **[6]**
38/40 . . for dc **[6]**
38/42 . Flyback transformers **[6]**

41/00 Apparatus or processes specially adapted for manufacturing or assembling the devices covered by this subclass

41/02 . for manufacturing cores, coils, or magnets (H01F 41/14 takes precedence; for dynamo-electric machines H02K 15/00) **[3]**
41/04 . . for manufacturing coils
41/06 . . . Winding
41/08 . . . . Winding conductors on to or threading conductors through cores or formers which are closed in themselves, e.g. toroids (for interconnecting digital storage elements G11C 5/12)
41/10 . . . Connecting leads to windings (making electric connections in general H01R 43/00)
41/12 . . . Insulating of windings (of conductors in general H01B 13/06)
41/14 . for applying magnetic films to substrates (covering metals, or materials with metals, in general C23C; manufacturing record carriers G11B 5/84) **[3]**

Note

Group H01F 41/30 takes precedence over groups H01F 41/16 to H01F 41/24. **[7]**

41/16 . . the magnetic material being applied in the form of particles, e.g. by serigraphy (H01F 41/18 takes precedence) **[3,7]**
41/18 . . by cathode sputtering **[3]**
41/20 . . by evaporation **[3]**

41/22 . . Heat treatment; Thermal decomposition; Chemical vapour deposition **[3]**
41/24 . . from liquids **[3]**
41/26 . . . using electric currents **[3]**
41/28 . . . by liquid phase epitaxy **[3]**
41/30 . . for applying nanostructures, e.g. by molecular beam epitaxy (MBE) **[7]**
41/32 . for applying conductive, insulating or magnetic material on a magnetic film **[7]**
41/34 . . in patterns, e.g. by lithography **[7]**

H01G CAPACITORS; **CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE** (selection of specified materials as dielectric H01B 3/00; capacitors with potential-jump or surface barrier H01L 29/00)

Subclass index

2/00 Details applicable to more than one of groups H01G 4/00 to H01G 9/00 [6]
2/02 . Mountings **[6]**
2/04 . . specially adapted for mounting on a chassis **[6]**
2/06 . . specially adapted for mounting on a printed-circuit support **[6]**
2/08 . Cooling arrangements; Heating arrangements; Ventilating arrangements **[6]**
2/10 . Housing; Encapsulation **[6]**
2/12 . Protection against corrosion (H01G 2/10 takes precedence) **[6]**
2/14 . Protection against electric or thermal overload (by cooling H01G 2/08) **[6]**
2/16 . . with fusing elements **[6]**
2/18 . . with breakable contacts **[6]**
2/20 . Arrangements for preventing discharge from edges of electrodes **[6]**
2/22 . Electrostatic or magnetic shielding **[6]**
2/24 . Distinguishing marks, e.g. colour coding **[6]**

4/00 Fixed capacitors; **Processes of their manufacture** (electrolytic capacitors H01G 9/00) **[2]**
4/002 . Details **[6]**
4/005 . . Electrodes **[6]**
4/008 . . . Selection of materials **[6]**
4/01 . . . Form of self-supporting electrodes **[6]**
4/012 . . . Form of non-self-supporting electrodes **[6]**
4/015 . . . Special provisions for self-healing **[6]**
4/018 . . Dielectrics **[6]**
4/02 . . . Gas or vapour dielectrics **[2,6]**
4/04 . . . Liquid dielectrics **[2,6]**
4/06 . . . Solid dielectrics **[2,6]**
4/08 . . . . Inorganic dielectrics **[2,6]**
4/10 . . . . . Metal-oxide dielectrics **[2,6]**
4/12 . . . . . Ceramic dielectrics **[2,6]**
4/14 . . . . Organic dielectrics **[2,6]**
4/16 . . . . . of fibrous material, e.g. paper **[2,6]**
4/18 . . . . . of synthetic material, e.g. derivatives of cellulose (H01G 4/16 takes precedence) **[2,6]**
4/20 . . . using combinations of dielectrics from more than one of groups H01G 4/02 to H01G 4/06 (H01G 4/12 takes precedence) **[2,6]**
4/22 . . . . impregnated **[2,6]**
4/224 . . Housing; Encapsulation **[6]**
4/228 . . Terminals **[6]**
4/232 . . . electrically connecting two or more layers of a stacked or rolled capacitor **[6]**
4/236 . . . leading through the housing, i.e. lead-through **[6]**
4/242 . . . the capacitive element surrounding the terminal **[6]**
4/245 . . . . Tabs between the layers of a rolled electrode **[6]**
4/248 . . . the terminals embracing or surrounding the capacitive element, e.g. caps (H01G 4/252 takes precedence) **[6]**
4/252 . . . the terminals being coated on the capacitive element (H01G 4/232 takes precedence) **[6]**
4/255 . . Means for correcting the capacitance value **[6]**
4/258 . . Temperature compensation means **[6]**
4/26 . Folded capacitors **[2]**
4/28 . Tubular capacitors **[2]**
4/30 . Stacked capacitors (H01G 4/33 takes precedence) **[2,6]**
4/32 . Wound capacitors **[2]**
4/33 . Thin- or thick-film capacitors (thin- or thick-film circuits H01L 27/00) **[6]**
4/35 . Feed-through capacitors or anti-noise capacitors **[6]**
4/38 . Multiple capacitors, i.e. structural combinations of fixed capacitors **[2]**
4/40 . Structural combinations of fixed capacitors with other electric elements not covered by this subclass, the structure mainly consisting of a capacitor, e.g. RC combinations (thin-or thick-film circuits H01L 27/00; RC-filters H03H) **[2]**

5/00 Capacitors in which the capacitance is varied by mechanical means, e.g. by turning a shaft; **Processes of their manufacture [2]**
5/01 . Details
5/011 . . Electrodes **[6]**
5/012 . . . at least one of the electrodes being a displaceable liquid or powder **[6]**
5/013 . . Dielectrics **[6]**
5/014 . . Housing; Encapsulation **[6]**
5/015 . . Current collectors
5/017 . . Temperature compensation **[6]**
5/019 . . Means for correcting the capacitance characteristics **[6]**

5/04 . using variation of effective area of electrode **[6]**
5/06 . . due to rotation of flat or substantially flat electrodes **[6]**
5/08 . . . becoming active in succession **[6]**
5/10 . . due to rotation of helical electrodes **[6]**
5/12 . . due to rotation of part-cylindrical, conical, or spherical electrodes **[6]**
5/14 . . due to longitudinal movement of electrodes **[6]**
5/16 . using variation of distance between electrodes **[6]**
5/18 . . due to change in inclination, e.g. by flexing, by spiral wrapping **[6]**
5/38 . Multiple capacitors, e.g. ganged
5/40 . Structural combinations of variable capacitors with other electric elements not covered by this subclass, the structure mainly consisting of a capacitor, e.g. RC combinations (RC-filters H03H) **[6]**

7/00 Capacitors in which the capacitance is varied by non-mechanical means; **Processes of their manufacture [2]**

7/02 . Electrets, i.e. having a permanently-polarised dielectric
7/04 . having a dielectric selected for the variation of its permitivity with applied temperature
7/06 . having a dielectric selected for the variation of its permitivity with applied voltage, i.e. ferroelectric capacitors (electrets H01G 7/02)

9/00 Electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices; **Processes of their manufacture [2]**

9/004 . Details **[6]**
9/008 . . Terminals **[6]**
9/012 . . . specially adapted for solid capacitors **[6]**
9/016 . . . specially adapted for double-layer capacitors **[6]**
9/02 . . Diaphragms; Separators **[6]**
9/022 . . Electrolytes, absorbents (electrolytic or electrophoretic processes, apparatus therefor C25; for primary, secondary or fuel cells H01M) **[6]**
9/025 . . . Solid electrolytes (H01G 9/038 takes precedence) **[6]**
9/028 . . . . Organic semiconducting electrolytes, e.g. TCNQ **[6]**
9/032 . . . . Inorganic semiconducting electrolytes, e.g. MnO_2 **[6]**
9/035 . . . Liquid electrolytes, e.g. impregnating materials (H01G 9/038 takes precedence) **[6]**
9/038 . . . Electrolytes specially adapted for double-layer capacitors **[6]**
9/04 . . Electrodes **[6]**
9/042 . . . characterised by the material (H01G 9/058 takes precedence) **[6]**
9/045 . . . . based on aluminium **[6]**
9/048 . . . characterised by their structure (H01G 9/058 takes precedence) **[6]**
9/052 . . . . Sintered electrodes **[6]**
9/055 . . . . Etched foil electrodes **[6]**
9/058 . . . specially adapted for double-layer capacitors **[6]**
9/06 . . . Mounting in containers **[6]**
9/07 . . Dielectric layers **[6]**
9/08 . . Housing; Encapsulation **[6]**
9/10 . . . Sealing, e.g. of lead-in wires **[6]**
9/12 . . . Vents or other means allowing expansion **[6]**
9/14 . . Structural combinations for modifying, or compensating for, electric characteristics of electrolytic capacitors (impedance networks H03H)
9/145 . Liquid electrolytic capacitors (H01G 9/155 takes precedence) **[6]**
9/15 . Solid electrolytic capacitors (H01G 9/155 takes precedence) **[6]**
9/155 . Double-layer capacitors **[6]**
9/16 . specially adapted for use as rectifiers or detectors (H01G 9/22 takes precedence)
9/18 . Self-interrupters
9/20 . Light-sensitive devices
9/21 . Temperature-sensitive devices **[6]**
9/22 . Devices using combined reduction and oxidation, e.g. redox arrangement, solion
9/26 . Structural combinations of electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices with each other **[6]**
9/28 . Structural combinations of electrolytic capacitors, rectifiers, detectors, switching devices with other electric components not covered by this subclass **[6]**

13/00 Apparatus specially adapted for manufacturing capacitors; **Processes specially adapted for manufacturing capacitors not provided for in groups H01G 4/00 to H01G 9/00 [2]**

13/02 . Machines for winding capacitors **[2]**
13/04 . Drying (in general F26B); Impregnating **[2]**
13/06 . with provision for removing metal surfaces **[2]**

15/00 Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with each other [6]

17/00 Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with other electric elements, not covered by this subclass, e.g. RC combinations (thin- or thick-film circuits H01L 27/00; RC-filters H03H) **[6]**

H01H ELECTRIC SWITCHES; **RELAYS**; **SELECTORS**; **EMERGENCY PROTECTIVE DEVICES** (contact cables H01B 7/10; electrolytic self-interrupters H01G 9/18; emergency protective circuit arrangements H02H; switching by electronic means without contact-making H03K 17/00)

(1) This subclass covers (in groups H01H 69/00 to H01H 87/00) devices for the protection of electric lines or electric machines or apparatus in the event of undesired change from normal electric working conditions, the electrical condition serving directly as the input to the device.
(2) This subclass does not cover bases, casings, or covers accommodating two or more switching devices or for accommodating a switching device as well as another electric component, e.g. bus-bar, line connector. Those bases, casings or covers are covered by group H02B 1/26.

(3) In this subclass, the following terms or expressions are used with the meanings indicated:
- "relay" means a switching device having contacts which are operated from electric inputs which supply, directly or indirectly, all the mechanical energy necessary to cause both the closure and the opening of the contacts;
- "driving mechanism" refers to the means by which an operating force applied to the switch is transmitted to the moving contact or contacts;
- "operating" is used in a broader sense than "actuating" which is reserved for those parts not touched by hand to effect switching;
- "acting" or "action" means a self-induced movements of parts at one stage of the switching. These connotations apply to all parts of the verbs "to operate"; "to actuate", and "to act", and to words derived therefrom, e.g. to "actuation".

(4) In this subclass, details are classified as follows:
- details of an unspecified type of switching device, or disclosed as applicable to two or more kinds of switching devices designated by the terms or expressions "switches", "relays", "selector switches", and "emergency protective devices", are classified in groups H01H 1/00 to H01H 9/00;
- details of an unspecified type of switch, or disclosed as applicable to two or more types of switches as defined by groups H01H 13/00 to H01H 43/00 and subgroups H01H 35/02, H01H 35/06, H01H 35/14, H01H 35/18, H01H 35/24, and H01H 35/42, all hereinafter called basic types, are classified in groups H01H 1/00 to H01H 9/00;
- details of an unspecified type of relay, or disclosed as applicable to two or more types of relays as defined by groups H01H 51/00 to H01H 61/00, hereinafter called basic types, are classified in group H01H 45/00;
- details of an unspecified protective device, or applicable to two or more types of protective devices as defined by groups H01H 73/00 to H01H 83/00, hereinafter called basic types, are classified in group H01H 71/00.
- However, details only described with reference to, or clearly only applicable to, switching devices of a single basic type, are classified in the group appropriate to switching devices of that basic type, e.g. H01H 19/02, H01H 75/04;
- mechanical structural details of control members of switches or of keyboards such as keys, push-buttons, levers or other mechanisms for transferring the force to the activated elements are classified in this subclass, even when they are used for controlling electronic switches.

However, mechanical details directly producing electronic effects are classified in group H03K 17/94. **[4]**

Subclass index

Electric switches

1/00 **Contacts** (liquid contacts H01H 29/04)
1/02 . characterised by the material thereof
1/021 . . Composite material **[8]**

(1) In this group, the following expression is used with the meaning indicated: **[8]**
– "composite material" is a material made of two or more different materials, e.g. coated material, layered materials or carbon fibres in a copper base or matrix. **[8]**
(2) Subject matter classifiable in more than one of groups H01H 1/023 to H01H 1/029 should be classified in all relevant groups. **[8]**

1/023 . . . having a noble metal as the basic material **[8]**
1/0233 . . . . and containing carbides **[8]**
1/0237 . . . . and containing oxides **[8]**
1/025 . . . having copper as the basic material **[8]**
1/027 . . . containing carbon particles or fibres **[8]**
1/029 . . . comprising conducting material dispersed in an elastic support or binding material **[8]**
1/04 . . Co-operating contacts of different material
1/06 . characterised by the shape or structure of the contact-making surface, e.g. grooved
1/08 . . wetted with mercury
1/10 . . Laminated contacts with divided contact surface
1/12 . characterised by the manner in which co-operating contacts engage
1/14 . . by abutting
1/16 . . . by rolling; by wrapping; Roller or ball contacts
1/18 . . . with subsequent sliding
1/20 . . . Bridging contacts
1/22 . . . with rigid pivoted member carrying the moving contact
1/24 . . . with resilient mounting
1/26 . . . . with spring blade support
1/28 . . . . . Assembly of three or more contact-supporting spring blades
1/30 . . . . within supporting guides
1/32 . . . Self-aligning contacts
1/34 . . . with provision for adjusting position of contact relative to its co-operating contact
1/36 . . by sliding
1/38 . . . Plug-and-socket contacts
1/40 . . . Contact mounted so that its contact-making surface is flush with adjoining insulation
1/42 . . . Knife-and-clip contacts
1/44 . . . with resilient mounting
1/46 . . . self-aligning contacts
1/48 . . . with provision for adjusting position of contact relative to its co-operating contact
1/50 . Means for increasing contact pressure, preventing vibration of contacts, holding contacts together after engagement, or biasing contacts to the open position
1/52 . . Contacts adapted to act as latches
1/54 . . by magnetic force
1/56 . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing
1/58 . Electric connections to or between contacts; Terminals
1/60 . Auxiliary means structurally associated with the switch for cleaning or lubricating contact-making surfaces (cleaning by normal sliding of contacts H01H 1/18, H01H 1/36)
1/62 . Heating or cooling of contacts
1/64 . Protective enclosures, baffle plates, or screens for contacts
1/66 . . Contacts sealed in an evacuated or gas-filled envelope, e.g. magnetic dry-reed contacts

3/00 **Mechanisms for operating contacts** (thermal actuating or release means H01H 37/02)
3/02 . Operating parts, i.e. for operating driving mechanism by a mechanical force external to the switch
3/04 . . Levers (tumblers H01H 23/14)
3/06 . . . Means for securing to shaft of driving mechanism
3/08 . . Turn knobs
3/10 . . . Means for securing to shaft of driving mechanism
3/12 . . Push-buttons
3/14 . . adapted for operation by a part of the human body other than the hand, e.g. by foot
3/16 . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. for a door switch, a limit switch, a floor-levelling switch of a lift
3/18 . . . the movement in one direction being intentionally by hand, e.g. for setting automatically cancelled trafficators
3/20 . . wherein an auxiliary movement thereof, or of an attachment thereto, is necessary before the main movement is possible or effective, e.g. for unlatching, for coupling
3/22 . Power arrangements internal to the switch for operating the driving mechanism
3/24 . . using pneumatic or hydraulic actuator
3/26 . . using dynamo-electric motor (for storing energy in a spring motor H01H 3/30)
3/28 . . using electromagnet (for storing energy in a spring motor H01H 3/30; for operating relays H01H 45/00)
3/30 . . using spring motor
3/32 . Driving mechanisms, i.e. for transmitting driving force to the contacts (snap-action arrangements H01H 5/00; introducing a predetermined time delay H01H 7/00)
3/34 . . using ratchet
3/36 . . using belt, chain, or cord
3/38 . . using spring or other flexible shaft coupling
3/40 . . using friction, toothed, or screw-and-nut gearing
3/42 . . using cam or eccentric
3/44 . . using Geneva movement
3/46 . . using rod or lever linkage, e.g. toggle
3/48 . . using lost-motion device
3/50 . . with indexing or locating means, e.g. indexing by ball and spring
3/52 . . with means to ensure stopping at intermediate operative positions
3/54 . Mechanisms for coupling or uncoupling operating parts, driving mechanisms, or contacts
3/56 . . using electromagnetic clutch
3/58 . . using friction, toothed, or other mechanical clutch

3/60 . Mechanical arrangements for preventing or damping vibration or shock

3/62 . Lubricating means structurally associated with the switch (for lubricating contact-making surfaces H01H 1/60)

5/00 Snap-action arrangements, i.e. in which during a single opening operation or a single closing operation energy is first stored and then released to produce or assist the contact movement

5/02 . Energy stored by the attraction or repulsion of magnetic parts

5/04 . Energy stored by deformation of elastic members (by deformation of bimetallic element in thermally-actuated switches H01H 37/54)

5/06 . . by compression or extension of coil springs

5/08 . . . one end of spring transmitting movement to the contact member when the other end is moved by the operating part

5/10 . . . one end of spring being fixedly connected to the stationary or movable part of the switch, and the other end reacting with a movable or stationary rigid member respectively through pins, cams, toothed, or other shaped surfaces

5/12 . . . having two or more snap-action motions in succession

5/14 . . by twisting of torsion members

5/16 . . . with auxiliary means for temporarily holding parts until torsion member is sufficiently strained

5/18 . . by flexing of blade springs

5/20 . . . single blade moved across dead-centre position

5/22 . . . blade spring with at least one snap-acting leg and at least one separate contact-carrying or contact-actuating leg

5/24 . . . . having three legs

5/26 . . . having two or more snap-action motions in succession

5/28 . . . two separate blade springs forming a toggle

5/30 . . by buckling of disc springs

7/00 Devices for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts (time or time-programme switches H01H 43/00)

7/02 . with fluid timing means

7/03 . . with dash-pots

7/04 . . with flies, i.e. fan governors

7/06 . with thermal timing means

7/08 . with timing by mechanical speed-control devices

7/10 . . by escapement

7/12 . . . mechanical

7/14 . . . electromagnetic

7/16 . Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 9/56)

9/00 Details of switching devices, not covered by groups H01H 1/00 to H01H 7/00

9/02 . Bases, casings, or covers (accommodating more than one switch or a switch and another electrical component H02B 1/26)

9/04 . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings

9/06 . . Casing of switch constituted by a handle serving a purpose other than the actuation of the switch, e.g. by the handle of a vacuum cleaner

9/08 . Arrangements to facilitate replacement of switch, e.g. cartridge housing

9/10 . Adaptation for built-in fuses (mounting switch and fuse separately on, or in, common support H02B 1/18)

9/12 . Means for earthing parts of switch not normally conductively connected to the contacts

9/14 . Adaptation for built-in safety spark gaps

9/16 . Indicators for switching condition, e.g. ”on” or “off”

9/18 . Distinguishing marks on switches, e.g. for indicating switch location in the dark; Adaptation of switches to receive distinguishing marks

9/20 . Interlocking, locking, or latching mechanisms

9/22 . . for interlocking between casing, cover, or protective shutter and mechanism for operating contacts

9/24 . . for interlocking two or more parts of the mechanism for operating contacts

9/26 . . for interlocking two or more switches (by a detachable member H01H 9/28)

9/28 . . for locking switch parts by a key or equivalent removable member (switches operated by a key H01H 27/00; locking by removable part of two-part coupling device H01R)

9/30 . Means for extinguishing or preventing arc between current-carrying parts

9/32 . . Insulating body insertable between contacts

9/34 . . Stationary parts for restricting or subdividing the arc, e.g. barrier plate

9/36 . . . Metal parts

9/38 . . Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing-horns H01H 9/46)

9/40 . . Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc

9/42 . . Impedances connected with contacts

9/44 . . using blow-out magnet

9/46 . . using arcing horns (using blow-out magnet H01H 9/44)

9/48 . Means for preventing discharge to non-current-carrying parts, e.g. using corona ring

9/50 . Means for detecting the presence of an arc or discharge

9/52 . Cooling of switch parts (cooling of contacts H01H 1/62)

9/54 . Circuit arrangements not adapted to a particular application of the switching device and for which no provision exists elsewhere

9/56 . . for ensuring operation of the switch at a predetermined point in the ac cycle

11/00 Apparatus or processes specially adapted for the manufacture of electric switches (processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards, H01H 13/88) **[1,8]**

11/02 . for mercury switches

11/04 . of switch contacts

11/06 . . Fixing of contacts to carrier

13/00 Switches having rectilinearly-movable operating part or parts adapted for pushing or pulling in one direction only, e.g. push-button switch (wherein the operating part is flexible H01H 17/00)

13/02 . Details **[1,8]**

13/04 . . Cases; Covers

13/06 . . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings

13/08 . . . Casing of switch constituted by a handle serving a purpose other than the actuation of the switch

13/10 . . Bases; Stationary contacts mounted thereon

13/12 . . Movable parts; Contacts mounted thereon

13/14 . . . Operating parts, e.g. push-button

13/16 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

13/18 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

13/20 . . . Driving mechanisms

13/22 . . . . acting with snap action (depending upon deformation of elastic members H01H 13/26)

13/24 . . . . with means for introducing a predetermined time delay

13/26 . . Snap-action arrangements depending upon deformation of elastic members

13/28 . . . using compression or extension of coil springs

13/30 . . . . one end of spring transmitting movement to the contact member when the other end is moved by the operating part

13/32 . . . . one end of spring being fixedly connected to the stationary or movable part of the switch and the other end reacting with a movable or stationary rigid member respectively through pins, cams, toothed, or other shaped surfaces

13/34 . . . . having two or more snap-action motions in succession

13/36 . . . using flexing of blade springs

13/38 . . . . Single blade moved across dead-centre position

13/40 . . . . Blade spring with at least one snap-acting leg and at least one separate contactcarrying or contact-actuating leg

13/42 . . . . . having three legs

13/44 . . . . having two or more snap-action motions in succession

13/46 . . . . two separate blade springs forming a toggle

13/48 . . . using buckling of disc springs

13/50 . having a single operating member

13/52 . . the contact returning to its original state immediately upon removal of operating force, e.g. bell push switch

13/54 . . the contact returning to its original state a predetermined time interval after removal of operating force, e.g. for staircase lighting

13/56 . . the contact returning to its original state upon the next application of operating force

13/58 . . . with contact-driving member rotated step-wise in one direction

13/60 . . . with contact-driving member moved alternately in opposite directions

13/62 . . the contact returning to its original state upon manual release of a latch (latch released by second push-button H01H 13/68)

13/64 . . wherein the switch has more than two electrically distinguishable positions, e.g. multi-position push-button switches

13/66 . . . the operating member having only two positions

13/68 . having two operating members, one for opening and one for closing the same set of contacts (single operating member protruding from different sides of switch casing for alternate pushing upon opposite ends H01H 15/22)

13/70 . having a plurality of operating members associated with different sets of contacts, e.g. keyboard (mounting together a plurality of independent switches H02B)

13/702 . . with contacts carried by or formed from layers in a multilayer structure, e.g. membrane switches **[7]**

13/703 . . . characterised by spacers between contact carrying layers **[8]**

13/704 . . . characterised by the layers, e.g. by their material or structure (H01H 13/703 takes precedence) **[8]**

13/705 . . . characterised by construction, mounting or arrangement of operating parts, e.g. push-buttons or keys **[7]**

13/7057 . . . . characterised by the arrangement of operating parts in relation to each other, e.g. pre-assembled groups of keys **[8]**

13/7065 . . . . characterised by the mechanism between keys and layered keyboards **[8]**

13/7073 . . . . . characterised by springs, e.g. Euler springs **[8]**

13/708 . . . in which all fixed and movable contacts are carried by insulating members (H01H 13/705 takes precedence) **[7]**

13/712 . . . . all of the insulating members being substantially flat **[7]**

13/715 . . . in which each contact set includes a contact which is not secured to or part of a supporting layer, e.g. a snap dome (H01H 13/705 takes precedence) **[7]**

13/718 . . . in which some or all of the movable contacts are formed in a single conductive plate, e.g. formed by punching sheet metal (H01H 13/705 takes precedence) **[7]**

13/72 . . wherein the switch has means for limiting the number of operating members that can concurrently be in the actuated position

13/74 . . . each contact set returning to its original state only upon actuation of another of the operating members

13/76 . . wherein some or all of the operating members actuate different combinations of the contact sets, e.g. ten operating members actuating different combinations of four contact sets

13/78 . . characterised by the contacts or the contact sites **[8]**

13/785 . . . characterised by the material of the contacts, e.g. conductive polymers **[8]**

13/79 . . . characterised by the form of the contacts, e.g. interspersed fingers or helical networks **[8]**

13/80 . . . characterised by the manner of cooperation of the contacts, e.g. with both contacts movable or with bounceless contacts **[8]**

13/803 . . . characterised by the switching function thereof, e.g. normally closed contacts or consecutive operation of contacts **[8]**

13/807 . . . characterised by the spatial arrangement of the contact sites, e.g. superimposed sites **[8]**

13/81 . . characterised by electrical connections to external devices **[8]**

13/82 . . characterised by contact space venting means **[8]**

13/83 . . characterised by legends, e.g. Braille, liquid crystal displays, light emitting or optical elements **[8]**

13/84 . . characterised by ergonomic functions, e.g. for miniature keyboards; characterised by operational sensory functions, e.g. sound feedback (legends H01H 13/83) **[8]**

13/85 . . . characterised by tactile feedback features **[8]**

13/86 . . characterised by the casing, e.g. sealed casings or casings reducible in size **[8]**

13/88 . . Processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards **[8]**

15/00 Switches having rectilinearly-movable operating part or parts adapted for actuation in opposite directions, e.g. slide switch

15/02 . Details

15/04 . . Stationary parts; Contacts mounted thereon

15/06 . . Movable parts; Contacts mounted thereon

15/08 . . . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing

15/10 . . . Operating parts

15/12 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

15/14 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

15/16 . . . Driving mechanisms

15/18 . . . . acting with snap action

15/20 . . . . with means for introducing a predetermined time delay

15/22 . having a single operating part protruding from different sides of switch casing for alternate actuation from opposite ends

15/24 . having a single operating part only protruding from one side of the switch casing for alternate pushing and pulling

17/00 Switches having flexible operating part adapted only for pulling, e.g. cord, chain

17/02 . Details

17/04 . . Stationary parts (guides H01H 17/14)

17/06 . . Movable parts (guides H01H 17/14)

17/08 . . . Operating part, e.g. cord

17/10 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

17/12 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

17/14 . . Guiding means for flexible operating part

17/16 . having a single flexible operating part adapted for pulling at one end only

17/18 . . secured to a part of the switch driving mechanism that has only angular movement

17/20 . . . the contact returning to its original state immediately upon removal of operating force

17/22 . . . the contact returning to its original state upon the next application of operating force

17/24 . . secured to a part of the switch driving mechanism that has both angular and rectilinear motion

17/26 . having two flexible operating parts; having a single operating part adapted for pulling at both ends

17/28 . . secured to a part or parts of the switch driving mechanism having only rectilinear motion

17/30 . . secured to a part or parts of the switch driving mechanism having only angular motion

19/00 Switches operated by an operating part which is rotatable about a longitudinal axis thereof and which is acted upon directly by a solid body external to the switch, e.g. by a hand [1,8]

19/02 . Details

19/03 . . Means for limiting the angle of rotation of the operating part **[8]**

19/04 . . Cases; Covers

19/06 . . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings

19/08 . . Bases; Stationary contacts mounted thereon

19/10 . . Movable parts; Contacts mounted thereon

19/11 . . . with indexing means **[8]**

19/12 . . . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing

19/14 . . . Operating parts, e.g. turn knob

19/16 . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

19/18 . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

19/20 . . . Driving mechanisms allowing angular displacement of the operating part to be effective in either direction

19/22 . . . . incorporating lost motion

19/24 . . . . acting with snap action

19/26 . . . . with means for introducing a predetermined time delay

19/28 . . . Driving mechanisms allowing angular displacement of the operating part to be effective or possible in only one direction

19/30 . . . . incorporating lost motion

19/32 . . . . acting with snap action

19/34 . . . . with means for introducing a predetermined time delay

19/36 . the operating part having only two operative positions, e.g. relatively displaced by 180°

19/38 . . Change-over switches

19/40 . . . having only axial contact pressure

19/42 . . providing more than two electrically-different conditions, e.g. for closing either or both of two circuits

19/44 . . . having only axial contact pressure

19/46 . the operating part having three operative positions, e.g. off/star/delta

19/48 . . having only axial contact pressure

19/50 . the operating part having four operative positions, e.g. off/two-in-series/one-only/two-in-parallel

19/52 . . having only axial contact pressure

19/54 . the operating part having at least five or an unspecified number of operative positions

19/56 . . Angularly-movable actuating part carrying contacts, e.g. drum switch

19/58 . . . having only axial contact pressure, e.g. disc switch, wafer switch

19/60 . . Angularly-movable actuating part carrying no contacts

19/62 . . . Contacts actuated by radial cams

19/63 . . . Contacts actuated by axial cams **[2]**

19/635 . . . Contacts actuated by rectilinearly-movable member linked to operating part, e.g. by pin and slot **[8]**

19/64 . Encased switches adapted for ganged operation when assembled in a line with identical switches, e.g. stacked switches

21/00 Switches operated by an operating part in the form of a pivotable member acted upon directly by a solid body, e.g. by a hand (tumbler or rocker switches H01H 23/00; switches having an operating part movable angularly in more than one plane H01H 25/04) **[1,8]**

21/02 . Details

21/04 . . Cases; Covers

21/06 . . . interlocked with operating mechanism

21/08 . . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings

21/10 . . . Casing of switch constituted by a handle serving a purpose other than the actuation of the switch

21/12 . . Bases; Stationary contacts mounted thereon

21/14 . . Means for increasing contact pressure

21/16 . . Adaptation for built-in fuse

21/18 . . Movable parts; Contacts mounted thereon

21/20 . . . Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing

21/22 . . . Operating parts, e.g. handle

21/24 . . . . biased to return to original position upon removal of operating force

21/26 . . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

21/28 . . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

21/30 . . . . not biased to return to original position upon removal of operating force

21/32 . . . . . adapted for operation by a part of the human body other than the hand, e.g. by foot

21/34 . . . . . adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

21/36 . . . Driving mechanisms

21/38 . . . . incorporating lost motion

21/40 . . . . having snap action

21/42 . . . . . produced by compression or extension of coil spring

21/44 . . . . . produced by flexing blade springs

21/46 . . . . . with two or more snap-action motions in succession

21/48 . . . . incorporating a ratchet mechanism

21/50 . . . . with indexing or latching means, e.g. indexing by ball and spring; with means to ensure stopping at intermediate operative positions

21/52 . . . . with means for introducing a predetermined time delay

21/54 . Lever switches with blade-type contact co-operating with one or two spring-clip contacts, e.g. knife switch, sectionalisers

21/56 . . making contact in one position only

21/58 . . Change-over switches without stable intermediate position

21/60 . . Change-over switches with stable intermediate position

21/86 . Switches with abutting contact carried by operating part, e.g. telegraph tapping key

21/88 . . with intermediate position of rest

23/00 Tumbler or rocker switches, i.e. switches characterised by being operated by rocking an operating member in the form of a rocker button

Note

In this group, the term “rocking” is defined as pivotal motion in one plane about an axis parallel to the switch faceplate and located substantially centrally between the ends of the rocker button. **[8]**

23/02 . Details

23/04 . . Cases; Covers

23/06 . . . Dustproof, splashproof, drip-proof, waterproof, or flameproof casings

23/08 . . Bases; Stationary contacts mounted thereon

23/10 . . Adaptation for built-in fuse

23/12 . . Movable parts; Contacts mounted thereon

23/14 . . . Tumblers

23/16 . . . Driving mechanisms

23/18 . . . . incorporating lost motion

23/20 . . . . having snap action

23/22 . . . . with means for introducing a predetermined time delay

23/24 . with two operating positions

23/26 . . one of which positions is unstable

23/28 . with three operating positions

23/30 . . with stable centre position and one or both end positions unstable

25/00 Switches with compound movement of handle or other operating part

25/04 . Operating part movable angularly in more than one plane, e.g. joystick

25/06 . Operating part movable both angularly and rectilinearly, the rectilinear movement being along the axis of angular movement

27/00 Switches operated by a removable member, e.g. key, plug or plate; **Switches operated by setting members according to a single predetermined combination out of several possible settings** (combined with plug-and-socket connectors H01R 13/70; with current-carrying plug H01R 31/08)

27/04 . Insulating plug or plate inserted between normally-closed contacts

27/06 . Key inserted and then turned to effect operation of the switch

27/08 . . wherein the key cannot be removed until the switch is returned to its original position

27/10 . Switch operated by setting members according to a single predetermined combination out of several possible settings

29/00 Switches having at least one liquid contact (solid contacts wetted or soaked with mercury H01H 1/08)

29/02 . Details

29/04 . . Contacts; Containers for liquid contacts

29/06 . . . Liquid contacts characterised by the material thereof

29/08 . . Means for introducing a predetermined time delay

29/10 . . . by constricting the flow of the contact liquid

29/12 . . Operating mechanisms adapted for operation by a part of the human body other than the hand, e.g. by foot

29/14 . . Operating mechanisms adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift

29/16 . operated by dipping solid contact into stationary contact liquid

29/18 . with level of surface of contact liquid displaced by non-electrical contact-making plunger

29/20 . operated by tilting contact-liquid container

29/22 . . wherein contact is made and broken between liquid and solid

29/24 . . wherein contact is made and broken between liquid and liquid

29/26 . with level of surface of contact liquid displaced by centrifugal action

29/28 . with level of surface of contact liquid displaced by fluid pressure

29/30 . with level of surface of contact liquid displaced by expansion or evaporation thereof

29/32 . with contact made by a liquid jet, e.g. earthing switch with contact made by jet of water

31/00 Air-break switches for high tension without arc-extinguishing or arc-preventing means (in combination with high tension or heavy-current switches with arc-extinguishing or arc-preventing means H01H 33/00) **[3]**

31/02 . Details

31/04 . . Interlocking mechanisms

31/06 . . . for interlocking between casing, cover, or protective shutter and mechanism for operating contacts

31/08 . . . for interlocking two or more parts of the mechanism for operating contacts

31/10 . . . for interlocking two or more switches

31/12 . . Adaptation for built-in fuse

31/14 . with bridging contact that is not electrically connected to either line contact in open position of switch

31/16 . . with angularly-movable bridging contact or contact-carrying member

31/18 . . . actuated through the movement of one or more insulators

31/20 . . . . at least one insulator being rotatable about its own geometrical axis

31/22 . . . wherein the contact or contacts are rectilinearly movable with respect to the carrying member

31/24 . . with rectilinearly-movable bridging contact

31/26 . with movable contact that remains electrically connected to one line in open position of switch

31/28 . . with angularly-movable contact

31/30 . . . actuated-through the movement of one or more insulators

31/32 . . with rectilinearly-movable contact

31/34 . with movable contact adapted to engage an overhead transmission line, e.g. for branching

31/36 . . Contact moved by pantograph

33/00 High-tension or heavy-current switches with arc-extinguishing or arc-preventing means

33/02 . Details

33/04 . . Means for extinguishing or preventing arc between current-carrying parts

33/06 . . . Insulating body insertable between contacts

33/08 . . . Stationary parts for restricting or subdividing the arc, e.g. barrier plate

33/10 . . . . Metal parts

33/12 . . . Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing horns H01H 33/20)

33/14 . . . Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc

33/16 . . . Impedances connected with contacts

33/18 . . . using blow-out magnet

33/20 . . . using arcing horns (using blow-out magnet H01H 33/18)

33/22 . . . Selection of fluids for arc-extinguishing

33/24 . . Means for preventing discharge to non-current-carrying parts, e.g. using corona ring

33/26 . . Means for detecting the presence of an arc or other discharge

33/28 . . Power arrangements internal to the switch for operating the driving mechanism

33/30 . . . using fluid actuator

33/32 . . . . pneumatic

33/34 . . . . hydraulic

33/36 . . . using dynamo-electric motor

33/38 . . . using electromagnet

33/40 . . . using spring motor

33/42 . . Driving mechanisms

33/44 . . Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 33/59)

33/46 . . Interlocking mechanisms

33/48 . . . for interlocking between casing or cover and mechanism for operating contacts

33/50 . . . for interlocking two or more parts of the mechanism for operating contacts

33/52 . . . for interlocking two or more switches

33/53 . . Cases (for switchgear H02B 1/26); Reservoirs, tanks, piping or valves, for arc-extinguishing fluid; Accessories therefor, e.g. safety arrangements, pressure relief devices **[3]**

33/55 . . . Oil reservoirs or tanks; Lowering means therefor (associated with withdrawal mechanism for isolation of switch H02B 11/08)

33/56 . . . Gas reservoirs

33/57 . . . Recuperation of liquid or gas

33/575 . . . Pressure relief devices for normal or emergency use **[3]**

33/58 . . . Silencers for suppressing noise of switch operation **[3]**

33/59 . . Circuit arrangements not adapted to a particular application of the switch and not otherwise provided for, e.g. for ensuring operation of the switch at a predetermined point in the ac cycle

33/60 . Switches wherein the means for extinguishing or preventing the arc do not include separate means for obtaining or increasing flow of arc-extinguishing fluid

33/64 . . wherein the break is in gas (vacuum switches H01H 33/66)

33/65 . . . wherein the break is in air at atmospheric pressure, e.g. in open air **[2009.01]**

33/66 . . Vacuum switches

33/662 . . . Housings or protective screens **[7]**

33/664 . . . Contacts; Arc-extinguishing means, e.g. arcing rings **[7]**

33/666 . . . Operating arrangements **[7]**

33/668 . . . Means for obtaining or monitoring the vacuum **[7]**

33/68 . . Liquid-break switches, e.g. oil-break

33/70 . Switches with separate means for directing, obtaining, or increasing flow of arc-extinguishing fluid

33/72 . . having stationary parts for directing the flow of arc-extinguishing fluid, e.g. arc-extinguishing chamber

33/73 . . . wherein the break is in air at atmospheric pressure, e.g. in open air

33/74 . . . wherein the break is in gas (in air at atmospheric pressure H01H 33/73)

33/75 . . . Liquid-break switches, e.g. oil-break

33/76 . . wherein arc-extinguishing gas is evolved from stationary parts; Selection of material therefor

33/77 . . . wherein the break is in air at atmospheric pressure

33/78 . . . wherein the break is in gas (in air at atmospheric pressure H01H 33/77)

33/80 . . flow of arc-extinguishing fluid from a pressure source being controlled by a valve

33/82 . . . the fluid being air or gas

33/825 . . . . with closed circuit of air or gas (H01H 33/835 takes precedence) **[3]**

33/83 . . . . wherein the contacts are opened by the flow of air or gas

33/835 . . . . . with closed circuit of air or gas **[3]**

33/84 . . . the fluid being liquid, e.g. oil

33/85 . . . . wherein the contacts are opened by the flow of liquid

33/86 . . the flow of arc-extinguishing fluid under pressure from the contact space being controlled by a valve

33/867 . . . the fluid being air or gas **[3]**

33/873 . . . . with closed circuit of air or gas **[3]**

33/88 . . the flow of arc-extinguishing fluid being produced or increased by movement of pistons or other pressure-producing parts

33/90 . . . this movement being effected by, or in conjunction with, the contact-operating mechanism

33/91 . . . . the arc-extinguishing fluid being air or gas

33/915 . . . . . with closed circuit of air or gas **[3]**

33/92 . . . . the arc-extinguishing fluid being liquid, e.g. oil

33/94 . . . this movement being effected solely due to the pressure caused by the arc itself or by an auxiliary arc

33/95 . . . . the arc-extinguishing fluid being air or gas

33/96 . . . . the arc-extinguishing fluid being liquid, e.g. oil

33/98 . . the flow of arc-extinguishing fluid being initiated by an auxiliary arc or a section of the arc, without any moving parts for producing or increasing the flow

33/985 . . . the fluid being air or gas **[3]**

33/99 . . . the fluid being liquid **[3]**

35/00 Switches operated by change of a physical condition (operated by change of magnetic or electric field H01H 36/00; thermally-actuated switches H01H 37/00)

Note

A switching device is classified according to that physical condition which when changed acts as input to the device, e.g. external explosion causing pressure wave to act upon switch is classified in group H01H 35/24, an explosion produced within the switch in group H01H 37/00 if initiated by heat, in group H01H 39/00 if initiated electrically, and in group H01H 35/14 if initiated by an external blow.

35/02 . Switches operated by change of position, inclination, or orientation of the switch itself in relation to gravitational field (tilting mercury container H01H 29/20; change of position due to change of liquid level H01H 35/18)

35/06 . Switches operated by change of speed (operated by change of fluid flow H01H 35/24)

35/10 . . Centrifugal switches (level of mercury displaced by centrifugal action H01H 29/26)

35/12 . . operated by reversal of direction of movement

35/14 . Switches operated by change of acceleration, e.g. by shock or vibration, inertia switch

35/18 . Switches operated by change of liquid level or of liquid density, e.g. float switch (by magnet carried on a float H01H 36/02)

35/24 . Switches operated by change of fluid pressure, by fluid pressure waves, or by change of fluid flow (wherein the change of pressure is caused by change of temperature H01H 37/36)

35/26 . . Details

35/28 . . . Compensation for variation of ambient pressure or temperature

35/30 . . . Means for transmitting pressure to pressure-responsive operating part, e.g. by capsule and capillary tube

35/32 . . actuated by bellows

35/34 . . actuated by diaphragm

35/36 . . actuated by curled flexible tube, e.g. Bourdon tube

35/38 . . actuated by piston and cylinder

35/40 . . actuated by devices allowing continual flow of fluid, e.g. vane

35/42 . Switches operated by change of humidity

36/00 Switches actuated by change of magnetic field or of electric field, e.g. by change of relative position of magnet and switch, by shielding

36/02 . actuated by movement of a float carrying a magnet

37/00 Thermally-actuated switches

37/02 . Details

37/04 . . Bases; Housings; Mountings

37/06 . . . to facilitate replacement, e.g. cartridge housing

37/08 . . Indicators; Distinguishing marks

37/10 . . Compensation for variation of ambient temperature or pressure
37/12 . . Means for adjustment of "on" or "off" operating temperature
37/14 . . . by anticipatory electric heater
37/16 . . . by varying the proportion of input heat received by the thermal element, e.g. by displacement of a shield
37/18 . . . by varying bias on the thermal element due to a separate spring
37/20 . . . by varying the position of the thermal element in relation to switch base or casing
37/22 . . . by adjustment of a member transmitting motion from the thermal element to contacts or latch
37/24 . . . by adjustment of position of the movable contact on its driving member
37/26 . . . by adjustment of abutment for "off" position of the movable contact
37/28 . . . by adjustment of the position of the fixed contact
37/30 . . . by varying the position of the contact unit in relation to switch base or casing
37/32 . . Thermally-sensitive members
37/34 . . . Means for transmitting heat thereto, e.g. capsule remote from contact member
37/36 . . . actuated due to expansion or contraction of a fluid with or without vaporisation (the fluid forming a contact of the switch H01H 29/04, H01H 29/30)
37/38 . . . . with bellows
37/40 . . . . with diaphragm
37/42 . . . . with curled flexible tube, e.g. Bourdon tube
37/44 . . . . with piston and cylinder
37/46 . . . actuated due to expansion or contraction of a solid (deflection of a bimetallic element H01H 37/52)
37/48 . . . . with extensible rigid rods or tubes
37/50 . . . . with extensible wires under tension
37/52 . . . actuated due to deflection of bimetallic element
37/54 . . . . wherein the bimetallic element is inherently snap acting
37/56 . . . . having spirally wound or helically wound bimetallic element
37/58 . . . actuated due to thermally controlled change of magnetic permeability
37/60 . . Means for producing snap action (inherent in bimetallic element H01H 37/54; caused by a magnet H01H 37/66)
37/62 . . Means other than thermal means for introducing a predetermined time delay
37/64 . . Contacts
37/66 . . . Magnetic reinforcement of contact pressure; Magnet causing snap action
37/68 . . . sealed in evacuated or gas-filled tube
37/70 . . . Resetting means
37/72 . Switches in which the opening movement and the closing movement of a contact are effected respectively by heating and cooling or vice versa
37/74 . Switches in which only the opening movement or only the closing movement of a contact is effected by heating or cooling
37/76 . . Contact member actuated by melting of fusible material, actuated due to burning of combustible material or due to explosion of explosive material

39/00 Switching devices actuated by an explosion produced within the device and initiated by an electric current

41/00 Switches providing a selected number of consecutive operations of the contacts by a single manual actuation of the operating part

41/04 . Switches without means for setting or mechanically storing a multidigit number
41/06 . . dial or slide operated
41/08 . . keyboard operated
41/10 . Switches with means for setting or mechanically storing a multidigit number
41/12 . . dial or slide operated
41/14 . . keyboard operated

43/00 Time or time-programme switches providing a choice of time-intervals for executing one or more switching actions and automatically terminating their operation after the programme is completed

43/02 . Details
43/04 . . Means for time setting
43/06 . . . comprising separately adjustable parts for each programme step, e.g. with tappets
43/08 . . . comprising an interchangeable programme part which is common for all programme steps, e.g. with a punched card
43/10 . with timing of actuation of contacts due to a part rotating at substantially constant speed
43/12 . . stopping automatically after a single cycle of operation
43/14 . . . wherein repetition of operation necessitates resetting of time intervals
43/16 . . stopping automatically after a predetermined plurality of cycles of operation
43/24 . with timing of actuation of contacts due to a non-rotatably moving part
43/26 . . the actuation being produced by a substance flowing due to gravity, e.g. sand, water
43/28 . . the actuation being produced by a part, the speed of which is controlled by fluid-pressure means, e.g. by piston and cylinder
43/30 . with timing of actuation of contacts due to thermal action
43/32 . with timing of actuation of contacts due to electrolytic processes; with timing of actuation of contacts due to chemical processes

Relays

45/00 Details of relays (electric circuit arrangements H01H 47/00; of electromagnetic relays H01H 50/00; details of electrically-operated selector switches H01H 63/00)

45/02 . Bases; Casings; Covers (frames for mounting two or more relays or for mounting a relay and another electric component H02B 1/01, H04Q 1/08, H05K)
45/04 . . Mounting complete relay or separate parts of relay on a base or inside a case
45/06 . . having windows; Transparent cases or covers
45/08 . Indicators; Distinguishing marks
45/10 . Electromagnetic or electrostatic shielding (casings H01H 45/02)
45/12 . Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013)
45/14 . Terminal arrangements

47/00 Circuit arrangements not adapted to a particular application of the relay and designed to obtain desired operating characteristics or to provide energising current

47/02 . for modifying the operation of the relay

47/04 . . for holding armature in attracted position, e.g. when initial energising circuit is interrupted; for maintaining armature in attracted position, e.g. with reduced energising current
47/06 . . . by changing number of serially-connected turns or winding
47/08 . . . by changing number of parallel-connected turns or windings
47/10 . . . by switching-in or -out impedance external to the relay winding
47/12 . . for biasing the electromagnet
47/14 . . for differential operation of the relay
47/16 . . for conjoint, e.g. additive, operation of the relay
47/18 . . for introducing delay in the operation of the relay (short-circuited conducting sleeves, bands, or discs H01H 50/46)
47/20 . . for producing frequency-selective operation of the relay
47/22 . for supplying energising current for relay coil
47/24 . . having light-sensitive input
47/26 . . having thermo-sensitive input
47/28 . . Energising current supplied by discharge tube
47/30 . . . by gas-filled discharge tube
47/32 . . Energising current supplied by semiconductor device
47/34 . . Energising current supplied by magnetic amplifier
47/36 . . Relay coil or coils forming part of a bridge circuit

49/00 Apparatus or processes specially adapted to the manufacture of relays or parts thereof

50/00 Details of electromagnetic relays (electric circuit arrangements H01H 47/00; details of electrically-operated selector switches H01H 63/00)
50/02 . Bases; Casings; Covers (frames for mounting two or more relays or for mounting a relay and another electric component H02B 1/01, H04Q 1/08, H05K)
50/04 . . Mounting complete relay or separate parts of relay on a base or inside a case
50/06 . . having windows; Transparent cases or covers
50/08 . Indicators; Distinguishing marks
50/10 . Electromagnetic or electrostatic shielding (casings H01H 50/02)
50/12 . Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013)
50/14 . Terminal arrangements
50/16 . Magnetic circuit arrangements
50/18 . . Movable parts of magnetic circuits, e.g. armature
50/20 . . . movable inside coil and substantially lengthwise with respect to axis thereof; movable coaxially with respect to coil
50/22 . . . . wherein the magnetic circuit is substantially closed
50/24 . . . Parts rotatable or rockable outside coil
50/26 . . . . Parts movable about a knife edge
50/28 . . . . Parts movable due to bending of a blade spring or reed
50/30 . . . Mechanical arrangements for preventing or damping vibration or shock, e.g. by balancing of armature
50/32 . . . Latching movable parts mechanically
50/34 . . . Means for adjusting limits of movement; Mechanical means for adjusting returning force
50/36 . . Stationary parts of magnetic circuit, e.g. yoke
50/38 . . . Part of main magnetic circuit shaped to suppress arcing between the contacts of the relay
50/40 . . . Branched or multiple-limb main magnetic circuits
50/42 . . . Auxiliary magnetic circuits, e.g. for maintaining armature in, or returning armature to, position of rest, for damping or accelerating movement
50/44 . Magnetic coils or windings
50/46 . . Short-circuited conducting sleeves, bands, or discs
50/54 . Contact arrangements
50/56 . . Contact spring sets
50/58 . . . Driving arrangements structurally associated therewith; Mounting of driving arrangement on armature
50/60 . . moving contact being rigidly combined with movable part of magnetic circuit
50/62 . . Co-operating movable contacts operated by separate electrical actuating means
50/64 . Driving arrangements between movable part of magnetic circuit and contact (structurally associated with contact spring sets H01H 50/58)
50/66 . . with lost motion
50/68 . . with snap action
50/70 . . operating contact momentarily during stroke of armature
50/72 . . for mercury contact
50/74 . . Mechanical means for producing a desired natural frequency of operation of the contacts, e.g. for self-interrupter
50/76 . . . using reed or blade spring
50/78 . . . using diaphragm; using stretched wire or ribbon vibrating sideways
50/80 . . . using torsionally vibrating member, e.g. wire, strip
50/82 . . . using spring-loaded pivoted inertia member
50/84 . . . with means for adjustment of frequency or of make-to-break ratio
50/86 . Means for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts (circuit arrangements for introducing delay H01H 47/18; short-circuited conducting sleeves, bands, or discs H01H 50/46)
50/88 . . Mechanical means, e.g. dash-pot
50/90 . . . the delay being effective in both directions of operation
50/92 . . Thermal means (inherent in electrothermal relays H01H 61/00)

51/00 Electromagnetic relays (relays using the dynamo-electric effect H01H 53/00)
51/01 . Relays in which the armature is maintained in one position by a permanent magnet and freed by energisation of a coil producing an opposing magnetic field **[3]**
51/02 . Non-polarised relays (H01H 51/01 takes precedence) **[3]**
51/04 . . with single armature; with single set of ganged armatures
51/06 . . . Armature is movable between two limit positions of rest and is moved in one direction due to energisation of an electromagnet and after the electromagnet is de-energised is returned by energy stored during the movement in the first direction, e.g. by using a spring, by using a permanent magnet, by gravity

51/08 . . . . Contacts alternately opened and closed by successive cycles of energisation and de-energisation of the electromagnet, e.g. by use of a ratchet
51/10 . . . . Contacts retained open or closed by a mechanical latch which is controlled by an electromagnet
51/12 . . . Armature is movable between two limit positions of rest and is moved in both directions due to the energisation of one or the other of two electromagnets without the storage of energy to effect the return movement
51/14 . . . . without intermediate neutral position of rest
51/16 . . . . with intermediate neutral position of rest
51/18 . . . Armature is rotatable through an unlimited number of revolutions
51/20 . . with two or more independent armatures
51/22 . Polarised relays
51/24 . . without intermediate neutral position of rest
51/26 . . with intermediate neutral position of rest
51/27 . Relays with armature having two stable magnetic states and operated by change from one state to the other
51/28 . Relays having both armature and contacts within a sealed casing outside which the operating coil is located, e.g. contact carried by a magnetic leaf spring or reed (H01H 51/27 takes precedence)
51/29 . Relays having armature, contacts, and operating coil within a sealed casing (H01H 51/27 takes precedence)
51/30 . specially adapted for actuation by ac
51/32 . . Frequency relays; Mechanically-tuned relays
51/34 . Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts
51/36 . . wherein the make-to-break ratio is varied by hand setting or current strength

53/00 Relays using the dynamo-electric effect, i.e. relays in which contacts are opened or closed due to relative movement of current-carrying conductor and magnetic field caused by force of interaction between them
53/01 . Details
53/015 . . Moving coils; Contact-driving arrangements associated therewith
53/02 . Electrodynamic relays, i.e. relays in which the interaction is between two current-carrying conductors
53/04 . . Ferrodynamic relays, i.e. relays in which the magnetic field is concentrated in ferromagnetic parts
53/06 . Magnetodynamic relays, i.e. relays in which the magnetic field is produced by a permanent magnet
53/08 . wherein a mercury contact constitutes the current-carrying conductor
53/10 . Induction relays, i.e. relays in which the interaction is between a magnetic field and current induced thereby in a conductor
53/12 . . Ferraris relays
53/14 . Contacts actuated by an electric motor through fluid-pressure transmission, e.g. using a motor-driven pump

55/00 Magnetostrictive relays

57/00 Electrostrictive relays; Piezo-electric relays

59/00 Electrostatic relays; Electro-adhesion relays

61/00 Electrothermal relays (thermal switches not operated by electrical input, thermal switches with anticipating electrical input H01H 37/00; thermally-sensitive members H01H 37/32)
61/01 . Details
61/013 . . Heating arrangements for operating relays
61/017 . . . Heating by glow discharge or arc in confined space
61/02 . wherein the thermally-sensitive member is heated indirectly, e.g. resistively, inductively
61/04 . wherein the thermally-sensitive member is only heated directly
61/06 . Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts
61/08 . . wherein the make-to-break ratio is varied by hand setting or current strength

Selectors [3]

63/00 Details of electrically-operated selector switches
63/02 . Contacts; Wipers; Connections thereto
63/04 . . Contact-making or contact-breaking wipers; Position indicators therefor
63/06 . . Contact banks
63/08 . . . cylindrical
63/10 . . . plane
63/12 . . Multiplying connections to contact banks, e.g. using ribbon cables
63/14 . . . without soldering
63/16 . Driving arrangements for multi-position wipers
63/18 . . with step-by-step motion of wiper to a selector position
63/20 . . . using stepping magnet and ratchet
63/22 . . . using step-by-step electromagnetic drive without ratchet, e.g. self-interrupting driving magnet
63/24 . . with continuous motion of wiper until a selected position is reached
63/26 . . . with an individual clutch-drive from a shaft common to more than one selector switch
63/28 . . . with an individual motor for each selector switch
63/30 . . . . Pneumatic motor for moving wiper to selected position
63/32 . . . . Spring motor for moving wiper to selected position
63/33 . Constructional details of co-ordinate-type selector switches not having relays at cross-points
63/34 . Bases; Cases; Covers; Mountings (racks for mounting selectors with or without other exchange equipment H04Q 1/04); Mounting of fuses on selector switch
63/36 . Circuit arrangements for ensuring correct or desired operation and not adapted to a particular application of the selector switch
63/38 . . for multi-position wiper switches
63/40 . . for multi-position switches without wipers
63/42 . . . for co-ordinate-type selector switches not having relays at cross-points

65/00 Apparatus or processes specially adapted to the manufacture of selector switches or parts thereof

67/00 Electrically-operated selector switches
67/02 . Multi-position wiper switches
67/04 . . having wipers movable only in one direction for purpose of selection

67/06 . . . Rotary switches, i.e. having angularly movable wipers
67/08 . . . . with wiper selection
67/10 . . . . with coarse and fine positioning of wipers
67/12 . . . Linear-motion switches
67/14 . . having wipers movable in two mutually perpendicular directions for purpose of selection
67/16 . . . one motion being rotary and the other being parallel to the axis of rotation, e.g. Strowger or "up and around" switches
67/18 . . . one motion being rotary and the other being perpendicular to the axis of rotation, e.g. "round and in" switches
67/20 . . . both motions being linear
67/22 . Switches without multi-position wipers
67/24 . . Co-ordinate-type relay switches having an individual electromagnet at each cross-point
67/26 . . Co-ordinate-type selector switches not having relays at cross-points but involving mechanical movement, e.g. cross-bar switch, code-bar switch
67/30 . . Co-ordinate-type selector switches with field of co-ordinate coil acting directly upon magnetic leaf spring or reed-type contact member
67/32 . . having a multiplicity of interdependent armatures operated in succession by a single coil and each controlling one contact or set of contacts, e.g. counting relay

Emergency protective devices

69/00 Apparatus or processes for the manufacture of emergency protective devices
69/01 . for calibrating or setting of devices to function under predetermined conditions
69/02 . Manufacture of fuses

71/00 Details of the protective switches or relays covered by groups H01H 73/00 to H01H 83/00
71/02 . Housings; Casings; Bases; Mountings
71/04 . Means for indicating condition of the switching device
71/06 . Distinguishing marks, e.g. colour coding
71/08 . Terminals; Connections
71/10 . Operating or release mechanisms
71/12 . . Automatic release mechanisms with or without manual release
71/14 . . . Electrothermal mechanisms
71/16 . . . . with bimetal element
71/18 . . . . with expanding rod, strip, or wire
71/20 . . . . with fusible mass
71/22 . . . . with compensation for variation of ambient temperature
71/24 . . . Electromagnetic mechanisms
71/26 . . . . with windings acting in opposition
71/28 . . . . with windings acting in conjunction
71/30 . . . . having additional short-circuited winding
71/32 . . . . having permanently magnetised part
71/34 . . . . having two or more armatures controlled by a common winding
71/36 . . . . frequency selective
71/38 . . . . wherein the magnet coil also acts as arc blow-out device
71/40 . . . Combined electrothermal and electromagnetic mechanisms
71/42 . . . Induction-motor, induced-current, or electrodynamic release mechanisms
71/43 . . . . Electrodynamic release mechanisms
71/44 . . . having means for introducing a predetermined time delay (by short-circuited winding H01H 71/30; by additional armature H01H 71/34)
71/46 . . . having means for operating auxiliary contacts additional to the main contacts
71/48 . . . . with provision for short-circuiting the electrical input to the release mechanism after release of the switch, e.g. for protection of heating wire
71/50 . . Manual reset mechanisms
71/52 . . . actuated by lever
71/54 . . . actuated by tumbler
71/56 . . . actuated by rotatable knob or wheel
71/58 . . . actuated by push-button, pull-knob, or slide
71/60 . . . actuated by closure of switch casing
71/62 . . . with means for preventing resetting while abnormal condition persists, e.g. loose handle arrangement
71/64 . . . . incorporating toggle linkage
71/66 . . Power reset mechanisms
71/68 . . . actuated by electromagnet
71/70 . . . actuated by electric motor
71/72 . . . actuated automatically a limited number of times
71/74 . Means for adjusting the conditions under which the device will function to provide protection

73/00 Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of a hand reset mechanism
73/02 . Details
73/04 . . Contacts
73/06 . . Housings; Casings; Bases; Mountings
73/08 . . . Plug-in housings
73/10 . . . Cartridge housings, e.g. screw-in housing
73/12 . . Means for indicating condition of the switch
73/14 . . . Indicating lamp structurally associated with the switch
73/16 . . Distinguishing marks, e.g. colour coding
73/18 . . Means for extinguishing or suppressing arc
73/20 . . Terminals; Connections
73/22 . having electrothermal release and no other automatic release (cartridge type H01H 73/62)
73/24 . . reset by lever
73/26 . . reset by tumbler
73/28 . . reset by rotatable knob or wheel
73/30 . . reset by push-button, pull-knob, or slide
73/32 . . reset by closure of switch casing
73/34 . . reset action requiring replacement or reconditioning of a fusible or explosive part
73/36 . having electromagnetic release and no other automatic release (cartridge type H01H 73/64)
73/38 . . reset by lever
73/40 . . reset by tumbler
73/42 . . reset by rotatable knob or wheel
73/44 . . reset by push-button, pull-knob, or slide
73/46 . . reset by closure of switch casing
73/48 . having both electrothermal and electromagnetic automatic release (cartridge type H01H 73/66)
73/50 . . reset by lever
73/52 . . reset by tumbler
73/54 . . reset by rotatable knob or wheel

73/56 . . reset by push-button, pull-knob, or slide
73/58 . . reset by closure of switch casing
73/60 . cartridge type, e.g. screw-in cartridge
73/62 . . having only electrothermal release
73/64 . . having only electromagnetic release
73/66 . . having combined electrothermal and electromagnetic release

75/00 Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of power reset mechanism

75/02 . Details
75/04 . . Reset mechanisms for automatically reclosing a limited number of times (circuit arrangements H02H 3/06)
75/06 . . . effecting one reclosing action only
75/08 . having only electrothermal release
75/10 . having only electromagnetic release
75/12 . having combined electrothermal and electromagnetic release

77/00 Protective overload circuit-breaking switches operated by excess current and requiring separate action for resetting (H01H 73/00, H01H 75/00 take precedence)

77/02 . in which the excess current itself provides the energy for opening the contacts, and having a separate reset mechanism
77/04 . . with electrothermal opening
77/06 . . with electromagnetic opening
77/08 . . . retained closed by permanent or remanent magnetism and opened by windings acting in opposition
77/10 . . with electrodynamic opening

79/00 Protective switches in which excess current causes the closing of contacts, e.g. for short-circuiting the apparatus to be protected

81/00 Protective switches in which contacts are normally closed but are repeatedly opened and reclosed as long as a condition causing excess current persists, e.g. for current limiting

81/02 . electrothermally-operated
81/04 . electromagnetically-operated

83/00 Protective switches, e.g. circuit-breaking switches, or protective relays operated by abnormal electrical conditions otherwise than solely by excess current

83/02 . operated by earth fault currents (H01H 83/14 takes precedence)
83/04 . . with testing means for indicating the ability of the switch or relay to function properly
83/06 . operated by current falling below a predetermined value
83/08 . operated by reversal of dc
83/10 . operated by excess voltage, e.g. for lightning protection
83/12 . operated by voltage falling below a predetermined value, e.g. for no-volt protection
83/14 . operated by unbalance of two or more currents or voltages, e.g. for differential protection
83/16 . operated by abnormal ratio of voltage and current, e.g. distance relay
83/18 . operated by abnormal product of, or abnormal phase angle between, voltage and current, e.g. directional relay
83/20 . operated by excess current as well as by some other abnormal electrical condition
83/22 . . the other condition being unbalance of two or more currents or voltages

85/00 Protective devices in which the current flows through a part of fusible material and this current is interrupted by displacement of the fusible material when this current becomes excessive (switches actuated by melting of fusible material H01H 37/76; disposition or arrangement of fuses on boards H02B 1/18)

85/02 . Details
85/04 . . Fuses, i.e. expendable parts of the protective device, e.g. cartridges
85/041 . . . characterised by the type **[5]**
85/042 . . . . General constructions or structure of high voltage fuses, i.e. above 1,000 V **[5]**
85/044 . . . . General constructions or structure of low voltage fuses, i.e. below 1,000 V, or of fuses where the applicable voltage is not specified (H01H 85/046 to H01H 85/048 take precedence) **[5]**
85/0445 . . . . . fast or slow type (H01H 85/045 to H01H 85/048 take precedence) **[5]**
85/045 . . . . . cartridge type **[5]**
85/046 . . . . Fuses formed as printed circuits **[5]**
85/047 . . . . Vacuum fuses **[5]**
85/048 . . . . Fuse resistors **[5]**
85/05 . . . Component parts thereof **[5]**
85/055 . . . . Fusible members **[5]**
85/06 . . . . . characterised by the fusible material (H01H 85/11 takes precedence) **[5]**
85/08 . . . . . characterised by the shape or form of the fusible member **[5]**
85/10 . . . . . with constriction for localised fusing (H01H 85/11 takes precedence) **[5]**
85/11 . . . . . with applied local area of a metal which, on melting, forms a eutectic with the main material of the fusible member, i.e. M-effect devices **[5]**
85/12 . . . . . Two or more separate fusible members in parallel **[5]**
85/143 . . . . Electrical contacts; Fastening fusible members to such contacts **[5]**
85/147 . . . . . Parallel-side contacts **[5]**
85/15 . . . . . Screw-in contacts **[5]**
85/153 . . . . . Knife-blade-end contacts **[5]**
85/157 . . . . . Ferrule-end contacts **[5]**
85/165 . . . . Casings **[5]**
85/17 . . . . . characterised by the casing material **[5]**
85/175 . . . . . characterised by the casing shape or form **[5]**
85/18 . . . . Casing fillings, e.g. powder
85/20 . . Bases for supporting the fuse; Separate parts thereof
85/22 . . Intermediate or auxiliary parts for carrying, holding, or retaining fuse, co-operating with base or fixed holder, and removable therefrom for renewing the fuse
85/24 . . Means for preventing insertion of incorrect fuse
85/25 . . Safety arrangements preventing or inhibiting contact with live parts, including operation of isolation on removal of cover **[5]**
85/26 . . Magazine arrangements
85/28 . . . effecting automatic replacement

85/30 . . Means for indicating condition of fuse structurally associated with the fuse
85/32 . . . Indicating lamp structurally associated with the protective device
85/34 . . Distinguishing marks, e.g. colour coding
85/36 . . Means for applying mechanical tension to fusible member
85/38 . . Means for extinguishing or suppressing arc (by powder filling H01H 85/18; by mechanical tension applied to fusible member H01H 85/36)
85/40 . . . using an arc-extinguishing liquid (characterised by the composition of the liquid H01H 33/22)
85/42 . . . using an arc-extinguishing gas (characterised by the composition of the gas H01H 33/22)
85/43 . . Means for exhausting or absorbing gases liberated by fusing arc, or for ventilating excess pressure generated by heating **[5]**
85/44 . . Structural association with spark-gap arrester
85/46 . . Circuit arrangements not adapted to a particular application of the protective device
85/47 . . Means for cooling **[5]**
85/48 . Protective devices wherein the fuse is carried or held directly by the base
85/50 . . the fuse having contacts at opposite ends for co-operation with the base
85/52 . . the fuse being adapted for screwing into the base
85/54 . Protective devices wherein the fuse is carried, held, or retained by an intermediate or auxiliary part removable from the base, or used as sectionalisers
85/56 . . the intermediate or auxiliary part having side contacts for plugging into the base, e.g. bridge-carrier type
85/58 . . . with intermediate auxiliary part and base shaped to interfit and thereby enclose the fuse
85/60 . . the intermediate or auxiliary part having contacts at opposite ends for co-operation with the base
85/62 . . the intermediate or auxiliary part being adapted for screwing into the base

87/00 Protective devices in which a current flowing through a liquid or solid is interrupted by the evaporation of the liquid or by the melting and evaporation of the solid when the current becomes excessive, the circuit continuity being reestablished on cooling [3]

89/00 Combinations of two or more different basic types of electric switches, relays, selectors and emergency protective devices, not covered by any single one of the other main groups of this subclass [8]
89/02 . Combination of a key operated switch with a manually operated switch, e.g. ignition and lighting switches **[8]**
89/04 . Combination of a thermally actuated switch with a manually operated switch **[8]**
89/06 . Combination of a manual reset circuit with a contactor, i.e. the same circuit controlled by both a protective and a remote control device **[8]**
89/08 . . with both devices using the same contact pair **[8]**
89/10 . . . with each device controlling one of the two co-operating contacts **[8]**

H01J ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)

(1) This subclass covers only devices for producing, influencing, or using a flow of electrons or ions, e.g. for controlling, indicating, or switching of electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend.
Light sources using a combination (other than covered by group H01J 61/96 of this subclass) of discharge and other kinds of light generation are covered by group H05B 35/00.
(2) In this subclass, groups H01J 1/00 to H01J 7/00 relate only to:
(i) details of an unspecified kind of discharge tube or lamp, or
(ii) details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds. A detail only described with reference to, or clearly only applicable to, tubes or lamps of a single basic kind is classified in the detail group appropriate to tubes or lamps of that basic kind, e.g. H01J 17/04.
(3) In this subclass, the following term is used with the meaning indicated:
– "lamp" includes tubes emitting ultra-violet or infra-red light.
(4) Attention is drawn to the definition of the expression "spark gaps" given in the Note following the title of subclass H01T. **[4]**
(5) Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof are classified in group H01J 9/00.

Subclass index

SPECIAL TUBES

For emergence of electrons or ions; particle spectrometers or separator tubes 33/00; 49/00

Vacuum gauges, evacuation by ion diffusion; secondary-emission tubes, electron multipliers; thermionic generators 41/00; 43/00; 45/00

Photoelectric; radiation and particle detectors 40/00; 47/00

DISCHARGE LAMPS

Gas discharge lamps; cathode ray or electron stream lamps; without electrode inside 61/00; 63/00; 65/00

DETAILS

Electrodes; electron optics; vessels; other details 1/00; 3/00; 5/00; 7/00

MANUFACTURE; REPAIR; REGENERATION; RECOVERY OF MATERIAL 9/00

SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS 99/00

1/00 **Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps** (details of electron-optical arrangements or of ion traps H01J 3/00)

1/02 . Main electrodes

1/04 . . Liquid electrodes, e.g. liquid cathode

1/05 . . . characterised by material

1/06 . . . Containers for liquid-pool electrodes; Arrangement or mounting thereof

1/08 . . . Positioning or moving the cathode spot on the surface of a liquid-pool cathode

1/10 . . . Cooling, heating, circulating, filtering, or controlling level of liquid in a liquid-pool electrode

1/12 . . Cathodes having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube

1/13 . . Solid thermionic cathodes

1/14 . . . characterised by the material

1/142 . . . . with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material **[6]**

1/144 . . . . with other metal oxides as an emissive material **[6]**

1/146 . . . . with metals or alloys as an emissive material **[6]**

1/148 . . . . with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material **[6]**

1/15 . . . Cathodes heated directly by an electric current

1/16 . . . . characterised by the shape

1/18 . . . . Supports; Vibration-damping arrangements

1/20 . . . Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment

1/22 . . . . Heaters (filaments for incandescent lamps H01K 1/02)

1/24 . . . . Insulating layer or body located between heater and emissive material

1/26 . . . . Supports for the emissive material

1/28 . . . . Dispenser-type cathodes, e.g. L-cathode

1/30 . . Cold cathodes

1/304 . . . Field-emissive cathodes **[7]**

1/308 . . . Semiconductor cathodes, e.g. cathodes with PN junction layers **[7]**

1/312 . . . having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of Metal-Insulator-Metal (MIM) type **[7]**

1/316 . . . having an electric field parallel to the surface, e.g. thin film cathodes **[7]**

1/32 . . Secondary-electron-emitting electrodes (H01J 1/35 takes precedence; luminescent screens H01J 1/62; charge-storage screens in general H01J 1/78; charge-storage screens using secondary emission for image tubes H01J 29/41; dynodes for secondary-emission tubes H01J 43/10; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)

1/34 . . Photo-emissive cathodes (H01J 1/35 takes precedence; photoelectric screens H01J 1/78)

1/35 . . Electrodes exhibiting both secondary emission and photo-emission

1/36 . . Solid anodes; Solid auxiliary anodes for maintaining a discharge

1/38 . . . characterised by the material

1/40 . . . forming part of the envelope of the tube or lamp

1/42 . . . Cooling of anodes (cooling rotary anodes H01J 1/44); Heating of anodes

1/44 . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes

1/46 . Control electrodes, e.g. grid (for igniting arrangements H01J 7/30); Auxiliary electrodes (auxiliary anodes for maintaining a discharge H01J 1/36)

1/48 . . characterised by the material

1/50 . Magnetic means for controlling the discharge

1/52 . Screens for shielding (screens acting as control electrodes H01J 1/46); Guides for influencing the discharge; Masks interposed in the electron stream

1/53 . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked-up, converted, or stored

1/54 . Screens on or from which an image or pattern is formed, picked-up, converted, or stored; Luminescent coatings on vessels

1/56 . . acting as light valves by shutter operation, e.g. for eidophor

1/58 . . acting by discolouration, e.g. halide screen

1/60 . . Incandescent screens

1/62 . . Luminescent screens; Selection of materials for luminescent coatings on vessels

1/63 . . . characterised by the luminescent material (luminescent materials C09K 11/00)

1/64 . . . characterised by the binder or adhesive for securing the luminescent material to its support

1/66 . . . Supports for luminescent material (vessels H01J 5/02)
1/68 . . . with superimposed luminescent layers
1/70 . . . with protective, conductive, or reflective layers
1/72 . . . with luminescent material discontinuously arranged, e.g. in dots or lines
1/74 . . . . with adjacent dots or lines of different luminescent material
1/76 . . . provided with permanent marks or references
1/78 . . Photoelectric screens; Charge-storage screens
1/88 . Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
1/90 . . Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 5/46)
1/92 . . Mountings for the electrode assembly as a whole
1/94 . . Mountings for individual electrodes (for directly-heated cathodes H01J 1/15)
1/96 . . Spacing members extending to the envelope
1/98 . . . without fixed connection between spacing member and envelope

3/00 Details of electron-optical or ion-optical arrangements or of ion traps common to two or more basic types of discharge tubes or lamps

3/02 . Electron guns
3/04 . Ion guns
3/06 . two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 3/07 takes precedence) **[2]**
3/07 . Arrangements for controlling convergence of a plurality of beams **[2]**
3/08 . Arrangements for controlling intensity of ray or beam (H01J 3/02, H01J 3/04 take precedence)
3/10 . Arrangements for centering ray or beam (H01J 3/02, H01J 3/04 take precedence)
3/12 . Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses (H01J 3/02, H01J 3/04 take precedence)
3/14 . Arrangements for focusing or reflecting ray or beam (H01J 3/02, H01J 3/04 take precedence)
3/16 . . Mirrors
3/18 . . Electrostatic lenses
3/20 . . Magnetic lenses
3/22 . . . using electromagnetic means only
3/24 . . . using permanent magnets only
3/26 . Arrangements for deflecting ray or beam (circuit arrangements for producing sawtooth pulses or other deflecting voltages or currents H03K)
3/28 . . along one straight line or along two perpendicular straight lines
3/30 . . . by electric fields only
3/32 . . . by magnetic fields only
3/34 . . along a circle, spiral, or rotating radial line
3/36 . Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration
3/38 . Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements
3/40 . Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection

5/00 Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps

5/02 . Vessels; Containers; Shields associated therewith; Vacuum locks
5/03 . . Arrangements for preventing or mitigating effects of implosion of vessels or containers **[2]**
5/04 . . Vessels or containers characterised by the material thereof (selection of the material of the coating H01J 5/08)
5/06 . . Vessels or containers specially adapted for operation at high tension, e.g. by improved potential distribution over surface of vessel
5/08 . . provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent coatings H01J 1/62)
5/10 . . . on internal surfaces
5/12 . . Double-wall vessels or containers
5/14 . . Dismountable vessels or containers, e.g. for replacing cathode heater
5/16 . . Optical or photographic arrangements structurally combined with the vessel (luminescent coatings H01J 1/62)
5/18 . . Windows permeable to X-rays, gamma-rays, or particles
5/20 . Seals between parts of vessels
5/22 . . Vacuum-tight joints between parts of vessel
5/24 . . . between insulating parts of vessel
5/26 . . . between insulating and conductive parts of vessel
5/28 . . . between conductive parts of vessel
5/30 . . . using packing material, e.g. sealing liquid or elastic insert
5/32 . Seals for leading-in conductors
5/34 . . for an individual conductor (pinched-stem seals H01J 5/38; end-disc seals H01J 5/40; annular seals H01J 5/44)
5/36 . . . using intermediate part
5/38 . . Pinched-stem or analogous seals
5/40 . . End-disc seals, e.g. flat header
5/42 . . . using intermediate part
5/44 . . Annular seals disposed between the ends of the vessel
5/46 . Leading-in conductors
5/48 . Means forming part of the tube or lamp for the purpose of supporting it (associated with electrical connecting means H01J 5/50)
5/50 . Means forming part of the tube or lamp for the purpose of providing electrical connection to it (electric coupling devices comprising a holder adapted for supporting a tube or lamp and not forming part of the tube or lamp H01R 33/00)
5/52 . . directly applied to, or forming part of, the vessel
5/54 . . supported by a separate part, e.g. base
5/56 . . . Shape of the separate part
5/58 . . . Means for fastening the separate part to the vessel, e.g. by cement
5/60 . . . . for fastening by mechanical means
5/62 . . . Connection of wires protruding from the vessel to connectors carried by the separate part

7/00 Details not provided for in groups H01J 1/00 to H01J 5/00 and common to two or more basic types of discharge tubes or lamps

7/02 . Selection of substances for gas fillings; Specified operating pressure or temperature (radioactive fillings H01J 7/40)

7/04 . . having one or more carbon compounds as the principal constituent
7/06 . . having helium, argon, neon, krypton, or xenon as the principal constituent
7/08 . . having a metallic vapour as the principal constituent
7/10 . . . mercury vapour
7/12 . . . vapour of an alkali metal
7/14 . Means for obtaining or maintaining the desired pressure within the vessel
7/16 . . Means for permitting pumping during operation of the tube or lamp
7/18 . . Means for absorbing or adsorbing gas, e.g. by gettering
7/20 . . Means for producing, introducing, or replenishing gas or vapour during operation of the tube or lamp
7/22 . . Tubulations therefor, e.g. for exhausting; Closures therefor
7/24 . Cooling arrangements (for main electrodes H01J 1/02); Heating arrangements (for main electrodes H01J 1/02); Means for circulating gas or vapour within the discharge space
7/26 . . by flow of fluid through passages associated with tube or lamp
7/28 . . by latent heat or evaporation of cooling liquid
7/30 . Igniting arrangements (circuit arrangements H02M 1/02, H05B)
7/32 . . having resistive or capacitative igniter
7/34 . . . having resistive igniter only
7/36 . . Igniting by movement of a solid electrode
7/38 . . Igniting by movement of vessel as a whole, e.g. tilting
7/40 . . Igniting by associated radioactive materials or fillings
7/42 . Means structurally associated with the tube or lamp for indicating defects or previous use
7/44 . One or more circuit elements structurally associated with the tube or lamp
7/46 . . Structurally associated resonator having distributed inductance and capacitance

9/00 Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof (manufacture of vessels or containers from metal B21, e.g. B21D 51/00, from glass C03B); **Recovery of material from discharge tubes or lamps [1,7]**

9/02 . Manufacture of electrodes or electrode systems
9/04 . . of thermionic cathodes
9/06 . . . Machines therefor
9/08 . . Manufacture of heaters for indirectly-heated cathodes
9/10 . . . Machines therefor
9/12 . . of photo-emissive cathodes; of secondary-emission electrodes
9/14 . . of non-emitting electrodes
9/16 . . . Machines for making wire grids
9/18 . . Assembling together the component parts of electrode systems
9/20 . Manufacture of screens on or from which an image or pattern is formed, picked-up, converted or stored; Applying coatings to the vessel
9/22 . . Applying luminescent coatings
9/227 . . . with luminescent material discontinuously arranged, e.g. in dots or lines **[2]**
9/233 . . Manufacture of photoelectric screens or charge-storage screens **[2]**
9/236 . Manufacture of magnetic deflecting devices for cathode-ray tubes (manufacturing coils for transformers, inductances, reactors or choke coils H01F 41/04) **[3]**
9/24 . Manufacture or joining of vessels, leading-in conductors, or bases
9/26 . . Sealing together parts of vessels
9/28 . . Manufacture of leading-in conductors
9/30 . . Manufacture of bases
9/32 . . Sealing leading-in conductors
9/34 . . Joining base to vessel
9/36 . . Joining connectors to internal electrode system
9/38 . Exhausting, degassing, filling, or cleaning vessels
9/385 . . Exhausting vessels **[2]**
9/39 . . Degassing vessels **[2]**
9/395 . . Filling vessels **[2]**
9/40 . Closing vessels
9/42 . Measurement or testing during manufacture
9/44 . Factory adjustment of completed discharge tubes or lamps to comply with desired tolerances
9/46 . Machines having sequentially-arranged operating stations
9/48 . . with automatic transfer of workpieces between operating stations
9/50 . Repairing or regenerating used or defective discharge tubes, lamps or their salvageable components
9/52 . Recovery of material from discharge tubes or lamps (H01J 9/50 takes precedence) **[7]**

11/00 Gas-filled discharge tubes without any main electrode inside the vessel; **Gas-filled discharge tubes with at least one main electrode outside the vessel** (lamps H01J 65/00)

11/02 . Details, e.g. gas filling, shape of vessel
11/04 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

13/00 Discharge tubes with liquid-pool cathodes, e.g. metal-vapour rectifying tubes (lamps H01J 61/00)

13/02 . Details
13/04 . . Main electrodes; Auxiliary anodes
13/06 . . . Cathodes
13/08 . . . . characterised by the material
13/10 . . . . Containers for the liquid pool; Arrangement or mounting thereof
13/12 . . . . Positioning or moving the cathode spot on the surface of the pool
13/14 . . . . Cooling, heating, circulating, filtering, or controlling level of the liquid
13/16 . . . Anodes; Auxiliary anodes for maintaining the discharge (screens H01J 13/22)
13/18 . . . . Cooling or heating of anodes
13/20 . . Control electrodes, e.g. grid (for igniting arrangements H01J 13/34)
13/22 . . Screens, e.g. for preventing or eliminating arcing-back
13/24 . . Vessels; Containers
13/26 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
13/28 . . Selection of substances for gas filling; Means for obtaining or maintaining the desired pressure within the tube **[2]**
13/30 . . . Means for permitting pumping during operation of the tube
13/32 . . Cooling arrangements; Heating arrangements (for cathodes H01J 13/14; for anodes H01J 13/18)

13/34 . . Igniting arrangements (circuit arrangements H02M 1/02)
13/36 . . . having resistive or capacitative igniter
13/38 . . . . having resistive igniter only
13/40 . . . Igniting by movement of a solid electrode
13/42 . . . Igniting by movement of vessel as a whole, e.g. tilting
13/44 . . Devices for preventing or eliminating arcing-back (screens therefor H01J 13/22)
13/46 . . One or more circuit elements structurally associated with the tube
13/48 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
13/50 . Tubes having a single main anode
13/52 . . with control by one or more intermediate control electrodes
13/54 . . with control by igniter, e.g. single-anode ignitron
13/56 . Tubes having two or more main anodes
13/58 . . with control by one or more intermediate control electrodes

15/00 Gas-filled discharge tubes with gaseous cathodes, e.g. plasma cathode (lamps H01J 61/62)
15/02 . Details, e.g. electrode, gas filling, shape of vessel
15/04 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

17/00 Gas-filled discharge tubes with solid cathode (H01J 25/00, H01J 27/00, H01J 31/00 to H01J 41/00 take precedence; gas or vapour discharge lamps H01J 61/00; gas filled spark gaps H01T; Marx converters H02M 7/26; tubes for generating potential differences by charges carried in a gas stream H02N)
17/02 . Details
17/04 . . Electrodes; Screens
17/06 . . . Cathodes
17/08 . . . . having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube
17/10 . . . Anodes
17/12 . . . Control electrodes
17/14 . . Magnetic means for controlling the discharge
17/16 . . Vessels; Containers
17/18 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
17/20 . . Selection of substances for gas fillings; Specified operating pressure or temperature (radioactive fillings H01J 17/32)
17/22 . . Means for obtaining or maintaining the desired pressure within the tube
17/24 . . . Means for absorbing or adsorbing gas, e.g. by gettering
17/26 . . . Means for producing, introducing, or replenishing gas or vapour during operation of the tube
17/28 . . Cooling arrangements
17/30 . . Igniting arrangements
17/32 . . . Igniting by associated radioactive materials or fillings
17/34 . . One or more circuit elements structurally associated with the tube
17/36 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
17/38 . Cold-cathode tubes (TR boxes H01J 17/64)
17/40 . . with one cathode and one anode, e.g. glow tube, tuning-indicator glow tube, voltage-stabiliser tube, voltage-indicator tube (cathode-glow lamps H01J 61/64)
17/42 . . . having one or more probe electrodes, e.g. for potential dividing
17/44 . . . having one or more control electrodes
17/46 . . . . for preventing and then permitting ignition, but thereafter having no control
17/48 . . with more than one cathode or anode, e.g. sequence-discharge tube, counting tube, dekatron
17/49 . . . Display panels, e.g. with crossed electrodes (gas-discharge-type indicating arrangements effected by the combination of a number of individual lamps G09F 9/313) **[3]**
17/50 . Thermionic-cathode tubes (TR boxes H01J 17/64)
17/52 . . with one cathode and one anode
17/54 . . . having one or more control electrodes
17/56 . . . . for preventing and then permitting ignition, but thereafter having no control
17/58 . . with more than one cathode or anode
17/60 . . . the discharge paths priming each other in a predetermined sequence, e.g. counting tube
17/62 . . . with independent discharge paths controlled by intermediate electrodes, e.g. polyphase rectifier
17/64 . Tubes specially designed for switching or modulating in a waveguide, e.g. TR box

19/00 Details of vacuum tubes of the types covered by group H01J 21/00
19/02 . Electron-emitting electrodes; Cathodes
19/04 . . Thermionic cathodes
19/06 . . . characterised by the material
19/062 . . . . with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material **[6]**
19/064 . . . . with other metal oxides as an emissive material **[6]**
19/066 . . . . with metals or alloys as an emissive material **[6]**
19/068 . . . . with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material **[6]**
19/08 . . . Cathodes heated directly by an electric current
19/10 . . . characterised by the shape
19/12 . . . . Supports; Vibration-damping arrangements
19/14 . . . Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment
19/16 . . . . Heaters (filaments for incandescent lamps H01K 1/02)
19/18 . . . . Insulating layer or body located between heater and emissive material
19/20 . . . . Supports for the emissive material
19/22 . . . . Dispenser-type cathodes, e.g. L-cathode
19/24 . . Cold cathodes, e.g. field-emissive cathode
19/28 . Non-electron-emitting electrodes; Screens
19/30 . . characterised by the material
19/32 . . Anodes
19/34 . . . forming part of the envelope
19/36 . . . Cooling of anodes
19/38 . . Control electrodes, e.g. grid
19/40 . . Screens for shielding (screens acting as control electrodes H01J 19/38)

19/42 . Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies
19/44 . . Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 19/62)
19/46 . . Mountings for the electrode assembly as a whole
19/48 . . Mountings for individual electrodes (for directly-heated cathodes H01J 19/12)
19/50 . . Spacing members extending to the envelope
19/52 . . . without fixed connection between spacing member and envelope
19/54 . Vessels; Containers; Shields associated therewith
19/56 . . characterised by the material of the vessel or container
19/57 . . provided with coatings on the walls thereof; Selection of materials for the coatings
19/58 . Seals between parts of vessels
19/60 . Seals for leading-in conductors
19/62 . Leading-in conductors
19/64 . Means forming part of the tube for the purpose of supporting it (associated with electrical connecting means H01J 19/66)
19/66 . Means forming part of the tube for the purpose of providing electrical connection to it (construction of connectors H01R)
19/68 . Specified gas introduced into the tube at low pressure, e.g. for reducing or influencing space charge
19/70 . Means for obtaining or maintaining the vacuum, e.g. by gettering
19/72 . . Tubulations therefor, e.g. for exhausting; Closures therefor
19/74 . Cooling arrangements (cooling of anodes H01J 19/36)
19/76 . Means structurally associated with the tube for indicating defects or previous use
19/78 . One or more circuit elements structurally associated with the tube
19/80 . . Structurally associated resonator having distributed inductance and capacitance
19/82 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

21/00 **Vacuum tubes** (H01J 25/00, H01J 31/00 to H01J 40/00, H01J 43/00, H01J 47/00, H01J 49/00 take precedence; details of vacuum tubes H01J 19/00; cathode-ray or electron-stream lamps H01J 63/00)

21/02 . Tubes with a single discharge path
21/04 . . without control means, i.e. diodes
21/06 . . having electrostatic control means only
21/08 . . . with movable electrode or electrodes
21/10 . . . with one or more immovable internal control electrodes, e.g. triode, pentode, octode
21/12 . . . . Tubes with variable amplification factor
21/14 . . . . Tubes with means for concentrating the electron stream, e.g. beam tetrode
21/16 . . . with external electrostatic control means and with or without internal control electrodes
21/18 . . having magnetic control means; having both magnetic and electrostatic control means
21/20 . Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode (secondary-emission tubes, electron-multiplier tubes H01J 43/00)
21/22 . . with movable electrode or electrodes
21/24 . . with variable amplification factor
21/26 . . with means for concentrating the electron stream
21/34 . Tubes with electrode system arranged or dimensioned so as to eliminate transit-time effect (with flat electrodes H01J 21/36)
21/36 . Tubes with flat electrodes, e.g. disc electrode

23/00 **Details of transit-time tubes of the types covered by group H01J 25/00**

23/02 . Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16)
23/027 . . Collectors **[2]**
23/033 . . . Collector cooling devices **[2]**
23/04 . . Cathodes
23/05 . . . having a cylindrical emissive surface, e.g. cathodes for magnetrons **[3]**
23/06 . . Electron or ion guns
23/065 . . . producing a solid cylindrical beam (H01J 23/075 takes precedence) **[3]**
23/07 . . . producing a hollow cylindrical beam (H01J 23/075 takes precedence) **[3]**
23/075 . . . Magnetron injection guns **[3]**
23/08 . . Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream
23/083 . . . Electrostatic focusing arrangements **[3]**
23/087 . . . Magnetic focusing arrangements **[3]**
23/09 . . Electric systems for directing or deflecting the discharge along a desired path, e.g. E-type (focusing arrangements H01J 23/08)
23/10 . . Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path (magnetic focusing arrangements H01J 23/08)
23/11 . . Means for reducing noise (in electron or ion gun H01J 23/06)
23/12 . Vessels; Containers
23/14 . Leading-in arrangements; Seals therefor
23/15 . . Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices **[4]**
23/16 . Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge (circuit elements, having distributed capacitance and inductance, in general H01P)
23/18 . . Resonators
23/20 . . . Cavity resonators; Adjustment or tuning thereof
23/207 . . . . Tuning of single resonator **[2]**
23/213 . . . . Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron **[2]**
23/22 . . . Connections between resonators, e.g. strapping for connecting resonators of a magnetron
23/24 . . Slow-wave structures
23/26 . . . Helical slow-wave structures; Adjustment therefor
23/27 . . . . Helix-derived slow-wave structures **[3]**
23/28 . . . Interdigital slow-wave structures; Adjustment therefor
23/30 . . . Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations
23/34 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
23/36 . Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy **[4]**

23/38 . . to or from the discharge **[4]**
23/40 . . to or from the interaction circuit **[4]**
23/42 . . . the interaction circuit being a helix or a helix-derived slow-wave structure (H01J 23/44 to H01J 23/48 take precedence) **[4]**
23/44 . . . Rod-type coupling devices (H01J 23/46, H01J 23/48, H01J 23/54 take precedence) **[4]**
23/46 . . . Loop coupling devices **[4]**
23/48 . . . for linking interaction circuit with coaxial lines; Devices of the coupled helices type (H01J 23/46 takes precedence) **[4]**
23/50 . . . . the interaction circuit being a helix or derived from a helix (H01J 23/52 takes precedence) **[4]**
23/52 . . . . the coupled helices being disposed coaxially around one another **[4]**
23/54 . . Filtering devices preventing unwanted frequencies or modes to be coupled to, or out of, the interaction circuit; Prevention of high frequency leakage in the environment **[4]**

25/00 Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons (details of transit-time tubes H01J 23/00; particle accelerators H05H)
25/02 . Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving-up energy in an inducing zone, the zones being associated with one or more resonators (tubes in which a travelling wave is simulated at spaced gaps H01J 25/34)
25/04 . . Tubes having one or more resonators, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly density modulation, e.g. Haeff tube
25/06 . . Tubes having only one resonator, without reflection of the electron stream, and in which the modulation produced in the modulator zone is mainly velocity modulation, e.g. Lüdi klystron
25/08 . . . with electron stream perpendicular to the axis of the resonator
25/10 . . Klystrons, i.e. tubes having two or more resonators, without reflection of the electron stream, and in which the stream is modulated mainly by velocity in the zone of the input resonator
25/11 . . . Extended interaction klystrons **[2]**
25/12 . . . with pencil-like electron stream in the axis of the resonators
25/14 . . . with tube-like electron stream coaxial with the axis of the resonators
25/16 . . . with pencil-like electron stream perpendicular to the axis of the resonators
25/18 . . . with radial or disc-like electron stream perpendicular to the axis of the resonators
25/20 . . . having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube
25/22 . . Reflex klystrons, i.e. tubes having one or more resonators, with a single reflection of the electron stream, and in which the stream is modulated mainly by velocity in the modulator zone
25/24 . . . in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection
25/26 . . . in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection
25/28 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection
25/30 . . . in which the electron stream is perpendicular to the axis of the resonator or resonators and is radial or disc-like before reflection
25/32 . . Tubes with plural reflection, e.g. Coeterier tube
25/34 . Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps
25/36 . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and without magnet system producing an H-field crossing the E-field
25/38 . . . the forward-travelling wave being utilised
25/40 . . . the backward-travelling wave being utilised
25/42 . . Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field (with travelling wave moving completely around the electron space H01J 25/50)
25/44 . . . the forward-travelling wave being utilised
25/46 . . . the backward-travelling wave being utilised
25/48 . . Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube
25/49 . . Tubes using the parametric principle, e.g. for parametric amplification
25/50 . Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field (with travelling wave not moving completely around the electron space H01J 25/42; functioning with plural reflection or with reversed cyclotron action H01J 25/62, H01J 25/64)
25/52 . . with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode
25/54 . . . having only one cavity or other resonator, e.g. neutrode tube (having a composite resonator H01J 25/58)
25/55 . . . . Coaxial-cavity magnetrons **[2]**
25/56 . . . . with interdigital arrangement of anodes, e.g. turbator tube
25/58 . . . having a number of resonators; having a composite resonator, e.g. a helix
25/587 . . . . Multi-cavity magnetrons **[2]**
25/593 . . . . . Rising-sun magnetrons **[2]**
25/60 . . with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons
25/61 . Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section **[2]**
25/62 . Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection
25/64 . Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action
25/66 . Tubes with electron stream crossing itself and thereby interrupting, or interfering with, itself
25/68 . Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators (with secondary emission H01J 25/76)
25/70 . . with resonator having distributed inductance and capacitance, e.g. Pintsch tube

25/72 . . in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube (with resonator having distributed inductance and capacitance H01J 25/70)

25/74 . Tubes specially designed to act as transit-time diode oscillators, e.g. monotron (with secondary emission H01J 25/76)

25/76 . Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor

25/78 . Tubes with electron stream modulated by deflection in a resonator

27/00 Ion beam tubes (H01J 25/00, H01J 33/00, H01J 37/00 take precedence; particle accelerators H05H)

27/02 . Ion sources; Ion guns (arrangements for handling particles, e.g. focusing, G21K 1/00; generating ions to be introduced into non-enclosed gases H01T 23/00; generating plasma H05H 1/24) **[3]**

27/04 . . using reflex discharge, e.g. Penning ion sources **[3]**

27/06 . . . without applied magnetic field **[3]**

27/08 . . using arc discharge **[3]**

27/10 . . . Duoplasmatrons (for use in particle accelerators H05H 7/00) **[3]**

27/12 . . . . provided with an expansion cup **[3]**

27/14 . . . Other arc discharge ion sources using an applied magnetic field **[3]**

27/16 . . using high-frequency excitation, e.g. microwave excitation **[3]**

27/18 . . . with an applied axial magnetic field **[3]**

27/20 . . using particle bombardment, e.g. ionisers **[3]**

27/22 . . . Metal ion sources **[3]**

27/24 . . using photo-ionisation, e.g. using laser beam **[3]**

27/26 . . using surface ionisation, e.g. field effect ion sources, thermionic ion sources (H01J 27/20, H01J 27/24 take precedence) **[3]**

29/00 Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00

29/02 . Electrodes; Screens; Mounting, supporting, spacing, or insulating thereof

29/04 . . Cathodes (electron guns H01J 29/48)

29/06 . . Screens for shielding; Masks interposed in the electron stream

29/07 . . . Shadow masks for colour-television tubes **[2]**

29/08 . . Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked-up converted, or stored, e.g. backing-plate for storage tube, for collecting secondary electrons (arrangements for colour switching H01J 29/80)

29/10 . . Screens on, or from, which an image or pattern is formed, picked-up, converted, or stored

29/12 . . . acting as light valves by shutter operation, e.g. for eidophor

29/14 . . . acting by discolouration, e.g. halide screen

29/16 . . . Incandescent screens

29/18 . . . Luminescent screens

29/20 . . . . characterised by the luminescent material

29/22 . . . . characterised by the binder or adhesive for securing the luminescent material to its support, e.g. vessel

29/24 . . . . Supports for luminescent material

29/26 . . . . with superimposed luminescent layers

29/28 . . . . with protective, conductive, or reflective layers

29/30 . . . . with luminescent material discontinuously arranged, e.g. in dots or lines

29/32 . . . . . with adjacent dots or lines of different luminescent material, e.g. for colour television

29/34 . . . . provided with permanent marks or references

29/36 . . . Photoelectric screens; Charge-storage screens

29/38 . . . . not using charge storage, e.g. photo-emissive screen, extended cathode

29/39 . . . . Charge-storage screens

29/41 . . . . . using secondary emission, e.g. for supericonoscope

29/43 . . . . . using photo-emissive mosaic, e.g. for orthicon, for iconoscope

29/44 . . . . . exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity

29/45 . . . . . exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodielectric screen, photovoltaic screen

29/46 . Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement

29/48 . . Electron guns

29/50 . . . two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 29/51 takes precedence) **[2]**

29/51 . . . Arrangements for controlling convergence of a plurality of beams **[2]**

Note

Group H01J 29/48 takes precedence over groups H01J 29/52 to H01J 29/58.

29/52 . . Arrangements for controlling intensity of ray or beam, e.g. for modulation

29/54 . . Arrangements for centring ray or beam

29/56 . . Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses

29/58 . . Arrangements for focusing or reflecting ray or beam

29/60 . . . Mirrors

29/62 . . . Electrostatic lenses

29/64 . . . Magnetic lenses

29/66 . . . . using electromagnetic means only

29/68 . . . . using permanent magnets only

29/70 . . Arrangements for deflecting ray or beam (circuit arrangements for producing sawtooth pulses or other deflecting voltages or currents H03K)

29/72 . . . along one straight line or along two perpendicular straight lines

29/74 . . . . Deflecting by electric fields only

29/76 . . . . Deflecting by magnetic fields only

29/78 . . . along a circle, spiral, or rotating radial line, e.g. for radar display

29/80 . . Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration, for colour switching

29/81 . . . using shadow masks (shadow masks per se H01J 29/07) **[3]**

29/82 . . Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements

29/84 . Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection (particle spectrometers or separator tubes H01J 49/00)

29/86 . Vessels; Containers; Vacuum locks

29/87 . . Arrangements for preventing or mitigating effects of implosion of vessels or containers **[2]**

29/88 . . provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent screens H01J 29/18)

29/89 . . Optical or photographic arrangements structurally combined with the vessel

29/90 . Leading-in arrangements; Seals therefor

29/92 . Means forming part of the tube for the purpose of providing electrical connection to it (construction of connectors H01R)

29/94 . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering

29/96 . One or more circuit elements structurally associated with the tube

29/98 . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

31/00 Cathode-ray tubes; **Electron-beam tubes** (H01J 25/00, H01J 33/00, H01J 35/00, H01J 37/00 take precedence; details of cathode-ray tubes or of electron-beam tubes H01J 29/00; cathode-ray or electron-stream lamps H01J 63/00)

31/02 . having one or more output electrodes which may be impacted selectively by the ray or beam, and onto, from, or over which the ray or beam may be deflected or de-focused

31/04 . . with only one or two output electrodes

31/06 . . with more than two output electrodes, e.g. for multiple switching or counting

31/08 . having a screen on or from which an image or pattern is formed, picked-up, converted, or stored

31/10 . . Image or pattern display tubes, i.e. having electrical input and optical output; Flying-spot tubes for scanning purposes

31/12 . . . with luminescent screen

31/14 . . . . Magic-eye or analogous tuning indicators

31/15 . . . . with ray or beam selectively directed to luminescent anode segments **[3]**

31/16 . . . . with mask carrying a number of selectively displayable signs, e.g. numeroscope

31/18 . . . . with image written by a ray or beam on a grid-like charge-accumulating screen, and with a ray or beam passing through, and influenced by, this screen before striking the luminescent screen, e.g. direct-view storage tube

31/20 . . . for displaying images or patterns in two or more colours

31/22 . . . for stereoscopic displays

31/24 . . . with screen acting as light valve by shutter operation, e.g. eidophor

31/26 . . Image pick-up tubes having an input of visible light and electric output (tubes without defined electron beams and having a light ray scanning a photo-emissive screen H01J 40/20)

31/28 . . . with electron ray scanning the image screen

31/30 . . . . having regulation of screen potential at anode potential, e.g. iconoscope

31/32 . . . . . Tubes with image-amplification section, e.g. image-iconoscope, supericonoscope

31/34 . . . . having regulation of screen potential at cathode potential, e.g. orthicon

31/36 . . . . . Tubes with image-amplification section, e.g. image-orthicon

31/38 . . . . . Tubes with photoconductive screen, e.g. vidicon

31/40 . . . . having grid-like image screen through which the electron ray passes and by which the ray is influenced before striking the output electrode, i.e. having “triode action”

31/42 . . . with image screen generating a composite electron beam which is deflected as a whole past a stationary probe to simulate a scanning effect, e.g. Farnsworth pick-up tube

31/44 . . . . Tubes with image-amplification section

31/46 . . . Tubes in which electrical output represents both intensity and colour of image

31/48 . . . Tubes with amplification of output effected by electron-multiplier arrangements within the vacuum space

31/49 . . Pick-up tubes adapted for an input of electromagnetic radiation other than visible light and having an electric output, e.g. for an input of X-rays, for an input of infra-red radiation

31/495 . . Pick-up tubes adapted for an input of sonic, ultrasonic, or mechanical vibrations and having an electric output

31/50 . . Image-conversion or image-amplification tubes, i.e. having optical, X-ray, or analogous input, and optical output

31/52 . . . having grid-like image screen through which the electron ray or beam passes and by which the ray or beam is influenced before striking the luminescent output screen, i.e. having “triode action”

31/54 . . . in which the electron ray or beam is reflected by the image input screen on to the image output screen

31/56 . . . for converting or amplifying images in two or more colours

31/58 . . Tubes for storage of image or information pattern or for conversion of definition of television or like images, i.e. having electrical input and electrical output

31/60 . . . having means for deflecting, either selectively or sequentially, an electron ray on to separate surface elements of the screen (by circuitry alone H01J 29/98)

31/62 . . . . with separate reading and writing rays

31/64 . . . . . on opposite sides of screen, e.g. for conversion of definition

31/66 . . . having means for allowing all but selected cross-section elements of a homogeneous electron beam to reach corresponding elements of the screen, e.g. selectron

31/68 . . . in which the information pattern represents two or more colours

33/00 Discharge tubes with provision for emergence of electrons or ions from the vessel (particle accelerators H05H); **Lenard tubes**

33/02 . Details

33/04 . . Windows

35/00 **X-ray tubes** (X-ray lasers H01S 4/00; X-ray technique in general H05G)
35/02 . Details
35/04 . . Electrodes
35/06 . . . Cathodes
35/08 . . . Anodes; Anticathodes
35/10 . . . . Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes
35/12 . . . . Cooling non-rotary anodes
35/14 . . Arrangements for concentrating, focusing, or directing the cathode ray
35/16 . . Vessels; Containers; Shields associated therewith
35/18 . . . Windows
35/20 . . Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering
35/22 . specially designed for passing a very high current for a very short time, e.g. for flash operation
35/24 . Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof
35/26 . . by rotation of the anode or anticathode
35/28 . . by vibration, oscillation, reciprocation, or swash-plate motion of the anode or anticathode
35/30 . . by deflection of the cathode ray
35/32 . Tubes wherein the X-rays are produced at or near the end of the tube or a part thereof, which tube or part has a small cross-section to facilitate introduction into a small hole or cavity

37/00 **Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof** (H01J 33/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00 take precedence; scanning-probe techniques or apparatus G01Q; contactless testing of electronic circuits using electron beams G01R 31/305) **[2,5]**
37/02 . Details
37/04 . . Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement
37/05 . . . Electron- or ion-optical arrangements for separating electrons or ions according to their energy (particle separator tubes H01J 49/00) **[3]**
37/06 . . . Electron sources; Electron guns
37/063 . . . . Geometrical arrangement of electrodes for beam-forming **[3]**
37/065 . . . . Construction of guns or parts thereof (H01J 37/067 to H01J 37/077 take precedence) **[3]**
37/067 . . . . Replacing parts of guns; Mutual adjustment of electrodes (H01J 37/073 to H01J 37/077 take precedence; vacuum locks H01J 37/18) **[3]**
37/07 . . . . Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073 to H01J 37/077 take precedence) **[3]**
37/073 . . . . Electron guns using field emission, photo emission, or secondary emission electron sources **[3]**
37/075 . . . . Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser **[3]**
37/077 . . . . Electron guns using discharge in gases or vapours as electron sources **[3]**
37/08 . . . Ion sources; Ion guns
37/09 . . . Diaphragms; Shields associated with electron- or ion-optical arrangements; Compensation of disturbing fields **[3]**
37/10 . . . Lenses
37/12 . . . . electrostatic
37/14 . . . . magnetic
37/141 . . . . . Electromagnetic lenses **[3]**
37/143 . . . . . Permanent magnetic lenses **[3]**
37/145 . . . . Combinations of electrostatic and magnetic lenses **[3]**
37/147 . . . Arrangements for directing or deflecting the discharge along a desired path (lenses H01J 37/10) **[2]**
37/15 . . . . External mechanical adjustment of electron- or ion-optical components (H01J 37/067, H01J 37/20 take precedence) **[3]**
37/153 . . . Electron-optical or ion-optical arrangements for the correction of image defects, e.g. stigmators **[2]**
37/16 . . Vessels; Containers
37/18 . . Vacuum locks
37/20 . . Means for supporting or positioning the object or the material; Means for adjusting diaphragms or lenses associated with the support (preparing specimens for investigation G01N 1/28)
37/21 . . Means for adjusting the focus **[2]**
37/22 . . Optical or photographic arrangements associated with the tube
37/24 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for
37/244 . . Detectors; Associated components or circuits therefor **[3]**
37/248 . . Components associated with high voltage supply (high voltage supply in general H02J, H02M) **[3]**
37/252 . Tubes for spot-analysing by electron or ion beams; Microanalysers (investigating or analysing thereby G01N 23/22) **[3]**
37/256 . . using scanning beams **[3]**
37/26 . Electron or ion microscopes; Electron- or ion-diffraction tubes **[2]**
37/27 . . Shadow microscopy **[3]**
37/28 . . with scanning beams (microanalysers using scanning beams H01J 37/256)
37/285 . . Emission microscopes, e.g. field-emission microscopes **[2]**
37/29 . . Reflection microscopes **[2]**
37/295 . . Electron- or ion-diffraction tubes **[2]**
37/30 . Electron-beam or ion-beam tubes for localised treatment of objects
37/301 . . Arrangements enabling beams to pass between regions of different pressure **[3]**
37/302 . . Controlling tubes by external information, e.g. programme control (H01J 37/304 takes precedence) **[3]**
37/304 . . Controlling tubes by information coming from the objects, e.g. correction signals **[3]**
37/305 . . for casting, melting, evaporating, or etching **[2]**
37/31 . . for cutting or drilling **[2]**
37/315 . . for welding **[2]**
37/317 . . for changing properties of the objects or for applying thin layers thereon, e.g. ion implantation (H01J 37/36 takes precedence) **[3]**

37/32 . Gas-filled discharge tubes (heating by discharge H05B)

37/34 . . operating with cathodic sputtering (H01J 37/36 takes precedence) **[3]**

37/36 . . for cleaning surfaces while plating with ions of materials introduced into the discharge, e.g. introduced by evaporation **[3]**

40/00 **Photoelectric discharge tubes not involving the ionisation of a gas** (H01J 49/00 takes precedence; cathode-ray or image-pick-up tubes H01J 31/26) **[3]**

40/02 . Details **[3]**

40/04 . . Electrodes **[3]**

40/06 . . . Photo-emissive cathodes **[3]**

40/08 . . Magnetic means for controlling discharge **[3]**

40/10 . . Selection of substances for gas fillings **[3]**

40/12 . . One or more circuit elements structurally associated with the tube **[3]**

40/14 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[3]**

40/16 . having photo-emissive cathode, e.g. alkaline photoelectric cell (operating with secondary emission H01J 43/00) **[3]**

40/18 . . with luminescent coatings for influencing the sensitivity of the tube, e.g. by converting the input wavelength (image-conversion or image-amplification tubes H01J 31/50) **[3]**

40/20 . . wherein a light-ray scans a photo-emissive screen **[3]**

41/00 **Discharge tubes and means integral therewith for measuring gas pressure** (vacuum gauge systems using such tubes G01L 21/30); **Discharge tubes for evacuation by diffusion of ions**

41/02 . Discharge tubes and means integral therewith for measuring gas pressure **[2]**

41/04 . . with ionisation by means of thermionic cathodes **[2]**

41/06 . . with ionisation by means of cold cathodes **[2]**

41/08 . . with ionisation by means of radioactive substances, e.g. alphatrons **[2]**

41/10 . . of particle-spectrometer type (particle spectrometers in general H01J 49/00) **[2]**

41/12 . Discharge tubes for evacuating by diffusion of ions, e.g. ion pumps, getter ion pumps **[2]**

41/14 . . with ionisation by means of thermionic cathodes **[2]**

41/16 . . . using gettering substances **[2]**

41/18 . . with ionisation by means of cold cathodes **[2]**

41/20 . . . using gettering substances **[2]**

43/00 **Secondary-emission tubes**; **Electron-multiplier tubes** (dynamic electron-multiplier tubes H01J 25/76; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)

43/02 . Tubes in which one or a few electrodes are secondary-electron-emitting electrodes

43/04 . Electron multipliers

43/06 . . Electrode arrangements

43/08 . . . Cathode arrangements (construction of photo cathodes H01J 40/06, H01J 40/16, H01J 47/00, H01J 49/08)

43/10 . . . Dynodes (H01J 43/24, H01J 43/26 take precedence; secondary-electron-emitting electrodes in general H01J 1/32)

43/12 . . . Anode arrangements

43/14 . . . Control of electron beam by magnetic field

43/16 . . . Electrode arrangements using essentially one dynode

43/18 . . . Electrode arrangements using essentially more than one dynode

43/20 . . . . Dynodes consisting of sheet material, e.g. plane, bent

43/22 . . . . Dynodes consisting of electron-permeable material, e.g. foil, grid, tube, venetian blind

43/24 . . . . Dynodes having potential gradient along their surfaces

43/26 . . . . Box dynodes

43/28 . . Vessels; Windows; Screens; Suppressing undesired discharges or currents

43/30 . . Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for

45/00 **Discharge tubes functioning as thermionic generators**

47/00 **Tubes for determining the presence, intensity, density or energy of radiation or particles** (photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00) **[3]**

47/02 . Ionisation chambers **[3]**

47/04 . . Capacitive ionisation chambers, e.g. the electrodes of which are used as electrometers (electrostatic dosimeters in general G01T 1/14) **[3]**

47/06 . Proportional counter tubes **[3]**

47/08 . Geiger-Müller counter tubes **[3]**

47/10 . Spark counters (H01J 47/14 takes precedence; spark gaps H01T) **[3]**

47/12 . Neutron detector tubes, e.g. BF_3 tubes **[3]**

47/14 . Parallel electrode spark or streamer chambers; Wire spark or streamer chambers **[3]**

47/16 . . characterised by readout of each individual wire **[3]**

47/18 . . . the readout being electrical (H01J 47/20 takes precedence) **[3]**

47/20 . . . the readout employing electrical or mechanical delay lines, e.g. magnetostrictive delay lines **[3]**

47/22 . . characterised by another type of readout **[3]**

47/24 . . . the readout being acoustical **[3]**

47/26 . . . the readout being optical **[3]**

49/00 **Particle spectrometers or separator tubes** (for measuring gas pressure H01J 41/10) **[3]**

Note

In classifying particle separators, no distinction is made between spectrometry and spectrography, the difference being only in the manner of detection which in the first case is electrical and in the second case is by means of a photographic film. **[3]**

49/02 . Details **[3]**

49/04 . . Arrangements for introducing or extracting samples to be analysed, e.g. vacuum locks; Arrangements for external adjustment of electron- or ion-optical components **[3]**

49/06 . . Electron- or ion-optical arrangements (H01J 49/04 takes precedence) **[3]**

49/08 . . Electron sources, e.g. for generating photo-electrons, secondary electrons or Auger electrons **[3]**

49/10 . . Ion sources; Ion guns **[3]**

49/12 . . . using an arc discharge, e.g. of the duoplasmatron type **[3]**
49/14 . . . using particle bombardment, e.g. ionisation chambers **[3]**
49/16 . . . using surface ionisation, e.g. field-, thermionic- or photo-emission **[3]**
49/18 . . . using spark ionisation **[3]**
49/20 . . Magnetic deflection **[3]**
49/22 . . Electrostatic deflection **[3]**
49/24 . . Vacuum systems, e.g. maintaining desired pressures **[3]**
49/26 . Mass spectrometers or separator tubes (isotope separation using these tubes B01D 59/44; mass spectrometers specially adapted for column chromatography G01N 30/72) **[3]**
49/28 . . Static spectrometers **[3]**
49/30 . . . using magnetic analysers **[3]**
49/32 . . . using double focusing **[3]**
49/34 . . Dynamic spectrometers **[3]**
49/36 . . . Radio frequency spectrometers, e.g. Bennett-type spectrometers, Redhead-type spectrometers **[3]**
49/38 . . . . Omegatrons **[3]**
49/40 . . . Time-of-flight spectrometers (H01J 49/36 takes precedence) **[3]**
49/42 . . . Stability-of-path spectrometers, e.g. monopole, quadrupole, multipole, farvitrons **[3]**
49/44 . Energy spectrometers, e.g. alpha-, beta-spectrometers **[3]**
49/46 . . Static spectrometers **[3]**
49/48 . . . using electrostatic analysers, e.g. cylindrical sector, Wien filter **[3]**

Discharge lamps

61/00 **Gas- or vapour-discharge lamps** (use for sterilising milk products A23C; use for medical purposes A61N 5/00; use for disinfecting water C02F; use for lighting F21; circuits therefor H05B; arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)
61/02 . Details
61/04 . . Electrodes (for igniting H01J 61/54); Screens; Shields
61/06 . . . Main electrodes
61/067 . . . . for low-pressure discharge lamps **[2]**
61/073 . . . . for high-pressure discharge lamps **[2]**
61/09 . . . . Hollow cathodes **[2]**
61/10 . . . Shield, screens, or guides for influencing the discharge
61/12 . . Selection of substances for gas fillings; Specified operating pressure or temperature
61/14 . . . having one or more carbon compounds as the principal constituents
61/16 . . . having helium, argon, neon, krypton, or xenon as the principle constituent
61/18 . . . having a metallic vapour as the principal constituent
61/20 . . . . mercury vapour
61/22 . . . . vapour of an alkali metal
61/24 . . Means for obtaining or maintaining the desired pressure within the vessel
61/26 . . . Means for absorbing or adsorbing gas, e.g. by gettering; Means for preventing blackening of the envelope
61/28 . . . Means for producing, introducing, or replenishing gas or vapour during operation of the lamp
61/30 . . Vessels; Containers
61/32 . . . Special longitudinal shape, e.g. for advertising purposes
61/33 . . . Special shape of cross-section, e.g. for producing cool spot
61/34 . . . Double-wall vessels or containers
61/35 . . . provided with coatings on the walls thereof; Selection of materials for the coatings (using coloured coatings H01J 61/40; using luminescent coatings H01J 61/42)
61/36 . . Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors
61/38 . . Devices for influencing the colour or wavelength of the light
61/40 . . . by light-filters; by coloured coatings in or on the envelope
61/42 . . . by transforming the wavelength of the light by luminescence
61/44 . . . . Devices characterised by the luminescent material (luminescent materials C09K 11/00)
61/46 . . . . Devices characterised by the binder or other non-luminescent constituent of the luminescent material, e.g. for obtaining desired pouring or drying properties
61/48 . . . . Separate coatings of different luminous materials
61/50 . . Auxiliary parts or solid material within the envelope for reducing risk of explosion upon breakage of the envelope, e.g. for use in mines
61/52 . . Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space
61/54 . . Igniting arrangements, e.g. promoting ionisation for starting (circuit arrangements H05B)
61/56 . . One or more circuit elements structurally associated with the lamp
61/58 . Lamps with both liquid anode and liquid cathode
61/60 . Lamps in which the discharge space is substantially filled with mercury before ignition
61/62 . Lamps with gaseous, e.g. plasma cathode
61/64 . Cathode glow lamps (designed as tuning or voltage indicators H01J 17/40)
61/66 . . having one or more specially shaped cathodes, e.g. for advertising purposes
61/68 . Lamps in which the main discharge is between parts of a current-carrying guide, e.g. halo lamp
61/70 . Lamps with low-pressure unconstricted discharge
61/72 . . having a main light-emitting filling of easily vaporisable metal vapour, e.g. mercury
61/74 . . having a main light-emitting filling of difficult vaporisable metal vapour, e.g. sodium
61/76 . . having a filling of permanent gas or gases only
61/78 . . . with cold cathode; with cathode heated only by discharge, e.g. high-tension lamp for advertising
61/80 . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/82 . Lamps with high-pressure unconstricted discharge
61/84 . Lamps with discharge constricted by high pressure
61/86 . . with discharge additionally constricted by close spacing of electrodes, e.g. for optical projection
61/88 . . with discharge additionally constricted by envelope

61/90 . . Lamps suitable only for intermittent operation, e.g. flash lamp
61/92 . Lamps with more than one main discharge path
61/94 . . Paths producing light of different wavelengths, e.g. for simulating daylight
61/95 . Lamps with control electrode for varying intensity or wavelength of the light, e.g. for producing modulated light
61/96 . Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight (lamps with filament heated only by non-luminous discharge H01K)
61/98 . Lamps with closely spaced electrodes heated to incandescence by light-emitting discharge, e.g. tungsten arc lamp

63/00 Cathode-ray or electron-stream lamps (flying-spot tubes H01J 31/10; magic-eye tuning indicators H01J 31/14; lamps with incandescent body heated by the ray or stream H01K)
63/02 . Details, e.g. electrode, gas filling, shape of vessel
63/04 . . Vessels provided with luminescent coatings; Selection of materials for the coatings
63/06 . Lamps with luminescent screen excited by the ray or stream
63/08 . Lamps with gas plasma excited by the ray or stream

65/00 Lamps without any electrode inside the vessel; **Lamps with at least one main electrode outside the vessel**
65/04 . Lamps in which a gas filling is excited to luminesce by an external electromagnetic field or by external corpuscular radiation, e.g. for indicating
65/06 . Lamps in which a gas filling is excited to luminesce by radioactive material structurally associated with the lamp, e.g. inside the vessel
65/08 . Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel

99/00 Subject matter not provided for in other groups of this subclass [8]

H01K ELECTRIC INCANDESCENT LAMPS (details or apparatus or processes for manufacture applicable to both discharge devices and incandescent lamps H01J; light sources using a combination of incandescent and other types of light generation H01J 61/96, H05B 35/00; circuits therefor H05B)

Note

In this subclass, the following term is used with the meaning indicated:
– "lamp" includes tubes emitting ultra-violet or infra-red light.

Subclass index

1/00 Details
1/02 . Incandescent bodies
1/04 . . characterised by the material thereof
1/06 . . . Carbon bodies
1/08 . . . Metallic bodies
1/10 . . . Bodies of metal or carbon combined with other substance
1/12 . . . Bodies which are non-conductive when cold, e.g. for Nernst lamp
1/14 . . characterised by the shape
1/16 . . Electric connection thereto
1/18 . Mountings or supports for the incandescent body
1/20 . . characterised by the material thereof
1/22 . . Lamp stems (seals for leading conductors therethrough H01K 1/38)
1/24 . . Mounts for lamps with connections at opposite ends, e.g. for tubular lamp
1/26 . Screens; Filters (associated with envelope H01K 1/28)
1/28 . Envelopes; Vessels
1/30 . . incorporating lenses
1/32 . . provided with coatings on the walls; Vessels or coatings thereon characterised by the material thereof
1/34 . . Double-wall vessels
1/36 . Seals between parts of vessel, e.g. between stem and envelope
1/38 . Seals for leading-in conductors
1/40 . Leading-in conductors
1/42 . Means forming part of the lamp for the purpose of providing electrical connection to, or support for, the lamp (electric coupling devices comprising a holder adapted for supporting a lamp and not forming part of the lamp H01R 33/00)
1/44 . . directly applied to, or forming part of, the vessel
1/46 . . supported by a separate part, e.g. base, cap
1/48 . . . Removable caps
1/50 . Selection of substances for gas fillings; Specified pressure thereof
1/52 . Means for obtaining or maintaining the desired pressure within the vessel

1/54 . . Means for adsorbing or absorbing gas, or for preventing or removing efflorescence, e.g. by gettering

1/56 . . . characterised by the material of the getter

1/58 . Cooling arrangements

1/60 . Means structurally associated with the lamp for indicating defects or previous use

1/62 . One or more circuit elements structurally associated with the lamp

1/64 . . with built-in switch

1/66 . . with built-in fuse

1/68 . . with built-in spark gap

1/70 . . with built-in short-circuiting device, e.g. for serially-connected lamps

3/00 Apparatus or processes adapted to the manufacture, installing, removal, or maintenance of incandescent lamps or parts thereof (manufacture of vessels from glass C03B)

3/02 . Manufacture of incandescent bodies

3/04 . . Machines therefor

3/06 . Attaching of incandescent bodies to mount

3/08 . Manufacture of mounts or stems

3/10 . . Machines therefor

3/12 . Joining of mount or stem to vessel; Joining parts of the vessel, e.g. by butt sealing

3/14 . . Machines therefor

3/16 . Joining of caps to vessel

3/18 . . Machines therefor

3/20 . Sealing-in wires directly into the envelope

3/22 . Exhausting, degassing, filling, or cleaning vessels

3/24 . . Machines therefor

3/26 . Closing of vessels

3/28 . Machines having sequentially arranged operating stations

3/30 . Repairing or regenerating used or defective lamps

3/32 . Auxiliary devices for cleaning, placing, or removing incandescent lamps

5/00 Lamps for general lighting (H01K 9/00 to H01K 13/00 take precedence)

5/02 . with connections made at opposite ends, e.g. tubular lamp with axially arranged filament

7/00 Lamps for purposes other than general lighting (H01K 9/00 to H01K 13/00 take precedence)

7/02 . for producing a narrow beam of light; for approximating a point-like source of light, e.g. for searchlight, for cinematographic projector (producing narrow beams by optical means external to lamp F21V)

7/04 . for indicating

7/06 . for decorative purposes

9/00 Lamps having two or more incandescent bodies separately heated (H01K 11/00, H01K 13/00 take precedence; incandescent-filament-type indicating arrangements affected by the combination of a number of individual lamps G09F 9/307)

9/02 . to provide substitution in the event of failure of one of the bodies

9/04 . . with built-in manually-operated switch

9/06 . . with built-in device, e.g. switch, for automatically completing circuit of reserve body

9/08 . to provide selectively different light effects, e.g. for automobile headlamp

11/00 Lamps having an incandescent body which is not conductively heated, e.g. heated inductively, heated by electronic discharge (H01K 13/00 takes precedence; heated by light-emitting discharge H01J 61/98)

13/00 Lamps having an incandescent body which is substantially non-conductive until heated, e.g. Nernst lamp

13/02 . Heating arrangements

13/04 . . using electric discharge

13/06 . . using induction heating; using high-frequency field

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H01L SEMICONDUCTOR DEVICES; **ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR** (use of semiconductor devices for measuring G01; resistors in general H01C; magnets, inductors, transformers H01F; capacitors in general H01G; electrolytic devices H01G 9/00; batteries, accumulators H01M; waveguides, resonators, or lines of the waveguide type H01P; line connectors, current collectors H01R; stimulated-emission devices H01S; electromechanical resonators H03H; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R; electric light sources in general H05B; printed circuits, hybrid circuits, casings or constructional details of electrical apparatus, manufacture of assemblages of electrical components H05K; use of semiconductor devices in circuits having a particular application, see the subclass for the application) **[2]**

(1) This subclass covers:
- electric solid state devices which are not covered by any other subclass and details thereof, and includes: semiconductor devices adapted for rectifying, amplifying, oscillating or switching; semiconductor devices sensitive to radiation; electric solid state devices using thermoelectric, superconductive, piezo-electric, electrostrictive, magnetostrictive, galvano-magnetic or bulk negative resistance effects and integrated circuit devices; **[2]**
- photoresistors, magnetic field dependent resistors, field effect resistors, capacitors with potential-jump barrier, resistors with potential-jump barrier or surface barrier, incoherent light emitting diodes and thin-film or thick-film circuits; **[2]**
- processes and apparatus adapted for the manufacture or treatment of such devices, except where such processes relate to single-step processes for which provision exists elsewhere. **[2]**

(2) In this subclass, the following terms or expressions are used with the meaning indicated:
- "wafer" means a slice of semiconductor or crystalline substrate material, which can be modified by impurity diffusion (doping), ion implantation or epitaxy, and whose active surface can be processed into arrays of discrete components or integrated circuits; **[8]**

– "solid state body" means the body of material within which, or at the surface of which, the physical effects characteristic of the device occur. In thermoelectric devices, it includes all materials in the current path.

Regions in or on the body of the device (other than the solid state body itself), which exert an influence on the solid state body electrically, are considered to be "electrodes" whether or not an external electrical connection is made thereto. An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions, only those portions which exert an influence on the solid state body by virtue of their shape, size, or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads; **[2]**

- "device" means an electric circuit element; where an electric circuit element is one of a plurality of elements formed in or on a common substrate it is referred to as a "component"; **[2]**
- "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g. electroforming, before it is ready for use but which does not require the addition of further structural units; **[2]**
- "parts" includes all structural units which are included in a complete device; **[2]**
- "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation"; **[2]**
- "integrated circuit" is a device where all components, e.g. diodes, resistors, are built up on a common substrate and form the device including interconnections between the components; **[2]**
- "assembly" of a device is the building up of the device from its component constructional units and includes the provision of fillings in containers. **[2]**

(3) In this subclass, both the process or apparatus for the manufacture or treatment of a device and the device itself are classified, whenever both of these are described sufficiently to be of interest. **[6]**

(4) Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**

Subclass index

21/00 Processes or apparatus specially adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof [2,8]

Note

Group H01L 21/70 takes precedence over groups H01L 21/02 to H01L 21/67. **[2]**

21/02 . Manufacture or treatment of semiconductor devices or of parts thereof **[2,8]**

21/027 . . Making masks on semiconductor bodies for further photolithographic processing, not provided for in group H01L 21/18 or H01L 21/34 **[5]**

21/033 . . . comprising inorganic layers **[5]**

21/04 . . the devices having at least one potential-jump barrier or surface barrier, e.g. PN junction, depletion layer, carrier concentration layer **[2]**

21/06 . . . the devices having semiconductor bodies comprising selenium or tellurium in uncombined form other than as impurities in semiconductor bodies of other materials **[2]**

21/08 . . . . Preparation of the foundation plate **[2]**

21/10 . . . . Preliminary treatment of the selenium or tellurium, its application to the foundation plate, or the subsequent treatment of the combination **[2]**

21/103 . . . . . Conversion of the selenium or tellurium to the conductive state **[2]**

21/105 . . . . . Treatment of the surface of the selenium or tellurium layer after having been made conductive **[2]**

21/108 . . . . . Provision of discrete insulating layers, i.e. non-genetic barrier layers **[2]**

21/12 . . . . Application of an electrode to the exposed surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate **[2]**

21/14 . . . . Treatment of the complete device, e.g. by electroforming to form a barrier **[2]**

21/145 . . . . . Ageing **[2]**

21/16 . . . the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide **[2]**

21/18 . . . the devices having semiconductor bodies comprising elements of the fourth group of the Periodic System or $A_{III}B_V$ compounds with or without impurities, e.g. doping materials **[2,6,7]**

Note

This group covers also processes and apparatus which, by using the appropriate technology, are clearly suitable for manufacture or treatment of devices whose bodies comprise elements of the fourth group of the Periodic System or $A_{III}B_V$ compounds, even if the material used is not explicitly specified. **[7]**

21/20 . . . . Deposition of semiconductor materials on a substrate, e.g. epitaxial growth **[2]**
21/203 . . . . . using physical deposition, e.g. vacuum deposition, sputtering **[2]**
21/205 . . . . . using reduction or decomposition of a gaseous compound yielding a solid condensate, i.e. chemical deposition **[2]**
21/208 . . . . . using liquid deposition **[2]**
21/22 . . . . Diffusion of impurity materials, e.g. doping materials, electrode materials, into, or out of, a semiconductor body, or between semiconductor regions; Redistribution of impurity materials, e.g. without introduction or removal of further dopant **[2]**
21/223 . . . . . using diffusion into, or out of, a solid from or into a gaseous phase **[2]**
21/225 . . . . . using diffusion into, or out of, a solid from or into a solid phase, e.g. a doped oxide layer **[2]**
21/228 . . . . . using diffusion into, or out of, a solid from or into a liquid phase, e.g. alloy diffusion processes **[2]**
21/24 . . . . Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body **[2]**
21/26 . . . . Bombardment with wave or particle radiation **[2]**
21/261 . . . . . to produce a nuclear reaction transmuting chemical elements **[6]**
21/263 . . . . . with high-energy radiation (H01L 21/261 takes precedence) **[2,6]**
21/265 . . . . . producing ion implantation **[2]**
21/266 . . . . . using masks **[5]**
21/268 . . . . . using electromagnetic radiation, e.g. laser radiation **[2]**
21/28 . . . . Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20 to H01L 21/268 **[2]**
21/283 . . . . . Deposition of conductive or insulating materials for electrodes **[2]**
21/285 . . . . . from a gas or vapour, e.g. condensation **[2]**
21/288 . . . . . from a liquid, e.g. electrolytic deposition **[2]**
21/30 . . . . Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20 to H01L 21/26 (manufacture of electrodes thereon H01L 21/28) **[2]**
21/301 . . . . . to subdivide a semiconductor body into separate parts, e.g. making partitions (cutting H01L 21/304) **[6]**
21/302 . . . . . to change the physical characteristics of their surfaces, or to change their shape, e.g. etching, polishing, cutting **[2]**
21/304 . . . . . Mechanical treatment, e.g. grinding, polishing, cutting **[2]**
21/306 . . . . . Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/31; after-treatment of insulating layers H01L 21/3105) **[2]**
21/3063 . . . . . Electrolytic etching **[6]**
21/3065 . . . . . Plasma etching; Reactive-ion etching **[6]**
21/308 . . . . . using masks (H01L 21/3063, H01L 21/3065, take precedence) **[2,6]**
21/31 . . . . to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers H01L 21/56); After-treatment of these layers; Selection of materials for these layers **[2,5]**
21/3105 . . . . . After-treatment **[5]**
21/311 . . . . . Etching the insulating layers **[5]**
21/3115 . . . . . Doping the insulating layers **[5]**
21/312 . . . . . Organic layers, e.g. photoresist (H01L 21/3105, H01L 21/32 take precedence) **[2,5]**
21/314 . . . . . Inorganic layers (H01L 21/3105, H01L 21/32 take precedence) **[2,5]**
21/316 . . . . . composed of oxides or glassy oxides or oxide-based glass **[2]**
21/318 . . . . . composed of nitrides **[2]**
21/32 . . . . . using masks **[2,5]**
21/3205 . . . . . Deposition of non-insulating-, e.g. conductive- or resistive-, layers, on insulating layers; After-treatment of these layers (manufacture of electrodes H01L 21/28) **[5]**
21/321 . . . . . After-treatment **[5]**
21/3213 . . . . . Physical or chemical etching of the layers, e.g. to produce a patterned layer from a pre-deposited extensive layer **[6]**
21/3215 . . . . . Doping the layers **[5]**
21/322 . . . . . to modify their internal properties, e.g. to produce internal imperfections **[2]**
21/324 . . . . . Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/20 to H01L 21/288, H01L 21/302 to H01L 21/322 take precedence) **[2]**
21/326 . . . . . Application of electric currents or fields, e.g. for electroforming (H01L 21/20 to H01L 21/288, H01L 21/302 to H01L 21/324 take precedence) **[2]**
21/328 . . . . Multistep processes for the manufacture of devices of the bipolar type, e.g. diodes, transistors, thyristors **[5]**
21/329 . . . . . the devices comprising one or two electrodes, e.g. diodes **[5]**
21/33 . . . . . the devices comprising three or more electrodes **[5]**
21/331 . . . . . Transistors **[5]**
21/332 . . . . . Thyristors **[5]**
21/334 . . . . Multistep processes for the manufacture of devices of the unipolar type **[5]**

21/335 . . . . . Field-effect transistors **[5]**
21/336 . . . . . with an insulated gate **[5]**
21/337 . . . . . with a PN junction gate **[5]**
21/338 . . . . . with a Schottky gate **[5]**
21/339 . . . . . Charge transfer devices **[5,6]**
21/34 . . . the devices having semiconductor bodies not provided for in groups H01L 21/06, H01L 21/16, and H01L 21/18 with or without impurities, e.g. doping materials **[2]**
21/36 . . . . Deposition of semiconductor materials on a substrate, e.g. epitaxial growth **[2]**
21/363 . . . . . using physical deposition, e.g. vacuum deposition, sputtering **[2]**
21/365 . . . . . using reduction or decomposition of a gaseous compound yielding a solid condensate, i.e. chemical deposition **[2]**
21/368 . . . . . using liquid deposition **[2]**
21/38 . . . . Diffusion of impurity materials, e.g. doping materials, electrode materials, into, or out of, a semiconductor body, or between semiconductor regions **[2]**
21/383 . . . . . using diffusion into, or out of, a solid from or into a gaseous phase **[2]**
21/385 . . . . . using diffusion into, or out of, a solid from or into a solid phase, e.g. a doped oxide layer **[2]**
21/388 . . . . . using diffusion into, or out of, a solid from or into a liquid phase, e.g. alloy diffusion processes **[2]**
21/40 . . . . Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body **[2]**
21/42 . . . . Bombardment with radiation **[2]**
21/423 . . . . . with high-energy radiation **[2]**
21/425 . . . . . producing ion implantation **[2]**
21/426 . . . . . using masks **[5]**
21/428 . . . . . using electromagnetic radiation, e.g. laser radiation **[2]**
21/44 . . . . Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/36 to H01L 21/428 **[2]**
21/441 . . . . . Deposition of conductive or insulating materials for electrodes **[2]**
21/443 . . . . . from a gas or vapour, e.g. condensation **[2]**
21/445 . . . . . from a liquid, e.g. electrolytic deposition **[2]**
21/447 . . . . . involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence) **[2]**
21/449 . . . . . involving the application of mechanical vibrations, e.g. ultrasonic vibrations **[2]**
21/46 . . . . Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/36 to H01L 21/428 (manufacture of electrodes thereon H01L 21/44) **[2]**
21/461 . . . . . to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting **[2]**
21/463 . . . . . Mechanical treatment, e.g. grinding, ultrasonic treatment **[2]**
21/465 . . . . . Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/469) **[2]**
21/467 . . . . . using masks **[2]**
21/469 . . . . . to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers H01L 21/56); After-treatment of these layers **[2,5]**
21/47 . . . . . Organic layers, e.g. photoresist (H01L 21/475, H01L 21/4757 take precedence) **[2,5]**
21/471 . . . . . Inorganic layers (H01L 21/475, H01L 21/4757 take precedence) **[2,5]**
21/473 . . . . . composed of oxides or glassy oxides or oxide-based glass **[2]**
21/475 . . . . . using masks **[2,5]**
21/4757 . . . . . After-treatment **[5]**
21/4763 . . . . . Deposition of non-insulating-, e.g. conductive-, resistive-, layers on insulating layers; After-treatment of these layers (manufacture of electrodes H01L 21/28) **[5]**
21/477 . . . . . Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/36 to H01L 21/449, H01L 21/461 to H01L 21/475 take precedence) **[2]**
21/479 . . . . . Application of electric currents or fields, e.g. for electroforming (H01L 21/36 to H01L 21/449, H01L 21/461 to H01L 21/477 take precedence) **[2]**
21/48 . . . Manufacture or treatment of parts, e.g. containers, prior to assembly of the devices, using processes not provided for in a single one of the groups H01L 21/06 to H01L 21/326 **[2]**
21/50 . . . Assembly of semiconductor devices using processes or apparatus not provided for in a single one of the groups H01L 21/06 to H01L 21/326 **[2]**
21/52 . . . . Mounting semiconductor bodies in containers **[2]**
21/54 . . . . Providing fillings in containers, e.g. gas fillings **[2]**
21/56 . . . . Encapsulations, e.g. encapsulating layers, coatings **[2]**
21/58 . . . . Mounting semiconductor devices on supports **[2]**
21/60 . . . . Attaching leads or other conductive members, to be used for carrying current to or from the device in operation **[2]**
21/603 . . . . . involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence) **[2]**
21/607 . . . . . involving the application of mechanical vibrations, e.g. ultrasonic vibrations **[2]**
21/62 . . the devices having no potential-jump barriers or surface barriers **[2]**
21/64 . Manufacture or treatment of solid state devices other than semiconductor devices, or of parts thereof, not specially adapted for a single type of device provided for in groups H01L 31/00 to H01L 51/00 **[2,8]**
21/66 . Testing or measuring during manufacture or treatment **[2]**
21/67 . Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus specially adapted for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components **[8]**

21/673 . . using specially adapted carriers **[8]**
21/677 . . for conveying, e.g. between different work stations **[8]**
21/68 . . for positioning, orientation or alignment **[2,8]**
21/683 . . for supporting or gripping (for positioning, orientation or alignment H01L 21/68) **[8]**
21/687 . . . using mechanical means, e.g. chucks, clamps or pinches **[8]**
21/70 . Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in or on a common substrate or of specific parts thereof; Manufacture of integrated circuit devices or of specific parts thereof (manufacture of assemblies consisting of preformed electrical components H05K 3/00, H05K 13/00) **[2]**
21/71 . . Manufacture of specific parts of devices defined in group H01L 21/70 (H01L 21/28, H01L 21/44, H01L 21/48 take precedence) **[6]**
21/74 . . . Making of buried regions of high impurity concentration, e.g. buried collector layers, internal connections **[2]**
21/76 . . . Making of isolation regions between components **[2]**
21/761 . . . . PN junctions **[6]**
21/762 . . . . Dielectric regions **[6]**
21/763 . . . . Polycrystalline semiconductor regions **[6]**
21/764 . . . . Air gaps **[6]**
21/765 . . . . by field-effect **[6]**
21/768 . . . Applying interconnections to be used for carrying current between separate components within a device **[6]**
21/77 . . Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in, or on, a common substrate **[6]**
21/78 . . . with subsequent division of the substrate into plural individual devices (cutting to change the surface-physical characteristics or shape of semiconductor bodies H01L 21/304) **[2,6]**
21/782 . . . . to produce devices, each consisting of a single circuit element (H01L 21/82 takes precedence) **[6]**
21/784 . . . . . the substrate being a semiconductor body **[6]**
21/786 . . . . . the substrate being other than a semiconductor body, e.g. insulating body **[6]**
21/82 . . . . to produce devices, e.g. integrated circuits, each consisting of a plurality of components **[2]**
21/822 . . . . . the substrate being a semiconductor, using silicon technology (H01L 21/8258 takes precedence) **[6]**
21/8222 . . . . . Bipolar technology **[6]**
21/8224 . . . . . comprising a combination of vertical and lateral transistors **[6]**
21/8226 . . . . . comprising merged transistor logic or integrated injection logic **[6]**
21/8228 . . . . . Complementary devices, e.g. complementary transistors **[6]**
21/8229 . . . . . Memory structures **[6]**
21/8232 . . . . . Field-effect technology **[6]**
21/8234 . . . . . MIS technology **[6]**
21/8236 . . . . . Combination of enhancement and depletion transistors **[6]**
21/8238 . . . . . Complementary field-effect transistors, e.g. CMOS **[6]**
21/8239 . . . . . Memory structures **[6]**
21/8242 . . . . . Dynamic random access memory structures (DRAM) **[6]**
21/8244 . . . . . Static random access memory structures (SRAM) **[6]**
21/8246 . . . . . Read-only memory structures (ROM) **[6]**
21/8247 . . . . . electrically-programmable (EPROM) **[6]**
21/8248 . . . . . Combination of bipolar and field-effect technology **[6]**
21/8249 . . . . . Bipolar and MOS technology **[6]**
21/8252 . . . . the substrate being a semiconductor, using III-V technology (H01L 21/8258 takes precedence) **[6]**
21/8254 . . . . the substrate being a semiconductor, using II-VI technology (H01L 21/8258 takes precedence) **[6]**
21/8256 . . . . the substrate being a semiconductor, using technologies not covered by one of groups H01L 21/822, H01L 21/8252 or H01L 21/8254 (H01L 21/8258 takes precedence) **[6]**
21/8258 . . . . the substrate being a semiconductor, using a combination of technologies covered by H01L 21/822, H01L 21/8252, H01L 21/8254 or H01L 21/8256 **[6]**
21/84 . . . . the substrate being other than a semiconductor body, e.g. being an insulating body **[2,6]**
21/86 . . . . . the insulating body being sapphire, e.g. silicon on sapphire structure, i.e. SOS **[2,6]**
21/98 . . Assembly of devices consisting of solid state components formed in or on a common substrate; Assembly of integrated circuit devices (H01L 21/50 takes precedence) **[2,5]**

23/00 Details of semiconductor or other solid state devices (H01L 25/00 takes precedence) **[2,5]**

Note

This group does not cover:
– details of semiconductor bodies or of electrodes of devices provided for in group H01L 29/00, which details are covered by that group;
– details peculiar to devices provided for in a single main group of groups H01L 31/00 to H01L 51/00, which details are covered by those groups.

23/02 . Containers; Seals (H01L 23/12, H01L 23/34, H01L 23/48, H01L 23/552 take precedence) **[2,5]**
23/04 . . characterised by the shape **[2]**
23/043 . . . the container being a hollow construction and having a conductive base as a mounting as well as a lead for the semiconductor body **[5]**
23/045 . . . . the other leads having an insulating passage through the base **[5]**
23/047 . . . . the other leads being parallel to the base **[5]**
23/049 . . . . the other leads being perpendicular to the base **[5]**
23/051 . . . . another lead being formed by a cover plate parallel to the base plate, e.g. sandwich type **[5]**
23/053 . . . the container being a hollow construction and having an insulating base as a mounting for the semiconductor body **[5]**

23/055 . . . . the leads having a passage through the base **[5]**
23/057 . . . . the leads being parallel to the base **[5]**
23/06 . . characterised by the material of the container or its electrical properties **[2]**
23/08 . . . the material being an electrical insulator, e.g. glass **[2]**
23/10 . . characterised by the material or arrangement of seals between parts, e.g. between cap and base of the container or between leads and walls of the container **[2]**
23/12 . Mountings, e.g. non-detachable insulating substrates **[2]**
23/13 . . characterised by the shape **[5]**
23/14 . . characterised by the material or its electrical properties **[2]**
23/15 . . . Ceramic or glass substrates **[5]**
23/16 . Fillings or auxiliary members in containers, e.g. centering rings (H01L 23/42, H01L 23/552 take precedence) **[2,5]**
23/18 . . Fillings characterised by the material, its physical or chemical properties, or its arrangement within the complete device **[2]**

Note

Group H01L 23/26 takes precedence over groups H01L 23/20 to H01L 23/24. **[2]**

23/20 . . . gaseous at the normal operating temperature of the device **[2]**
23/22 . . . liquid at the normal operating temperature of the device **[2]**
23/24 . . . solid or gel, at the normal operating temperature of the device **[2]**
23/26 . . . including materials for absorbing or reacting with moisture or other undesired substances **[2]**
23/28 . Encapsulation, e.g. encapsulating layers, coatings (H01L 23/552 takes precedence) **[2,5]**
23/29 . . characterised by the material **[5]**
23/31 . . characterised by the arrangement **[5]**
23/32 . Holders for supporting the complete device in operation, i.e. detachable fixtures (H01L 23/40 takes precedence) **[2,5]**
23/34 . Arrangements for cooling, heating, ventilating or temperature compensation **[2,5]**
23/36 . . Selection of materials, or shaping, to facilitate cooling or heating, e.g. heat sinks **[2]**
23/367 . . . Cooling facilitated by shape of device **[5]**
23/373 . . . Cooling facilitated by selection of materials for the device **[5]**
23/38 . . Cooling arrangements using the Peltier effect **[2]**
23/40 . . Mountings or securing means for detachable cooling or heating arrangements **[2]**
23/42 . . Fillings or auxiliary members in containers selected or arranged to facilitate heating or cooling **[2,5]**
23/427 . . . Cooling by change of state, e.g. use of heat pipes **[5]**
23/433 . . . Auxiliary members characterised by their shape, e.g. pistons **[5]**
23/44 . . the complete device being wholly immersed in a fluid other than air (H01L 23/427 takes precedence) **[2,5]**
23/46 . . involving the transfer of heat by flowing fluids (H01L 23/42, H01L 23/44 take precedence) **[2]**
23/467 . . . by flowing gases, e.g. air **[5]**
23/473 . . . by flowing liquids **[5]**
23/48 . Arrangements for conducting electric current to or from the solid state body in operation, e.g. leads or terminal arrangements **[2]**
23/482 . . consisting of lead-in layers inseparably applied to the semiconductor body **[5]**
23/485 . . . consisting of layered constructions comprising conductive layers and insulating layers, e.g. planar contacts **[5]**
23/488 . . consisting of soldered or bonded constructions **[5,8]**
23/49 . . . wire-like **[5]**
23/492 . . . Bases or plates **[5]**
23/495 . . . Lead-frames **[5]**
23/498 . . . Leads on insulating substrates **[5]**
23/50 . . for integrated circuit devices (H01L 23/482 to H01L 23/498 take precedence) **[2,5]**
23/52 . Arrangements for conducting electric current within the device in operation from one component to another **[2]**
23/522 . . including external interconnections consisting of a multilayer structure of conductive and insulating layers inseparably formed on the semiconductor body **[5]**
23/525 . . . with adaptable interconnections **[5]**
23/528 . . . Layout of the interconnection structure **[5]**
23/532 . . . characterised by the materials **[5]**
23/535 . . including internal interconnections, e.g. cross-under constructions **[5]**
23/538 . . the interconnection structure between a plurality of semiconductor chips being formed on, or in, insulating substrates **[5]**
23/544 . Marks applied to semiconductor devices, e.g. registration marks, test patterns **[5]**
23/552 . Protection against radiation, e.g. light **[5]**
23/556 . . against alpha rays **[5]**
23/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for **[5]**
23/60 . . Protection against electrostatic charges or discharges, e.g. Faraday shields **[5]**
23/62 . . Protection against overcurrent or overload, e.g. fuses, shunts **[5]**
23/64 . . Impedance arrangements **[5]**
23/66 . . . High-frequency adaptations **[5]**

25/00 Assemblies consisting of a plurality of individual semiconductor or other solid state devices (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; assemblies of photoelectronic cells H01L 31/042) **[2,5]**
25/03 . all the devices being of a type provided for in the same subgroup of groups H01L 27/00 to H01L 51/00, e.g. assemblies of rectifier diodes **[5,8]**
25/04 . . the devices not having separate containers **[2]**
25/065 . . . the devices being of a type provided for in group H01L 27/00 **[5]**
25/07 . . . the devices being of a type provided for in group H01L 29/00 **[5]**
25/075 . . . the devices being of a type provided for in group H01L 33/00 **[5]**
25/10 . . the devices having separate containers **[2]**
25/11 . . . the devices being of a type provided for in group H01L 29/00 **[5]**
25/13 . . . the devices being of a type provided for in group H01L 33/00 **[5]**

25/16 . the devices being of types provided for in two or more different main groups of groups H01L 27/00 to H01L 51/00, e.g. forming hybrid circuits **[2,8]**

25/18 . the devices being of types provided for in two or more different subgroups of the same main group of groups H01L 27/00 to H01L 51/00 **[5,8]**

27/00 Devices consisting of a plurality of semiconductor or other solid-state components formed in or on a common substrate (details thereof H01L 23/00, H01L 29/00 to H01L 51/00; assemblies consisting of a plurality of individual solid state devices H01L 25/00) **[2,8]**

Note

In groups H01L 27/01 to H01L 27/28, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[2]**

27/01 . comprising only passive thin-film or thick-film elements formed on a common insulating substrate **[3]**

27/02 . including semiconductor components specially adapted for rectifying, oscillating, amplifying or switching and having at least one potential-jump barrier or surface barrier; including integrated passive circuit elements with at least one potential-jump barrier or surface barrier **[2]**

27/04 . . the substrate being a semiconductor body **[2]**

27/06 . . . including a plurality of individual components in a non-repetitive configuration **[2]**

27/07 . . . . the components having an active region in common **[5]**

27/08 . . . including only semiconductor components of a single kind **[2]**

27/082 . . . . including bipolar components only **[5]**

27/085 . . . . including field-effect components only **[5]**

27/088 . . . . . the components being field-effect transistors with insulated gate **[5]**

27/092 . . . . . . complementary MIS field-effect transistors **[5]**

27/095 . . . . . the components being Schottky barrier gate field-effect transistors **[5]**

27/098 . . . . . the components being PN junction gate field-effect transistors **[5]**

27/10 . . . including a plurality of individual components in a repetitive configuration **[2]**

27/102 . . . . including bipolar components **[5]**

27/105 . . . . including field-effect components **[5]**

27/108 . . . . . Dynamic random access memory structures **[5]**

27/11 . . . . . Static random access memory structures **[5]**

27/112 . . . . . Read-only memory structures **[5]**

27/115 . . . . . Electrically programmable read-only memories **[5]**

27/118 . . . . Masterslice integrated circuits **[5]**

27/12 . . the substrate being other than a semiconductor body, e.g. an insulating body **[2]**

27/13 . . . combined with thin-film or thick-film passive components **[3]**

27/14 . including semiconductor components sensitive to infra-red radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation and specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation (radiation-sensitive components structurally associated with one or more electric light sources only H01L 31/14; couplings of light guides with optoelectronic elements G02B 6/42) **[2]**

27/142 . . Energy conversion devices **[5]**

27/144 . . Devices controlled by radiation **[5]**

27/146 . . . Imager structures **[5]**

27/148 . . . . Charge coupled imagers **[5]**

27/15 . including semiconductor components with at least one potential-jump barrier or surface barrier, specially adapted for light emission **[2]**

27/16 . including thermoelectric components with or without a junction of dissimilar materials; including thermomagnetic components (using the Peltier effect only for cooling of semiconductor or other solid state devices H01L 23/38) **[2]**

27/18 . including components exhibiting superconductivity **[2]**

27/20 . including piezo-electric components; including electrostrictive components; including magnetostrictive components **[2,7]**

27/22 . including components using galvano-magnetic effects, e.g. Hall effect; using similar magnetic field effects **[2]**

27/24 . including solid state components for rectifying, amplifying, or switching without a potential-jump barrier or surface barrier **[2]**

27/26 . including bulk negative resistance effect components **[2]**

27/28 . including components using organic materials as the active part, or using a combination of organic materials with other materials as the active part **[8]**

27/30 . . with components specially adapted for sensing infra-red radiation, light, electromagnetic radiation of shorter wavelength, or corpuscular radiation; with components specially adapted for either the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation **[8]**

27/32 . . with components specially adapted for light emission, e.g. flat-panel displays using organic light-emitting diodes **[8]**

29/00 Semiconductor devices specially adapted for rectifying, amplifying, oscillating or switching and having at least one potential-jump barrier or surface barrier; **Capacitors or resistors with at least one potential-jump barrier or surface barrier, e.g.** PN-**junction depletion layer or carrier concentration layer**; **Details of semiconductor bodies or of electrodes thereof** (H01L 31/00 to H01L 47/00, H01L 51/05 take precedence; details other than of semiconductor bodies or of electrodes thereof H01L 23/00; devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2,6]**

Note

In this main group, classification is made in all of groups H01L 29/02, H01L 29/40 and H01L 29/66 if all of these groups are relevant. **[2]**

29/02 . Semiconductor bodies **[2]**
29/04 . . characterised by their crystalline structure, e.g. polycrystalline, cubic or particular orientation of crystalline planes (characterized by physical imperfections H01L 29/30) **[2]**
29/06 . . characterised by their shape; characterised by the shapes, relative sizes, or dispositions of the semiconductor regions **[2]**
29/08 . . . with semiconductor regions connected to an electrode carrying current to be rectified, amplified, or switched and such electrode being part of a semiconductor device which comprises three or more electrodes **[2]**
29/10 . . . with semiconductor regions connected to an electrode not carrying current to be rectified, amplified, or switched and such electrode being part of a semiconductor device which comprises three or more electrodes **[2]**
29/12 . . characterised by the materials of which they are formed **[2]**
29/15 . . . Structures with periodic or quasi periodic potential variation, e.g. multiple quantum wells, superlattices (such structures applied for the control of light G02F 1/017, applied in semiconductor lasers H01S 5/34) **[6]**

Note

Group H01L 29/15 takes precedence over groups H01L 29/16 to H01L 29/26. **[6]**

29/16 . . . including, apart from doping materials or other impurities, only elements of the fourth group of the Periodic System in uncombined form **[2]**
29/161 . . . . including two or more of the elements provided for in group H01L 29/16 **[2]**
29/165 . . . . . in different semiconductor regions **[2]**
29/167 . . . . further characterised by the doping material **[2]**
29/18 . . . Selenium or tellurium only, apart from doping materials or other impurities **[2]**
29/20 . . . including, apart from doping materials or other impurities, only $A_{III}B_{V}$ compounds **[2,6]**
29/201 . . . . including two or more compounds **[2]**
29/205 . . . . . in different semiconductor regions **[2]**
29/207 . . . . further characterised by the doping material **[2]**
29/22 . . . including, apart from doping materials or other impurities, only $A_{II}B_{VI}$ compounds **[2]**
29/221 . . . . including two or more compounds **[2]**
29/225 . . . . . in different semiconductor regions **[2]**
29/227 . . . . further characterised by the doping material **[2]**
29/24 . . . including, apart from doping materials or other impurities, only inorganic semiconductor materials not provided for in groups H01L 29/16, H01L 29/18, H01L 29/20 or H01L 29/22 **[2]**
29/26 . . . including, apart from doping materials or other impurities, elements provided for in two or more of the groups H01L 29/16, H01L 29/18, H01L 29/20, H01L 29/22, H01L 29/24 **[2]**
29/267 . . . . in different semiconductor regions **[2]**
29/30 . . characterised by physical imperfections; having polished or roughened surface **[2]**
29/32 . . . the imperfections being within the semiconductor body **[2]**
29/34 . . . the imperfections being on the surface **[2]**
29/36 . . characterised by the concentration or distribution of impurities **[2]**
29/38 . . characterised by combination of features provided for in two or more of the groups H01L 29/04, H01L 29/06, H01L 29/12, H01L 29/30, H01L 29/36 **[2]**
29/40 . Electrodes **[2]**
29/41 . . characterised by their shape, relative sizes or dispositions **[6]**
29/417 . . . carrying the current to be rectified, amplified or switched **[6]**
29/423 . . . not carrying the current to be rectified, amplified or switched **[6]**
29/43 . . characterised by the materials of which they are formed **[6]**
29/45 . . . Ohmic electrodes **[6]**
29/47 . . . Schottky barrier electrodes **[6]**
29/49 . . . Metal-insulator semiconductor electrodes **[6]**
29/51 . . . . Insulating materials associated therewith **[6]**
29/66 . Types of semiconductor device **[2]**
29/68 . . controllable by only the electric current supplied, or only the electric potential applied, to an electrode which does not carry the current to be rectified, amplified, or switched (H01L 29/96 takes precedence) **[2]**
29/70 . . . Bipolar devices **[2]**
29/72 . . . . Transistor-type devices, i.e. able to continuously respond to applied control signals **[2]**
29/73 . . . . . Bipolar junction transistors **[5]**
29/732 . . . . . Vertical transistors **[6]**
29/735 . . . . . Lateral transistors **[6]**
29/737 . . . . . Hetero-junction transistors **[6]**
29/739 . . . . . controlled by field effect **[6]**
29/74 . . . . Thyristor-type devices, e.g. having four-zone regenerative action **[2]**
29/744 . . . . . Gate-turn-off devices **[6]**
29/745 . . . . . with turn-off by field effect **[6]**
29/747 . . . . . Bidirectional devices, e.g. triacs **[2]**
29/749 . . . . . with turn-on by field effect **[6]**
29/76 . . . Unipolar devices **[2]**
29/762 . . . . Charge transfer devices **[6]**
29/765 . . . . . Charge-coupled devices **[6]**
29/768 . . . . . with field effect produced by an insulated gate **[6]**
29/772 . . . . Field-effect transistors **[6]**
29/775 . . . . . with one-dimensional charge carrier gas channel, e.g. quantum wire FET **[6]**
29/778 . . . . . with two-dimensional charge carrier gas channel, e.g. HEMT **[6]**
29/78 . . . . . with field effect produced by an insulated gate **[2]**
29/786 . . . . . Thin-film transistors **[6]**
29/788 . . . . . with floating gate **[5]**
29/792 . . . . . with charge trapping gate insulator, e.g. MNOS-memory transistor **[5]**
29/80 . . . . . with field effect produced by a PN or other rectifying junction gate **[2]**
29/808 . . . . . with a PN junction gate **[5]**

29/812 . . . . . with a Schottky gate **[5]**
29/82 . . controllable by variation of the magnetic field applied to the device (H01L 29/96 takes precedence) **[2,6]**
29/84 . . controllable by variation of applied mechanical force, e.g. of pressure (H01L 29/96 takes precedence) **[2,6]**
29/86 . . controllable only by variation of the electric current supplied, or only the electric potential applied, to one or more of the electrodes carrying the current to be rectified, amplified, oscillated, or switched (H01L 29/96 takes precedence) **[2]**
29/8605 . . . Resistors with PN junction **[6]**
29/861 . . . Diodes **[6]**
29/862 . . . . Point contact diodes **[6]**
29/864 . . . . Transit-time diodes, e.g. IMPATT, TRAPATT diodes **[6]**
29/866 . . . . Zener diodes **[6]**
29/868 . . . . PIN diodes **[6]**
29/87 . . . . Thyristor diodes, e.g. Shockley diodes, break-over diodes **[6]**
29/872 . . . . Schottky diodes **[6]**
29/88 . . . . Tunnel-effect diodes **[2]**
29/885 . . . . . Esaki diodes **[6]**
29/92 . . . Capacitors with potential-jump barrier or surface barrier **[2]**
29/93 . . . . Variable-capacitance diodes, e.g. varactors **[2]**
29/94 . . . . Metal-insulator-semiconductors, e.g. MOS **[2]**
29/96 . . of a type covered by more than one of groups H01L 29/68, H01L 29/82, H01L 29/84 or H01L 29/86 **[2]**

31/00 Semiconductor devices sensitive to infra-red radiation, light, electromagnetic radiation of shorter wavelength, or corpuscular radiation and specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (H01L 51/42 takes precedence; devices consisting of a plurality of solid state components formed in, or on, a common substrate, other than combinations of radiation-sensitive components with one or more electric light sources, H01L 27/00) **[2,6,8]**

31/02 . Details **[2]**
31/0203 . . Containers; Encapsulations **[5]**
31/0216 . . Coatings **[5]**
31/0224 . . Electrodes **[5]**
31/0232 . . Optical elements or arrangements associated with the device **[5]**
31/0236 . . Special surface textures **[5]**
31/024 . . Arrangements for cooling, heating, ventilating or temperature compensation **[5]**
31/0248 . characterised by their semiconductor bodies **[5]**
31/0256 . . characterised by the material **[5]**
31/0264 . . . Inorganic materials **[5]**
31/0272 . . . . Selenium or tellurium **[5]**
31/028 . . . . including, apart from doping material or other impurities, only elements of the fourth group of the Periodic System **[5]**
31/0288 . . . . . characterised by the doping material **[5]**
31/0296 . . . . including, apart from doping materials or other impurities, only $A_{II}B_{VI}$ compounds, e.g. CdS, ZnS, HgCdTe **[5]**
31/0304 . . . . including, apart from doping materials or other impurities, only $A_{III}B_{V}$ compounds **[5]**
31/0312 . . . . including, apart from doping materials or other impurities, only $A_{IV}B_{IV}$ compounds, e.g. SiC **[5]**
31/032 . . . . including, apart from doping materials or other impurities, only compounds not provided for in groups H01L 31/0272 to H01L 31/0312 **[5]**
31/0328 . . . . including, apart from doping materials or other impurities, semiconductor materials provided for in two or more of groups H01L 31/0272 to H01L 31/032 **[5]**
31/0336 . . . . . in different semiconductor regions, e.g. Cu_2X/CdX hetero-junctions, X being an element of the sixth group of the Periodic System **[5]**
31/0352 . . characterised by their shape or by the shapes, relative sizes or disposition of the semiconductor regions **[5]**
31/036 . . characterised by their crystalline structure or particular orientation of the crystalline planes **[5]**
31/0368 . . . including polycrystalline semiconductors (H01L 31/0392 takes precedence) **[5]**
31/0376 . . . including amorphous semiconductors (H01L 31/0392 takes precedence) **[5]**
31/0384 . . . including other non-monocrystalline materials, e.g. semiconductor particles embedded in an insulating material (H01L 31/0392 takes precedence) **[5]**
31/0392 . . . including thin films deposited on metallic or insulating substrates **[5]**
31/04 . adapted as conversion devices **[2]**
31/042 . . including a panel or array of photoelectric cells, e.g. solar cells **[5]**
31/045 . . . collapsible or foldable **[5]**
31/048 . . . encapsulated or with housing **[5]**
31/05 . . . characterised by special interconnection means **[5]**
31/052 . . . with cooling, light-reflecting or light-concentrating means **[5]**
31/055 . . . . where light is absorbed and re-emitted at a different wavelength by the concentrator, e.g. by using luminescent material **[5]**
31/058 . . . including means to utilise heat energy, e.g. hybrid systems, or a supplementary source of electric energy **[5]**
31/06 . . characterised by at least one potential-jump barrier or surface barrier **[2]**
31/062 . . . the potential barriers being only of the metal-insulator-semiconductor type **[5]**
31/065 . . . the potential barriers being only of the graded gap type **[5]**
31/068 . . . the potential barriers being only of the PN homojunction type **[5]**
31/07 . . . the potential barriers being only of the Schottky type **[5]**
31/072 . . . the potential barriers being only of the PN heterojunction type **[5]**
31/075 . . . the potential barriers being only of the PIN type **[5]**
31/078 . . . including potential barriers provided for in two or more of groups H01L 31/062 to H01L 31/075 **[5]**
31/08 . in which radiation controls flow of current through the device, e.g. photoresistors **[2]**

31/09 . . Devices sensitive to infra-red, visible or ultra-violet radiation (H01L 31/101 takes precedence) **[5]**

31/10 . . characterised by at least one potential-jump barrier or surface barrier, e.g. phototransistors **[2]**

31/101 . . . Devices sensitive to infra-red, visible or ultra-violet radiation **[5]**

31/102 . . . . characterised by only one potential barrier or surface barrier **[5]**

31/103 . . . . . the potential barrier being of the PN homojunction type **[5]**

31/105 . . . . . the potential barrier being of the PIN type **[5]**

31/107 . . . . . the potential barrier working in avalanche mode, e.g. avalanche photodiode **[5]**

31/108 . . . . . the potential barrier being of the Schottky type **[5]**

31/109 . . . . . the potential barrier being of the PN heterojunction type **[5]**

31/11 . . . . characterised by two potential barriers or surface barriers, e.g. bipolar phototransistor **[5]**

31/111 . . . . characterised by at least three potential barriers, e.g. photothyristor **[5]**

31/112 . . . . characterised by field-effect operation, e.g. junction field-effect photo- transistor **[5]**

31/113 . . . . . being of the conductor-insulator-semiconductor type, e.g. metal- insulator-semiconductor field-effect transistor **[5]**

31/115 . . . Devices sensitive to very short wavelength, e.g. X-rays, gamma-rays or corpuscular radiation **[5]**

31/117 . . . . of the bulk effect radiation detector type, e.g. Ge-Li compensated PIN gamma-ray detectors **[5]**

31/118 . . . . of the surface barrier or shallow PN junction detector type, e.g. surface barrier alpha-particle detectors **[5]**

31/119 . . . . characterised by field-effect operation, e.g. MIS type detectors **[5]**

31/12 . structurally associated with, e.g. formed in or on a common substrate with, one or more electric light sources, e.g. electroluminescent light sources, and electrically or optically coupled thereto (electroluminescent light sources per se H05B 33/00) **[2,5]**

31/14 . . the light source or sources being controlled by the semiconductor device sensitive to radiation, e.g. image converters, image amplifiers, image storage devices **[2]**

31/147 . . . the light sources and the devices sensitive to radiation all being semiconductor devices characterised by at least one potential or surface barrier **[5]**

31/153 . . . . formed in, or on, a common substrate **[5]**

31/16 . . the semiconductor device sensitive to radiation being controlled by the light source or sources **[2]**

31/167 . . . the light sources and the devices sensitive to radiation all being semiconductor devices characterised by at least one potential or surface barrier **[5]**

31/173 . . . . formed in, or on, a common substrate **[5]**

31/18 . Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2]**

31/20 . . such devices or parts thereof comprising amorphous semiconductor material **[5]**

33/00 Semiconductor devices with at least one potential-jump barrier or surface barrier specially adapted for light emission; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (H01L 51/50 takes precedence; devices consisting of a plurality of semiconductor components formed in or on a common substrate and including semiconductor components with at least one potential-jump barrier or surface barrier, specially adapted for light emission H01L 27/15; semiconductor lasers H01S 5/00) **[2,8,2010.01]**

(1) This group covers light emitting diodes [LEDs] or superluminescent diodes [SLDs], including LEDs or SLDs emitting infra-red [IR] light or ultra-violet [UV] light. **[2010.01]**

(2) In this group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2010.01]**

33/02 . characterised by the semiconductor bodies **[2010.01]**

33/04 . . with a quantum effect structure or superlattice, e.g. tunnel junction **[2010.01]**

33/06 . . . within the light emitting region, e.g. quantum confinement structure or tunnel barrier **[2010.01]**

33/08 . . with a plurality of light emitting regions, e.g. laterally discontinuous light emitting layer or photoluminescent region integrated within the semiconductor body (H01L 27/15 takes precedence) **[2010.01]**

33/10 . . with a light reflecting structure, e.g. semiconductor Bragg reflector **[2010.01]**

33/12 . . with a stress relaxation structure, e.g. buffer layer **[2010.01]**

33/14 . . with a carrier transport control structure, e.g. highly-doped semiconductor layer or current-blocking structure **[2010.01]**

33/16 . . with a particular crystal structure or orientation, e.g. polycrystalline, amorphous or porous **[2010.01]**

33/18 . . . within the light emitting region **[2010.01]**

Note

When classifying in this group, classification is also made in group H01L 33/26 or one of its subgroups in order to identify the chemical composition of the light emitting region. **[2010.01]**

33/20 . . with a particular shape, e.g. curved or truncated substrate **[2010.01]**

33/22 . . . Roughened surfaces, e.g. at the interface between epitaxial layers **[2010.01]**

33/24 . . . of the light emitting region, e.g. non-planar junction **[2010.01]**

33/26 . . Materials of the light emitting region **[2010.01]**

33/28 . . . containing only elements of group II and group VI of the periodic system **[2010.01]**

33/30 . . . containing only elements of group III and group V of the periodic system **[2010.01]**

33/32 . . . . containing nitrogen **[2010.01]**

33/34 . . . containing only elements of group IV of the periodic system **[2010.01]**

33/36 . characterised by the electrodes **[2010.01]**

33/38 . . with a particular shape **[2010.01]**

33/40 . . Materials therefor **[2010.01]**
33/42 . . . Transparent materials **[2010.01]**
33/44 . characterised by the coatings, e.g. passivation layer or anti-reflective coating **[2010.01]**
33/46 . . Reflective coating, e.g. dielectric Bragg reflector **[2010.01]**
33/48 . characterised by the semiconductor body packages **[2010.01]**

Note

This group covers elements in intimate contact with the semiconductor body or integrated with the package. **[2010.01]**

33/50 . . Wavelength conversion elements **[2010.01]**
33/52 . . Encapsulations **[2010.01]**
33/54 . . . having a particular shape **[2010.01]**
33/56 . . . Materials, e.g. epoxy or silicone resin **[2010.01]**
33/58 . . Optical field-shaping elements **[2010.01]**
33/60 . . . Reflective elements **[2010.01]**
33/62 . . Arrangements for conducting electric current to or from the semiconductor body, e.g. leadframe, wire-bond or solder balls **[2010.01]**
33/64 . . Heat extraction or cooling elements **[2010.01]**

35/00 Thermoelectric devices comprising a junction of dissimilar materials, i.e. exhibiting Seebeck or Peltier effect with or without other thermoelectric effects or thermomagnetic effects; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

35/02 . Details **[2]**
35/04 . . Structural details of the junction; Connections of leads **[2]**
35/06 . . . detachable, e.g. using a spring **[2]**
35/08 . . . non-detachable, e.g. cemented, sintered, soldered **[2]**
35/10 . . . Connections of leads **[2]**
35/12 . Selection of the material for the legs of the junction **[2]**
35/14 . . using inorganic compositions **[2]**
35/16 . . . comprising tellurium or selenium or sulfur **[2]**
35/18 . . . comprising arsenic or antimony or bismuth (H01L 35/16 takes precedence) **[2]**
35/20 . . . comprising metals only (H01L 35/16, H01L 35/18 take precedence) **[2]**
35/22 . . . comprising compounds containing boron, carbon, oxygen, or nitrogen **[2]**
35/24 . . using organic compositions **[2]**
35/26 . . using compositions changing continuously or discontinuously inside the material **[2]**
35/28 . operating with Peltier or Seebeck effect only **[2]**
35/30 . . characterised by the heat-exchanging means at the junction **[2]**
35/32 . . characterised by the structure or configuration of the cell or thermo-couple forming the device **[2]**
35/34 . Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2]**

37/00 Thermoelectric devices without a junction of dissimilar materials; **Thermomagnetic devices, e.g. using Nernst-Ettinghausen effect**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

37/02 . using thermal change of dielectric constant, e.g. working above and below the Curie point **[2]**
37/04 . using thermal change of magnetic permeability, e.g. working above and below the Curie point **[2]**

39/00 Devices using superconductivity or hyperconductivity; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; superconductors characterised by the ceramic-forming technique or the ceramic composition C04B 35/00; superconductive or hyperconductive conductors, cables, or transmission lines H01B 12/00; superconductive coils or windings H01F; amplifiers using superconductivity H03F 19/00) **[2,4]**

39/02 . Details **[2]**
39/04 . . Containers; Mountings **[2]**
39/06 . . characterised by the current path **[2]**
39/08 . . characterised by the shape of the element **[2]**
39/10 . . characterised by the means for switching **[2]**
39/12 . . characterised by the material **[2]**
39/14 . Permanent superconductor devices **[2]**
39/16 . Devices switchable between superconductive and normal states **[2]**
39/18 . . Cryotrons **[2]**
39/20 . . . Power cryotrons **[2]**
39/22 . Devices comprising a junction of dissimilar materials, e.g. Josephson-effect devices **[2]**
39/24 . Processes or apparatus specially adapted for the manufacture or treatment of devices provided for in group H01L 39/00 or of parts thereof **[2]**

41/00 Piezo-electric elements in general; **Electrostrictive elements in general**; **Magnetostrictive elements in general**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof**; **Details thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

(1) This group does not cover adaptations for particular purposes, which are covered by the relevant places. **[6]**
(2) Attention is drawn to the following such places: **[6]**

B06B		for adaptations for generating or transmitting mechanical vibrations
G01		for transducers as sensing elements for measuring
G04C, G04F		for transducers adapted for use in time-pieces
G10K		for adaptations for generating or transmitting sound
H02N		for arrangements of elements in electric machines
H03H	9/00	for networks comprising electro-mechanical or electro-acoustic elements, e.g. resonant circuits

H04R for loudspeakers, microphones, gramophone pick-ups or like transducers.

41/02 . Details **[2]**
41/04 . . of piezo-electric or electrostrictive elements **[2]**
41/047 . . . Electrodes **[6]**
41/053 . . . Mounts, supports, enclosures or casings **[6]**
41/06 . . of magnetostrictive elements **[2]**
41/08 . Piezo-electric or electrostrictive elements **[2]**
41/083 . . having a stacked or multilayer structure **[6]**
41/087 . . formed as coaxial cables **[6]**

Note

Groups H01L 41/083 and H01L 41/087 take precedence over groups H01L 41/09 to H01L 41/113. **[6]**

41/09 . . with electrical input and mechanical output **[5]**
41/107 . . with electrical input and electrical output **[5]**
41/113 . . with mechanical input and electrical output **[5]**
41/12 . Magnetostrictive elements **[2]**
41/16 . Selection of materials **[2]**
41/18 . . for piezo-electric or electrostrictive elements **[2]**
41/187 . . . Ceramic compositions **[5]**
41/193 . . . Macromolecular compositions **[5]**
41/20 . . for magnetostrictive elements **[2]**
41/22 . Processes or apparatus specially adapted for the manufacture or treatment of these elements or of parts thereof **[2]**
41/24 . . of elements of ceramic composition **[5]**
41/26 . . of elements of macromolecular composition **[5]**

43/00 Devices using galvano-magnetic or similar magnetic effects; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

43/02 . Details **[2]**
43/04 . . of Hall-effect devices **[2]**
43/06 . Hall-effect devices **[2]**
43/08 . Magnetic-field-controlled resistors **[2]**
43/10 . Selection of materials **[2]**
43/12 . Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2]**
43/14 . . for Hall-effect devices **[2]**

45/00 Solid state devices specially adapted for rectifying, amplifying, oscillating, or switching without a potential-jump barrier or surface barrier, e.g. dielectric triodes; **Ovshinsky-effect devices**; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00; devices using superconductivity or hyperconductivity H01L 39/00; piezo-electric elements H01L 41/00; bulk negative resistance effect devices H01L 47/00) **[2]**

45/02 . Solid state travelling-wave devices **[2]**

47/00 Bulk negative resistance effect devices, e.g. Gunn-effect devices; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof** (devices consisting of a plurality of solid state components formed in or on a common substrate H01L 27/00) **[2]**

47/02 . Gunn-effect devices **[2]**

49/00 Solid state devices not provided for in groups H01L 27/00 to H01L 47/00 and H01L 51/00 and not provided for in any other subclass; **Processes or apparatus specially adapted for the manufacture or treatment thereof or of parts thereof [2,8]**

49/02 . Thin-film or thick-film devices **[2]**

51/00 Solid state devices using organic materials as the active part, or using a combination of organic materials with other materials as the active part; **Processes or apparatus specially adapted for the manufacture or treatment of such devices, or of parts thereof** (devices consisting of a plurality of components formed in or on a common substrate H01L 27/28; thermoelectric devices using organic material H01L 35/00, H01L 37/00; piezo-electric, electrostrictive or magnetostrictive elements using organic material H01L 41/00) **[6,8]**

51/05 . specially adapted for rectifying, amplifying, oscillating or switching and having at least one potential-jump barrier or surface barrier; Capacitors or resistors with at least one potential-jump barrier or surface barrier **[8]**
51/10 . . Details of devices **[6]**
51/30 . . Selection of materials **[6]**
51/40 . . Processes or apparatus specially adapted for the manufacture or treatment of such devices or of parts thereof **[6,8]**
51/42 . specially adapted for sensing infra-red radiation, light, electromagnetic radiation of shorter wavelength, or corpuscular radiation; specially adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation **[8]**
51/44 . . Details of devices **[8]**
51/46 . . Selection of materials **[8]**
51/48 . . Processes or apparatus specially adapted for the manufacture or treatment of such devices or of parts thereof **[8]**
51/50 . specially adapted for light emission, e.g. organic light emitting diodes (OLED) or polymer light emitting devices (PLED) (organic semiconductor lasers H01S 5/36) **[8]**
51/52 . . Details of devices **[8]**
51/54 . . Selection of materials **[8]**
51/56 . . Processes or apparatus specially adapted for the manufacture or treatment of such devices or of parts thereof **[8]**

H01M PROCESSES OR MEANS, E.G. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY (electrochemical processes or apparatus in general C25; semiconductor or other solid state devices for converting light or heat into electrical energy H01L, e.g. H01L 31/00, H01L 35/00, H01L 37/00) **[2]**

(1) This subclass covers galvanic primary or secondary cells or batteries, fuel cells or batteries.
(2) Processes using enzymes or micro-organisms in order to:
(i) liberate, separate or purify a pre-existing compound or composition, or to
(ii) treat textiles or clean solid surfaces of materials
are further classified in subclass C12S. **[5]**

Subclass index

2/00 Constructional details, or processes of manufacture, of the non-active parts [2]

2/02 . Cases, jackets, or wrappings (working of plastics or substances in a plastic state B29) **[2]**
2/04 . . Lids or covers **[2]**
2/06 . . Arrangements for introducing electric connectors into or through cases **[2]**
2/08 . . Sealing materials **[2]**
2/10 . Mountings; Suspension devices; Shock absorbers; Transport or carrying devices; Holders (structural combination of accumulators with charging apparatus H01M 10/46) **[2]**
2/12 . Vent plugs or other mechanical arrangements for facilitating escape of gases **[2]**
2/14 . Separators; Membranes; Diaphragms; Spacing elements **[2]**
2/16 . . characterised by the material **[2]**
2/18 . . characterised by the shape **[2]**
2/20 . Current-conducting connections for cells **[2]**
2/22 . . Fixed connections, i.e. not intended for disconnection **[2]**
2/24 . . . Intercell connections through partitions, e.g. in a battery case **[2]**
2/26 . . . Electrode connections **[2]**
2/28 . . . . for lead-acid accumulators **[2]**
2/30 . . Terminals **[2]**
2/32 . . Methods or arrangements for affording protection against corrosion; Selection of materials therefor **[2]**
2/34 . . with provision for preventing undesired use or discharge **[2]**
2/36 . Arrangements for filling, topping-up or emptying cases with or of liquid, e.g. for filling with electrolytes, for washing-out **[2]**
2/38 . Arrangements for moving electrolytes **[2]**
2/40 . . with external circulating path (H01M 8/04 takes precedence) **[2]**

4/00 Electrodes (electrodes for electrolytic processes C25) **[2]**

Note

In classifying electrodes of hybrid cells, the individual half-cells of the hybrid cell are considered separately, e.g. an electrode in the primary half of a primary/fuel type hybrid cell is considered to be a primary-cell electrode covered by H01M 4/06. **[2]**

4/02 . Electrodes composed of, or comprising, active material **[2]**
4/04 . . Processes of manufacture in general **[2]**
4/06 . . Electrodes for primary cells **[2]**
4/08 . . . Processes of manufacture **[2]**
4/10 . . . . of pressed electrodes with central core, i.e. dollies **[2]**
4/12 . . . . of consumable metal or alloy electrodes (use of alloy compositions as active materials H01M 4/38) **[2]**
4/13 . . Electrodes for accumulators with non-aqueous electrolyte, e.g. for lithium-accumulators; Processes of manufacture thereof **[2010.01]**

Note

This group does not cover electrodes for accumulators working at high temperatures, e.g. molten sodium electrodes, which subject matter is classified in group H01M 10/39. **[2010.01]**

4/131 . . . Electrodes based on mixed oxides or hydroxides, or on mixtures of oxides or hydroxides, e.g. LiCoOx **[2010.01]**
4/1315 . . . . containing halogen atoms, e.g. LiCoOxFy **[2010.01]**
4/133 . . . Electrodes based on carbonaceous material, e.g. graphite-intercalation compounds or CFx **[2010.01]**
4/134 . . . Electrodes based on metals, Si or alloys **[2010.01]**

4/136 . . . Electrodes based on inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or LiCoFy **[2010.01]**
4/137 . . . Electrodes based on electro-active polymers **[2010.01]**
4/139 . . . Processes of manufacture **[2010.01]**
4/1391 . . . . of electrodes based on mixed oxides or hydroxides, or on mixtures of oxides or hydroxides, e.g. LiCoOx **[2010.01]**
4/13915. . . . . containing halogen atoms, e.g. LiCoOxFy **[2010.01]**
4/1393 . . . . of electrodes based on carbonaceous material, e.g. graphite-intercalation compounds or CFx **[2010.01]**
4/1395 . . . . of electrodes based on metals, Si or alloys **[2010.01]**
4/1397 . . . . of electrodes based on inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or LiCoFy **[2010.01]**
4/1399 . . . . of electrodes based on electro-active polymers **[2010.01]**
4/14 . . Electrodes for lead-acid accumulators **[2]**
4/16 . . . Processes of manufacture **[2]**
4/18 . . . . of Plante electrodes **[2]**
4/20 . . . . of pasted electrodes **[2]**
4/21 . . . . . Drying of pasted electrodes **[2]**
4/22 . . . . Forming of electrodes **[2]**
4/23 . . . . . Drying or preserving electrodes after forming **[2]**
4/24 . . Electrodes for alkaline accumulators **[2]**
4/26 . . . Processes of manufacture **[2]**
4/28 . . . . Precipitating active material on the carrier **[2]**
4/29 . . . . . by electrochemical methods **[2]**
4/30 . . . . Pressing **[2]**
4/32 . . . Nickel oxide or hydroxide electrodes **[2]**
4/34 . . . Silver oxide or hydroxide electrodes **[2]**
4/36 . . Selection of substances as active materials, active masses, active liquids **[2]**
4/38 . . . of elements or alloys **[2]**
4/40 . . . . Alloys based on alkali metals **[2]**
4/42 . . . . Alloys based on zinc **[2]**
4/44 . . . . Alloys based on cadmium **[2]**
4/46 . . . . Alloys based on magnesium or aluminium **[2]**
4/48 . . . of inorganic oxides or hydroxides **[2,2010.01]**
4/485 . . . . of mixed oxides or hydroxides for inserting or intercalating light metals, e.g. $LiTi_2O_4$ or $LiTi_2OxFy$ (H01M 4/505, H01M 4/525 take precedence) **[2010.01]**
4/50 . . . . of manganese **[2,2010.01]**
4/505 . . . . . of mixed oxides or hydroxides containing manganese for inserting or intercalating light metals, e.g. $LiMn_2O_4$ or $LiMn_2OxFy$ **[2010.01]**
4/52 . . . . of nickel, cobalt or iron **[2,2010.01]**
4/525 . . . . . of mixed oxides or hydroxides containing iron, cobalt or nickel for inserting or intercalating light metals, e.g. $LiNiO_2$, $LiCoO_2$ or LiCoOxFy **[2010.01]**
4/54 . . . . of silver **[2]**
4/56 . . . . of lead **[2]**
4/57 . . . . . of “grey lead”, i.e. powders containing lead and lead oxide **[2]**
4/58 . . . of inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or LiCoFy **[2,2010.01]**
4/583 . . . . Carbonaceous material, e.g. graphite-intercalation compounds or CFx **[2010.01]**
4/587 . . . . . for inserting or intercalating light metals **[2010.01]**
4/60 . . . of organic compounds **[2]**
4/62 . . Selection of inactive substances as ingredients for active masses, e.g. binders, fillers **[2]**
4/64 . . Carriers or collectors **[2]**
4/66 . . . Selection of materials **[2]**
4/68 . . . . for use in lead-acid accumulators **[2]**
4/70 . . . characterised by shape or form **[2]**
4/72 . . . . Grids **[2]**
4/73 . . . . . for lead-acid accumulators, e.g. frame plates **[2]**
4/74 . . . . . Meshes or woven material; Expanded metal **[2]**
4/75 . . . . Wires, rods, or strips **[2]**
4/76 . . . . Containers for holding the active material, e.g. tubes, capsules **[2]**
4/78 . . . . Shapes other than plane or cylindrical, e.g. helical **[2]**
4/80 . . . . Porous plates, e.g. sintered carriers **[2]**
4/82 . . . Multi-step processes for manufacturing carriers for lead-acid accumulators (single-step processes, see the relevant subclasses, e.g. B21D, B22D) **[2]**
4/84 . . . . involving casting **[2]**
4/86 . Inert electrodes with catalytic activity, e.g. for fuel cells **[2]**
4/88 . . Processes of manufacture **[2]**
4/90 . . Selection of catalytic material **[2]**
4/92 . . . Metals of platinum group (H01M 4/94 takes precedence) **[2]**
4/94 . . Non-porous diffusion electrodes, e.g. palladium membranes, ion exchange membranes **[2]**
4/96 . . Carbon-based electrodes **[2]**
4/98 . . Raney-type electrodes **[2]**

6/00 Primary cells; **Manufacture thereof** **[2]**

Note

In this group, primary cells are electrochemical generators in which the cell energy is present in chemical form and is not regenerated. **[2]**

6/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
6/04 . Cells with aqueous electrolyte **[2]**
6/06 . . Dry cells, i.e. cells wherein the electrolyte is rendered non-fluid **[2]**
6/08 . . . with cup-shaped electrodes **[2]**
6/10 . . . with wound or folded electrodes **[2]**
6/12 . . . with flat electrodes **[2]**
6/14 . Cells with non-aqueous electrolyte **[2]**
6/16 . . with organic electrolyte (H01M 6/18 takes precedence) **[2]**
6/18 . . with solid electrolyte **[2]**
6/20 . . . working at high temperature (deferred-action thermal cells H01M 6/36) **[2]**
6/22 . Immobilising of electrolyte **[2]**

6/24 . Cells comprising two different electrolytes **[2]**
6/26 . Cells without oxidising active material, e.g. Volta cells **[2]**
6/28 . Standard cells, e.g. Weston cells **[2]**
6/30 . Deferred-action cells **[2]**
6/32 . . activated through external addition of electrolyte or of electrolyte components **[2]**
6/34 . . . Immersion cells, e.g. sea-water cells **[2]**
6/36 . . containing electrolyte and made operational by physical means, e.g. thermal cells (thermoelectric solid state devices H01L 35/00, H01L 37/00) **[2]**
6/38 . . . by mechanical means **[2]**
6/40 . Printed batteries **[2]**
6/42 . Grouping of primary cells into batteries (H01M 6/40 takes precedence) **[2]**
6/44 . . of tubular or cup-shaped cells **[2]**
6/46 . . of flat cells **[2]**
6/48 . . . with bipolar electrodes **[2]**
6/50 . Methods or arrangements for servicing or maintenance, e.g. maintaining operating temperature **[2]**
6/52 . Reclaiming serviceable parts of waste cells or batteries **[2]**

8/00 Fuel cells; **Manufacture thereof [2]**

Note

In this group, fuel cells are electrochemical generators wherein the reactants are supplied from outside. **[2]**

8/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
8/04 . Auxiliary arrangements or processes, e.g. for control of pressure, for circulation of fluids **[2]**
8/06 . Combination of fuel cell with means for production of reactants or for treatment of residues (regenerative fuel cells H01M 8/18; production of reactants per se, see sections B or C) **[2]**
8/08 . Fuel cells with aqueous electrolytes **[2]**
8/10 . Fuel cells with solid electrolytes **[2]**
8/12 . . operating at high temperature, e.g. with stabilised ZrO_2 electrolyte **[2]**
8/14 . Fuel cells with fused electrolytes **[2]**
8/16 . Biochemical fuel cells, i.e. cells in which micro-organisms function as catalysts **[2]**
8/18 . Regenerative fuel cells **[2]**
8/20 . Indirect fuel cells, e.g. redox cells (H01M 8/18 takes precedence) **[2]**
8/22 . Fuel cells in which the fuel is based on materials comprising carbon or oxygen or hydrogen and other elements; Fuel cells in which the fuel is based on materials comprising only elements other than carbon, oxygen, or hydrogen **[2]**
8/24 . Grouping of fuel cells into batteries, e.g. modules **[2]**

10/00 Secondary cells; **Manufacture thereof [2]**

Note

In this group, secondary cells are accumulators receiving and supplying electrical energy by means of reversible electrochemical reactions. **[2]**

10/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
10/04 . Construction or manufacture in general (H01M 10/12, H01M 10/28, H01M 10/38 take precedence) **[2]**
10/05 . Accumulators with non-aqueous electrolyte (H01M 10/39 takes precedence) **[2010.01]**
10/052 . . Li-accumulators **[2010.01]**
10/0525 . . . Rocking-chair batteries, i.e. batteries with lithium insertion or intercalation in both electrodes; Lithium-ion batteries **[2010.01]**
10/054 . . Accumulators with insertion or intercalation of metals other than lithium, e.g. with magnesium or aluminium **[2010.01]**
10/056 . . characterized by the materials used as electrolytes, e.g. mixed inorganic/organic electrolytes **[2010.01]**
10/0561 . . . the electrolyte being constituted of inorganic materials only **[2010.01]**
10/0562 . . . . Solid materials **[2010.01]**
10/0563 . . . . Liquid materials, e.g. for Li-$SOCl_2$ cells **[2010.01]**
10/0564 . . . the electrolyte being constituted of organic materials only **[2010.01]**
10/0565 . . . . Polymeric materials, e.g. gel-type or solid-type **[2010.01]**
10/0566 . . . . Liquid materials **[2010.01]**
10/0567 . . . . . characterised by the additives **[2010.01]**
10/0568 . . . . . characterised by the solutes **[2010.01]**
10/0569 . . . . . characterised by the solvents **[2010.01]**
10/058 . . Construction or manufacture **[2010.01]**
10/0583 . . . of accumulators with folded construction elements except wound ones, i.e. folded positive or negative electrodes or separators, e.g. with ''Z''-shaped electrodes or separators **[2010.01]**
10/0585 . . . of accumulators having only flat construction elements, i.e. flat positive electrodes, flat negative electrodes and flat separators **[2010.01]**
10/0587 . . . of accumulators having only wound construction elements, i.e. wound positive electrodes, wound negative electrodes and wound separators **[2010.01]**
10/06 . Lead-acid accumulators (semi-lead accumulators H01M 10/20) **[2]**
10/08 . . Selection of materials as electrolytes **[2]**
10/10 . . . Immobilising of electrolyte **[2]**
10/12 . . Construction or manufacture **[2]**
10/14 . . . Assembling a group of electrodes or separators **[2]**
10/16 . . . Suspending or supporting electrodes or groups of electrodes in the case **[2]**
10/18 . . with bipolar electrodes **[2]**
10/20 . Semi-lead accumulators, i.e. accumulators in which only one electrode contains lead **[2]**
10/22 . . Selection of materials as electrolytes **[2]**
10/24 . Alkaline accumulators **[2]**
10/26 . . Selection of materials as electrolytes **[2]**
10/28 . . Construction or manufacture **[2]**
10/30 . . Nickel accumulators (H01M 10/34 takes precedence) **[2]**
10/32 . . Silver accumulators (H01M 10/34 takes precedence) **[2]**
10/34 . Gastight accumulators **[2]**
10/36 . Accumulators not provided for in groups H01M 10/05 to H01M 10/34 **[2,2010.01]**
10/38 . . Construction or manufacture **[2]**

10/39 . . working at high temperature **[2]**
10/42 . Methods or arrangements for servicing or maintenance of secondary cells or secondary half-cells **[2]**
10/44 . . Methods for charging or discharging (circuits for charging H02J 7/00) **[2]**
10/46 . . Accumulators structurally combined with charging apparatus (circuits for charging H02J 7/00) **[2]**
10/48 . . Accumulators combined with arrangements for measuring, testing, or indicating condition, e.g. level or density of the electrolyte (indicating or measuring level of liquid in general G01F 23/00; measuring density G01N, e.g. G01N 9/00; measuring electric variables G01R) **[2]**
10/50 . . Heating or cooling or regulating temperature (control of temperature in general G05D 23/00) **[2]**
10/52 . . Removing gases inside the secondary cell, e.g. by absorption (vent plugs or other mechanical arrangements for facilitating escape of gases H01M 2/12) **[2]**
10/54 . Reclaiming serviceable parts of waste accumulators **[2]**

12/00 Hybrid cells; **Manufacture thereof [2]**

Note

In this group, hybrid cells are electrochemical generators having two different types of half-cells, the half-cell being an electrode-electrolyte combination of either a primary, a secondary, or a fuel cell. **[2]**

12/02 . Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2]**
12/04 . composed of a half-cell of the fuel-cell type and of a half-cell of the primary-cell type (methods or arrangements for servicing or maintenance H01M 6/50) **[2]**
12/06 . . with one metallic and one gaseous electrode **[2]**
12/08 . composed of a half-cell of a fuel-cell type and a half-cell of the secondary-cell type (methods or arrangements for servicing or maintenance, e.g. for charging, H01M 10/42) **[2]**

14/00 Electrochemical current or voltage generators not provided for in groups H01M 6/00 to H01M 12/00; **Manufacture thereof [2]**

16/00 Structural combinations of different types of electrochemical generators [2]

H01P WAVEGUIDES; **RESONATORS, LINES OR OTHER DEVICES OF THE WAVEGUIDE TYPE** (operating at optical frequencies G02B)

Note

In this subclass, the following expression is used with the meaning indicated:
– "waveguide type" as applied to transmission lines includes only high-frequency coaxial cables or Lecher lines, and as applied to resonators, delay lines, or other devices includes all devices having distributed inductance and capacitance.

Subclass index

1/00 Auxiliary devices (coupling devices of the waveguide type H01P 5/00)
1/02 . Bends; Corners; Twists
1/04 . Fixed joints
1/06 . Movable joints, e.g. rotating joints
1/08 . Dielectric windows
1/10 . for switching or interrupting
1/11 . . by ferromagnetic devices **[3]**
1/12 . . by mechanical chopper
1/14 . . by electric discharge devices (discharge devices H01J 17/64)
1/15 . . by semiconductor devices **[2]**
1/16 . for mode selection, e.g. mode suppression or mode promotion; for mode conversion **[3]**
1/161 . . sustaining two independent orthogonal modes, e.g. orthomode transducer **[3]**
1/162 . . absorbing spurious or unwanted modes of propagation **[3]**
1/163 . . specifically adapted for selection or promotion of the TE_{01} circular-electric mode **[3]**
1/165 . for rotating the plane of polarisation **[2]**
1/17 . . for producing a continuously rotating polarisation, e.g. circular polarisation **[2]**
1/175 . . using Faraday rotators **[3]**
1/18 . Phase-shifters (H01P 1/165 takes precedence) **[2]**
1/185 . . using a diode or a gas filled discharge tube **[3]**
1/19 . . using a ferromagnetic device **[3]**
1/195 . . . having a toroidal shape **[3]**
1/20 . Frequency-selective devices, e.g. filters
1/201 . . Filters for transverse electromagnetic waves (H01P 1/212, H01P 1/213, H01P 1/215, H01P 1/219 take precedence) **[3]**
1/202 . . . Coaxial filters (cascaded coaxial cavities H01P 1/205) **[3]**
1/203 . . . Strip line filters **[3]**
1/205 . . . Comb or interdigital filters; Cascaded coaxial cavities (H01P 1/203 takes precedence) **[3]**

1/207 . . Hollow waveguide filters (H01P 1/212, H01P 1/213, H01P 1/215, H01P 1/219 take precedence) **[3]**
1/208 . . . Cascaded cavities; Cascaded resonators inside a hollow waveguide structure (H01P 1/205 takes precedence) **[3]**
1/209 . . . comprising one or more branching arms or cavities wholly outside the main waveguide **[3]**
1/211 . . . Waffle-iron filters; Corrugated structures **[3]**
1/212 . . suppressing or attenuating harmonic frequencies (H01P 1/215 takes precedence) **[3]**
1/213 . . combining or separating two or more different frequencies (H01P 1/215 takes precedence) **[3]**
1/215 . . using ferromagnetic material **[3]**
1/217 . . . the ferromagnetic material acting as a tuning element in resonators **[3]**
1/218 . . . the ferromagnetic material acting as a frequency selective coupling element, e.g. YIG-filters **[3]**
1/219 . . Evanescent mode filters **[3]**
1/22 . Attenuating devices (dissipative terminating devices H01P 1/26)
1/23 . . using ferromagnetic material **[3]**
1/24 . Terminating devices
1/26 . . Dissipative terminations
1/28 . . Short-circuiting plungers
1/30 . for compensation of, or protection against, temperature or moisture effects
1/32 . Non-reciprocal transmission devices (H01P 1/02 to H01P 1/30 take precedence) **[3]**
1/36 . . Isolators **[2,3]**
1/365 . . . Resonance absorption isolators **[3]**
1/37 . . . Field displacement isolators **[3]**
1/375 . . . using Faraday rotators **[3]**
1/38 . . Circulators **[2,3]**
1/383 . . . Junction circulators, e.g. Y-circulators **[3]**
1/387 . . . . Strip line circulators **[3]**
1/39 . . . . Hollow waveguide circulators **[3]**
1/393 . . . using Faraday rotators **[3]**
1/397 . . . using non-reciprocal phase shifters (H01P 1/393 takes precedence) **[3]**

3/00 Waveguides; Transmission lines of the waveguide type

3/02 . with two longitudinal conductors
3/04 . . Lines formed as Lecher wire pairs
3/06 . . Coaxial lines
3/08 . . Microstrips; Strip lines
3/10 . Wire waveguides, i.e. with a single solid longitudinal conductor
3/12 . Hollow waveguides (H01P 3/20 takes precedence)
3/123 . . with a complex or stepped cross-section, e.g. ridged or grooved waveguides (H01P 3/14 takes precedence) **[3]**
3/127 . . with a circular, elliptic, or parabolic cross-section **[3]**
3/13 . . specially adapted for transmission of the TE_{01} circular-electric mode **[2]**
3/14 . . flexible
3/16 . Dielectric waveguides, i.e. without a longitudinal conductor
3/18 . built-up from several layers to increase operating surface, i.e. alternately conductive and dielectric layers
3/20 . Quasi-optical arrangements for guiding a wave, e.g. focusing by dielectric lenses

5/00 Coupling devices of the waveguide type

5/02 . with invariable factor of coupling (H01P 5/12 takes precedence) **[3]**
5/04 . with variable factor of coupling
5/08 . for linking lines or devices of different kinds (H01P 1/16, H01P 5/04 take precedence; linking lines of the same kind but with different dimensions H01P 5/02) **[3]**
5/10 . . for coupling balanced with unbalanced lines or devices
5/103 . . . Hollow-waveguide/coaxial-line transitions **[3]**
5/107 . . . Hollow-waveguide/strip-line transitions **[3]**
5/12 . Coupling devices having more than two ports (H01P 5/04 takes precedence) **[3]**
5/16 . . Conjugate devices, i.e. devices having at least one port decoupled from one other port **[2]**
5/18 . . . consisting of two coupled guides, e.g. directional couplers **[2]**
5/19 . . . of the junction type **[3]**
5/20 . . . . Magic-T junctions **[2,3]**
5/22 . . . . Hybrid ring junctions **[2,3]**

7/00 Resonators of the waveguide type

7/02 . Lecher resonators
7/04 . Coaxial resonators
7/06 . Cavity resonators
7/08 . Strip line resonators **[3]**
7/10 . Dielectric resonators **[3]**

9/00 Delay lines of the waveguide type

9/02 . Helical lines
9/04 . Interdigital lines

11/00 Apparatus or processes specially adapted for manufacturing waveguides or resonators, lines, or other devices of the waveguide type

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H01Q AERIALS (microwave radiators for near-field therapeutic treatment A61N 5/04; apparatus for testing aerials or for measuring aerial characteristics G01R; waveguides H01P; radiators or aerials for microwave heating H05B 6/72)

(1) This subclass covers:
– in addition to the primary active radiating elements,
(i) secondary devices for absorbing or for modifying the direction or polarisation of waves radiated from aerials, and
(ii) combinations with auxiliary devices such as earthing switches, lead-in devices, and lightning protectors;
– both transmitting and receiving aerials. **[3]**

(2) This subclass does not cover devices of the waveguide type, such as resonators or lines, not designed as radiating elements, which are covered by subclass H01P.

(3) In this subclass, the following expression is used with the meaning indicated:
– "active radiating element" covers corresponding parts of a receiving aerial. **[3]**

Subclass index

1/00 Details of, or arrangements associated with, aerials (arrangements for varying orientation of directional pattern H01Q 3/00)

(1) This group covers only:
– structural details or features of aerials not dependent on electric operation;
– structural details or features applicable to more than one type of aerial or aerial element.

(2) Structural details or features described with reference to, or clearly applicable only to, aerials or aerial elements of a particular type are classified in the group appropriate to that type.

1/02 . Arrangements for de-icing; Arrangements for drying-out

1/04 . Adaptation for subterranean or subaqueous use

1/06 . Means for the lighting or illuminating of aerials, e.g. for purpose of warning

1/08 . Means for collapsing aerials or parts thereof (collapsible loop aerials H01Q 7/02; collapsible H-aerials or Yagi aerials H01Q 19/04)

1/10 . . Telescopic elements

1/12 . Supports; Mounting means (supporting conductors in general H02G 7/00)

1/14 . . for wire or other non-rigid radiating elements

1/16 . . . Strainers, spreaders, or spacers

1/18 . . Means for stabilising aerials on an unstable platform

1/20 . . Resilient mountings

1/22 . . by structural association with other equipment or articles

1/24 . . . with receiving set

1/26 . . . with electric discharge tube

1/27 . Adaptation for use in or on movable bodies (H01Q 1/08, H01Q 1/12, H01Q 1/18 take precedence) **[3]**

1/28 . . Adaptation for use in or on aircraft, missiles, satellites, or balloons **[3]**

1/30 . . . Means for trailing aerials **[3]**

1/32 . . Adaptation for use in or on road or rail vehicles (telescopic elements H01Q 1/10; resilient mountings for aerials H01Q 1/20) **[3]**

1/34 . . Adaptation for use in or on ships, submarines, buoys, or torpedoes (for subaqueous use H01Q 1/04; retractable loop aerials H01Q 7/02) **[3]**

1/36 . Structural form of radiating elements, e.g. cone, spiral, umbrella (H01Q 1/08, H01Q 1/14 take precedence)

1/38 . . formed by a conductive layer on an insulating support (conductors in general H01B 5/14)

1/40 . Radiating elements coated with, or embedded in, protective material

1/42 . Housings not intimately mechanically associated with radiating elements, e.g. radome

1/44 . using equipment having another main function to serve additionally as an aerial (H01Q 1/28 to H01Q 1/34 take precedence)

1/46 . . Electric supply lines or communication lines

1/48 . Earthing means; Earth screens; Counterpoises (earthing pins H01R 4/66)

1/50 . Structural association of aerials with earthing switches, lead-in devices, or lightning protectors (lead-in devices H01B; lightning protectors, switches H01H)

1/52 . Means for reducing coupling between aerials; Means for reducing coupling between an aerial and another structure (absorbing means H01Q 17/00)

3/00 Arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system

3/01 . varying the shape of the aerial or aerial system **[3]**

3/02 . using mechanical movement of aerial or aerial system as a whole

3/04 . . for varying one co-ordinate of the orientation

3/06 . . . over a restricted angle

3/08 . . for varying two co-ordinates of the orientation

3/10 . . . to produce a conical or spiral scan

3/12 . using mechanical relative movement between primary active elements and secondary devices of aerials or aerial systems

3/14 . . for varying the relative position of primary active element and a refracting or diffracting device

3/16 . . for varying relative position of primary active element and a reflecting device

3/18 . . . wherein the primary active element is movable and the reflecting device is fixed

3/20 . . . wherein the primary active element is fixed and the reflecting device is movable

3/22 . varying the orientation in accordance with variation of frequency of radiated wave

3/24 . varying the orientation by switching energy from one active radiating element to another, e.g. for beam switching

3/26 . varying the relative phase or relative amplitude of energisation between two or more active radiating elements; varying the distribution of energy across a radiating aperture (H01Q 3/22, H01Q 3/24 take precedence)
3/28 . . varying the amplitude **[3]**
3/30 . . varying the phase **[3]**
3/32 . . . by mechanical means **[3]**
3/34 . . . by electrical means (active lenses or reflecting arrays H01Q 3/46) **[3]**
3/36 . . . . with variable phase-shifters **[3]**
3/38 . . . . . the phase-shifters being digital **[3]**
3/40 . . . . with phasing matrix **[3]**
3/42 . . . . using frequency-mixing **[3]**
3/44 . varying the electric or magnetic characteristics of reflecting, refracting, or diffracting devices associated with the radiating element **[3]**
3/46 . . Active lenses or reflecting arrays **[3]**

5/00 Arrangements for simultaneous operation of aerials on two or more different wavebands (length of elements adjustable H01Q 9/14; combinations of separate active aerial units operating in different wavebands and connected to a common feeder system H01Q 21/30) **[3]**
5/01 . Resonant aerials **[3]**
5/02 . . for operation of centre-fed aerials which comprise a single, or two or more collinear, substantially straight elongated active elements **[3]**

7/00 Loop aerials with a substantially uniform current distribution around the loop and having a directional radiation pattern in a plane perpendicular to the plane of the loop
7/02 . Collapsible aerials; Retractable aerials
7/04 . Screened aerials (H01Q 7/02, H01Q 7/06 take precedence)
7/06 . with core of ferromagnetic material (H01Q 7/02 takes precedence)
7/08 . . Ferrite rod or like elongated core

9/00 Electrically-short aerials having dimensions not more than twice the operating wavelength and consisting of conductive active radiating elements (loop aerials H01Q 7/00; waveguide horns or mouths H01Q 13/00; slot aerials H01Q 13/00; combinations of active elements with secondary devices to give desired directional characteristic H01Q 19/00; combinations of two or more active elements H01Q 21/00)
9/02 . Non-resonant aerials
9/04 . Resonant aerials
9/06 . . Details
9/08 . . . Junction boxes specially adapted for supporting adjacent ends of collinear rigid elements
9/10 . . . Junction boxes specially adapted for supporting adjacent ends of divergent elements
9/12 . . . . adapted for adjustment of angle between elements
9/14 . . . Length of element or elements adjustable (telescopic elements H01Q 1/10)
9/16 . . with feed intermediate between the extremities of the aerial, e.g. centre-fed dipole (H01Q 9/44 takes precedence)
9/18 . . . Vertical disposition of the aerial
9/20 . . . Two collinear substantially straight active elements; Substantially straight single active elements (H01Q 9/28 takes precedence)
9/22 . . . . Rigid rod or equivalent tubular element or elements
9/24 . . . . Shunt feed arrangements to single active elements, e.g. for delta matching
9/26 . . . with folded element or elements, the folded parts being spaced apart a small fraction of operating wavelength (resonant loop aerials H01Q 7/00)
9/27 . . . . Spiral aerials **[3]**
9/28 . . . Conical, cylindrical, cage, strip, gauze, or like elements having an extended radiating surface; Elements comprising two conical surfaces having collinear axes and adjacent apices and fed by two-conductor transmission lines (biconical horns H01Q 13/04)
9/30 . . with feed to end of elongated active element, e.g. unipole (H01Q 9/44 takes precedence)
9/32 . . . Vertical arrangement of element (H01Q 9/40 takes precedence)
9/34 . . . . Mast, tower, or like self-supporting or stay-supported aerials
9/36 . . . . with top loading
9/38 . . . . with counterpoise (with counterpoise comprising elongated elements coplanar with the active element H01Q 9/44)
9/40 . . . Element having extended radiating surface
9/42 . . . with folded element, the folded parts being spaced apart a small fraction of the operating wavelength
9/43 . . . . Scimitar aerials **[3]**
9/44 . . with plurality of divergent straight elements, e.g. V-dipole, X-aerial; with plurality of elements having mutually inclined substantially straight portions (turnstile aerials H01Q 21/26)
9/46 . . . with rigid elements diverging from single point

11/00 Electrically-long aerials having dimensions more than twice the shortest operating wavelength and consisting of conductive active radiating elements (leaky-waveguide aerials, slot aerials H01Q 13/00; combinations of active elements with secondary devices to give desired directional characteristic H01Q 19/00; aerial arrays or systems H01Q 21/00)
11/02 . Non-resonant aerials, e.g. travelling-wave aerial
11/04 . . with parts bent, folded, shaped, screened, or electrically loaded to obtain desired phase relation of radiation from selected sections of the aerial (rhombic aerials, V-aerials H01Q 11/06)
11/06 . . Rhombic aerials; V-aerials
11/08 . . Helical aerials
11/10 . . Log-periodic aerials (H01Q 11/08 takes precedence) **[3]**
11/12 . Resonant aerials
11/14 . . with parts bent, folded, shaped, or screened, or with phasing impedances, to obtain desired phase relation of radiation from selected sections of the aerial or to obtain desired polarisation effects
11/16 . . . in which the selected sections are collinear
11/18 . . . in which the selected sections are parallelly spaced **[3]**
11/20 . . V-aerials

13/00 Waveguide horns or mouths; **Slot aerials**; **Leaky-waveguide aerials**; **Equivalent structures causing radiation along the transmission path of a guided wave** (multimode aerials H01Q 25/04)
13/02 . Waveguide horns

13/04 . . Biconical horns (biconical dipoles comprising two conical surfaces having collinear axes and adjacent apices and fed by a two-conductor transmission line H01Q 9/28)
13/06 . Waveguide mouths (horns H01Q 13/02)
13/08 . Radiating ends of two-conductor microwave transmission lines, e.g. of coaxial lines, of microstrip lines
13/10 . Resonant slot aerials
13/12 . . Longitudinally slotted cylinder aerials; Equivalent structures
13/14 . . . Skeleton cylinder aerials
13/16 . . Folded slot aerials
13/18 . . the slot being backed by, or formed in boundary wall of, a resonant cavity (longitudinally slotted cylinder H01Q 13/12)
13/20 . Non-resonant leaky-waveguide or transmission-line aerials; Equivalent structures causing radiation along the transmission path of a guided wave
13/22 . . Longitudinal slot in boundary wall of waveguide or transmission line
13/24 . . constituted by a dielectric or ferromagnetic rod or pipe (H01Q 13/28 takes precedence)
13/26 . . Surface waveguide constituted by a single conductor, e.g. strip conductor
13/28 . . comprising elements constituting electric discontinuities and spaced in direction of wave propagation, e.g. dielectric elements, conductive elements forming artificial dielectric (Yagi aerials H01Q 19/30)

15/00 Devices for reflection, refraction, diffraction, or polarisation of waves radiated from an aerial, e.g. quasi-optical devices (variable for purpose of altering directivity H01Q 3/00; arrangements of such devices for guiding waves H01P 3/20; variable for purpose of modulation H03C 7/02)

15/02 . Refracting or diffracting devices, e.g. lens, prism
15/04 . . comprising wave-guiding channel or channels bounded by effective conductive surfaces substantially perpendicular to the electric vector of the wave, e.g. parallel-plate waveguide lens
15/06 . . comprising plurality of wave-guiding channels of different length
15/08 . . formed of solid dielectric material
15/10 . . comprising three-dimensional array of impedance discontinuities, e.g. holes in conductive surfaces or conductive discs forming artificial dielectric (leaky-waveguide aerials H01Q 13/28)
15/12 . . functioning also as polarisation filter
15/14 . Reflecting surfaces; Equivalent structures
15/16 . . curved in two dimensions, e.g. paraboloidal
15/18 . . comprising plurality of mutually inclined plane surfaces, e.g. corner reflector
15/20 . . . Collapsible reflectors
15/22 . . functioning also as polarisation filter
15/23 . Combinations of reflecting surfaces with refracting or diffracting devices **[3]**
15/24 . Polarising devices; Polarisation filters (devices functioning simultaneously both as polarisation filters and as refracting or diffracting devices or as reflectors H01Q 15/12, H01Q 15/22)

17/00 Devices for absorbing waves radiated from an aerial; Combinations of such devices with active aerial elements or systems

19/00 Combinations of primary active aerial elements and units with secondary devices, e.g. with quasi-optical devices, for giving the aerial a desired directional characteristic

19/02 . Details
19/04 . . Means for collapsing H-aerials or Yagi aerials
19/06 . using refracting or diffracting devices, e.g. lens
19/08 . . for modifying the radiation pattern of a radiating horn in which it is located
19/09 . . wherein the primary active element is coated with or embedded in a dielectric or magnetic material (protective material H01Q 1/40; with variable characteristics H01Q 3/44) **[3]**
19/10 . using reflecting surfaces
19/12 . . wherein the surfaces are concave (H01Q 19/18 takes precedence) **[3]**
19/13 . . . the primary radiating source being a single radiating element, e.g. a dipole, a slot, a waveguide termination (H01Q 19/15 takes precedence) **[3]**
19/15 . . . the primary radiating source being a line source, e.g. leaky waveguide aerials **[3]**
19/17 . . . the primary radiating source comprising two or more radiating elements (H01Q 19/15, H01Q 25/00 take precedence) **[3]**
19/18 . . having two or more spaced reflecting surfaces (producing pencil beam by two cylindrical reflectors with their focal lines orthogonally disposed H01Q 19/20)
19/185 . . . wherein the surfaces are plane **[3]**
19/19 . . . comprising one main concave reflecting surface associated with an auxiliary reflecting surface **[3]**
19/195 . . . . wherein a reflecting surface acts also as a polarisation filter or a polarising device **[3]**
19/20 . Producing pencil beam by two cylindrical focusing devices with their focal lines orthogonally disposed
19/22 . using a secondary device in the form of a single substantially straight conductive element
19/24 . . the primary active element being centre-fed and substantially straight, e.g. H-aerial
19/26 . . the primary active element being end-fed and elongated
19/28 . using a secondary device in the form of two or more substantially straight conductive elements (log-periodic aerials H01Q 11/10; constituting a reflecting surface H01Q 19/10)
19/30 . . the primary active element being centre-fed and substantially straight, e.g. Yagi aerial
19/32 . . the primary active element being end-fed and elongated

21/00 Aerial arrays or systems (producing a beam the orientation or the shape of the directional pattern of which can be changed or varied H01Q 3/00; electrically-long aerials H01Q 11/00)

21/06 . Arrays of individually energised aerial units similarly polarised and spaced apart
21/08 . . the units being spaced along, or adjacent to, a rectilinear path
21/10 . . . Collinear arrangements of substantially straight elongated conductive units
21/12 . . . Parallel arrangements of substantially straight elongated conductive units (travelling-wave aerials comprising transmission line loaded with transverse elements, e.g. "fishbone" aerial, H01Q 11/04)
21/14 . . . . Adcock aerials

21/16 . . . . . U-type
21/18 . . . . . H-type
21/20 . . the units being spaced along, or adjacent to, a curvilinear path
21/22 . . Aerial units of the array energised non-uniformly in amplitude or phase, e.g. tapered array, binomial array
21/24 . Combinations of aerial units polarised in different directions for transmitting or receiving circularly and elliptically polarised waves or waves linearly polarised in any direction
21/26 . . Turnstile or like aerials comprising arrangements of three or more elongated elements disposed radially and symmetrically in a horizontal plane about a common centre
21/28 . Combinations of substantially independent non-interacting aerial units or systems
21/29 . Combinations of different interacting aerial units for giving a desired directional characteristic (H01Q 25/00 takes precedence) **[3]**
21/30 . Combinations of separate aerial units operating in different wavebands and connected to a common feeder system

23/00 Aerials with active circuits or circuit elements integrated within them or attached to them [3]

(1) This group covers only such combinations in which the type of aerial or aerial element is immaterial. **[3]**
(2) Combinations with a particular type of aerial are classified in the group appropriate to that type. **[3]**

25/00 Aerials or aerial systems providing at least two radiating patterns (arrangements for changing or varying the orientation or the shape of the directional pattern H01Q 3/00) **[3]**
25/02 . providing sum and difference patterns (multimode aerials H01Q 25/04) **[3]**
25/04 . Multimode aerials **[3]**

H01R ELECTRICALLY-CONDUCTIVE CONNECTIONS; **STRUCTURAL ASSOCIATIONS OF A PLURALITY OF MUTUALLY-INSULATED ELECTRICAL CONNECTING ELEMENTS**; **COUPLING DEVICES**; **CURRENT COLLECTORS** (switches, fuses H01H; coupling devices of the waveguide type H01P 5/00; switching arrangements for the supply or distribution of electric power H02B; installations of electric cables or lines, or of combined optical and electric cables or lines, or of auxiliary apparatus H02G; printed means for providing electric connections to or between printed circuits H05K)

(1) This subclass covers:
– all kinds of contact-making disconnectable and non-disconnectable electric line connecting devices, coupling devices, lamp or similar holders or current collectors for all kinds of electric lines, cables or apparatus;
– non-printed means for electric connections to or between printed circuits.
(2) This subclass does not cover mounting of connections in or on specified apparatus. Such mounting is covered by the relevant subclass for such apparatus, e.g. mounting in junction or distribution boxes is covered by subclass H02B or H02G, high-temperature connections for heating elements is covered by group H05B 3/08. Structural association of one part of a coupling device with specific electric apparatus is classified with the apparatus, e.g. association of cap with incandescent lamp is covered by subclass H01K.
(3) In this subclass, the following expressions are used with the meaning indicated: **[7]**
– "pin" is a rigid or flexible conductor for engagement with an appropriately shaped socket to establish contact therewith; **[7]**
– "socket" is a rigid or flexible conductor for receiving an appropriate pin to establish electrical contact therewith; **[7]**
– "coupling devices" are devices having two or more parts specially adapted so as to be capable of ready and repeated physical engagement or disengagement, without the use of a tool, for the purpose of establishing or breaking an electrical path. Examples of such devices having more than two parts are: a) adapters for linking two coupling parts; and b) rails or bus-bars provided with a plurality of discrete connecting locations for counterparts. **[7]**
(4) General details are classified in groups H01R 4/00, H01R 9/00, H01R 11/00, H01R 12/00.

Subclass index

3/00 **Electrically-conductive connections not otherwise provided for**

3/08 . for making connection to a liquid (electrodes for batteries or accumulators H01M)

4/00 **Electrically-conductive connections between two or more conductive members in direct contact, i.e. touching one another**; **Means for effecting or maintaining such contact**; **Electrically-conductive connections having two or more spaced connecting locations for conductors and using contact members penetrating insulation** (details of contacts of coupling devices H01R 13/00; coupling devices H01R 12/70, H01R 24/00 to H01R 33/00; flexible or turnable line connectors H01R 35/00 non-rotary current collectors H01R 41/00) **[3]**

4/01 . Connections using shape memory materials, e.g. shape memory metal **[7]**

4/02 . Soldered or welded connections (H01R 4/62, H01R 12/59, H01R 12/65 take precedence) **[3,7]**

4/04 . using electrically conductive adhesives **[3]**

4/06 . Riveted connections (by explosion H01R 4/08) **[3]**

4/08 . effected by an explosion **[3]**

4/10 . effected solely by twisting, wrapping, bending, crimping, or other permanent deformation **[3]**

4/12 . . by twisting **[3]**

4/14 . . by wrapping **[3]**

4/16 . . by bending **[3]**

4/18 . . by crimping (H01R 4/01, H01R 4/24 take precedence) **[3,7]**

4/20 . . . using a crimping sleeve **[3]**

4/22 . End caps, i.e. caps of insulating or conductive material for covering or maintaining connections between wires entering the cap from the same end **[3]**

4/24 . Connections using needle-point, slotted-plate, or analogous contact members penetrating insulation or cable strands **[3]**

4/26 . Connections in which at least one of the connecting parts has projections which bite into or engage the other connecting part in order to improve the contact (using shape memory materials H01R 4/01) **[3]**

4/28 . Clamped connections; Spring connections (made by means of terminals specially adapted for contact with, or insertion into, printed circuits H01R 12/00) **[3,7]**

4/30 . . using a screw or nut clamping member (H01R 4/50 takes precedence; using a clamping member acted on by screw or nut H01R 4/38) **[3]**

4/32 . . . Conductive members located in slot or hole in screw **[3]**

4/34 . . . Conductive members located under head of screw **[3]**

4/36 . . . Conductive members located under tip of screw **[3]**

4/38 . . using a clamping member acted on by screw or nut (H01R 4/50 takes precedence) **[3]**

4/40 . . . Pivotable clamping member **[3]**

4/42 . . . Clamping area to one side of screw only **[3]**

4/44 . . . Clamping areas on both sides of screw **[3]**

4/46 . . . Clamping area between two screws placed side by side **[3]**

4/48 . . using a spring, clip or other resilient member (H01R 4/52 takes precedence) **[3]**

4/50 . . using a cam, wedge, cone or ball **[3]**

4/52 . . . which is spring loaded **[3]**

4/56 . one conductor screwing into another **[3]**

4/58 . characterised by the form or material of the contacting members (H01R 4/01 takes precedence) **[3,7]**

4/60 . . Connections between or with tubular conductors (H01R 4/56 takes precedence) **[3]**

4/62 . . Connections between conductors of different materials; Connections between or with aluminium or steel-core aluminium conductors (H01R 4/68 takes precedence) **[3]**

4/64 . . Connections between or with conductive parts having primarily a non-electric function, e.g. frame, casing, rail **[3]**

4/66 . . Connections with the terrestrial mass, e.g. earth plate, earth pin **[3]**

4/68 . . Connections to or between superconductive conductors **[3]**

4/70 . Insulation of connections (end caps H01R 4/22) **[3]**

4/72 . . using a heat shrinking insulating sleeve **[4]**

9/00 **Structural associations of a plurality of mutually-insulated electrical connecting elements, e.g. terminal strips, terminal blocks**; **Terminals or binding posts mounted upon a base or in a case**; **Bases therefor** (details of direct connections or connections using contact members penetrating insulation H01R 4/00; specially adapted for printed circuits, flat or ribbon cables, or like generally planar structures H01R 12/00; coupling devices H01R 12/70, H01R 24/00 to H01R 33/00; flexible or turnable line connectors H01R 35/00) **[3]**

9/03 . Connectors arranged to contact a plurality of the conductors of a multiconductor cable **[3]**

9/05 . . for coaxial cables **[3]**

9/053 . . . using contact members penetrating insulation **[7]**

9/11 . End pieces for multiconductor cables supported by the cable and for facilitating connections to other conductive members **[3]**

9/15 . Connectors for wire wrapping **[3]**

9/16 . Fastening of connecting parts to base or case; Insulating connecting parts from base or case (lead-through insulators H01B 17/26) **[3]**

9/18 . . Fastening by means of screw or nut **[3]**

9/20 . . Fastening by means of rivet or eyelet **[3]**

9/22 . Bases, e.g. strip, block, panel **[3]**

9/24 . . Terminal blocks **[3]**

9/26 . . . Clip-on terminal blocks for side-by-side rail or strip-mounting **[3]**

9/28 . . Terminal boards **[3]**

11/00 **Individual connecting elements providing two or more spaced connecting locations for conductive members which are, or may be, thereby interconnected, e.g. end pieces for wires or cables supported by the wire or cable and having means for facilitating electrical connection to some other wire, terminal, or conductive member, blocks of binding posts** (connections between members in direct contact H01R 4/00; structural associations of a plurality of mutually-insulated electrical connecting elements H01R 9/00; coupling devices H01R 12/70, H01R 24/00 to H01R 29/00, H01R 33/00; flexible or turnable line connectors H01R 35/00) **[3]**

11/01 . characterised by the form or arrangement of the conductive interconnection between their connecting locations **[3]**

11/03 . characterised by the type of the connecting locations on the individual element or by the type of the connections between the connecting locations and the conductive members (H01R 11/11 takes precedence) **[3]**

11/05 . . the connecting locations having different types of direct connections **[3]**

11/07 . . the connecting locations being of the same type but different sizes **[3]**

11/09 . . the connecting locations being identical **[3]**

11/11 . End pieces or tapping pieces for wires or cables, supported by the wire or cable and having means for facilitating electrical connection to some other wire, terminal, or conductive member (H01R 11/01 takes precedence) **[3]**

11/12 . . End pieces terminating in an eye, hook, or fork **[3]**

11/14 . . . the hook being adapted for hanging on overhead or other suspended lines, e.g. hot line clamp **[3]**

11/15 . . . . Hook in the form of a screw clamp **[3]**

11/16 . . End pieces terminating in a soldering tip or socket **[3]**

11/18 . . End pieces terminating in a probe **[3]**

11/20 . . End pieces terminating in a needle point or analogous contact for penetrating insulation or cable strands **[3]**

11/22 . . End pieces terminating in a spring clip **[3]**

11/24 . . . with gripping jaws, e.g. crocodile clip **[3]**

11/26 . . End pieces terminating in a screw clamp, screw or nut **[3]**

11/28 . . End pieces consisting of a ferrule or sleeve **[3]**

11/30 . . End pieces held in contact by a magnet **[3]**

11/32 . . End pieces with two or more terminations **[3]**

12/00 **Structural associations of a plurality of mutually-insulated electrical connecting elements, specially adapted for printed circuits, e.g. printed circuit boards (PCBs), flat or ribbon cables, or like generally planar structures, e.g. terminal strips, terminal blocks**; **Coupling devices specially adapted for printed circuits, flat or ribbon cables, or like generally planar structures**; **Terminals specially adapted for contact with, or insertion into, printed circuits, flat or ribbon cables, or like generally planar structures** (printed connections to, or between, printed circuits H05K 1/11) **[7]**

12/50 . *Fixed connections* **[2011.01]**

12/51 . . *for rigid printed circuits or like structures* **[2011.01]**

12/52 . . . *connecting to other rigid printed circuits or like structures* **[2011.01]**

12/53 . . . *connecting to cables except for flat or ribbon cables* **[2011.01]**

12/55 . . . *characterised by the terminals* **[2011.01]**

12/57 . . . . *surface mounting terminals* **[2011.01]**

12/58 . . . . *terminals for insertion into holes* **[2011.01]**

12/59 . . *for flexible printed circuits, flat or ribbon cables or like structures* **[2011.01]**

12/61 . . . *connecting to flexible printed circuits, flat or ribbon cables or like structures* **[2011.01]**

12/62 . . . *connecting to rigid printed circuits or like structures* **[2011.01]**

12/63 . . . *connecting to another shape cable* **[2011.01]**

12/65 . . . *characterised by the terminal* **[2011.01]**

12/67 . . . . *insulation penetrating terminals* **[2011.01]**

12/68 . . . . . *comprising deformable portions* **[2011.01]**

12/69 . . . . *deformable terminals e.g. crimping terminals* **[2011.01]**

12/70 . *Coupling devices* **[2011.01]**

12/71 . . *for rigid printing circuits or like structures* **[2011.01]**

12/72 . . . *coupling with the edge of the rigid printed circuits or like structures* **[2011.01]**

12/73 . . . . *connecting to other rigid printed circuits or like structures* **[2011.01]**

12/75 . . . *connecting to cables except for flat or ribbon cables* **[2011.01]**

12/77 . . *for flexible printed circuits, flat or ribbon cables or like structures* **[2011.01]**

12/78 . . . *connecting to other flexible printed circuits, flat or ribbon cables or like structures* **[2011.01]**

12/79 . . . *connecting to rigid printed circuits or like structures* **[2011.01]**

12/81 . . . *connecting to another cable except for flat or ribbon cable* **[2011.01]**

12/82 . . *connected with low or zero insertion force* **[2011.01]**

12/83 . . . *connected with pivoting of printed circuits or like after insertion* **[2011.01]**

12/85 . . . *contact pressure producing means, contacts activated after insertion of printed circuits or like structures* **[2011.01]**

12/87 . . . . *acting automatically by insertion of rigid printed or like structures* **[2011.01]**

12/88 . . . . *acting manually by rotating or pivoting connector housing parts* **[2011.01]**

12/89 . . . . *acting manually by moving connector housing parts linearly e.g. slider* **[2011.01]**

12/91 . . *allowing relative movement between coupling parts e.g. floating or self aligning* **[2011.01]**

13/00 **Details of coupling devices of the kinds covered by groups H01R 12/70 or H01R 24/00 to H01R 33/00 [1,7]**

13/02 . Contact members

13/03 . . characterised by the material, e.g. plating or coating materials **[4]**

13/04 . . Pins or blades for co-operation with sockets

13/05 . . . Resilient pins or blades (carrying separate resilient parts H01R 13/15) **[3]**

13/08 . . . Resiliently-mounted rigid pins or blades

13/10 . . Sockets for co-operation with pins or blades

13/11 . . . Resilient sockets (carrying separate resilient parts H01R 13/15) **[3]**

13/115 . . . . U-shaped sockets having inwardly-bent legs **[3]**

13/14 . . . Resiliently-mounted rigid sockets
13/15 . . Pins, blades or sockets having separate spring member for producing or increasing contact pressure **[3]**
13/17 . . . the spring member being on the pin **[3]**
13/18 . . . with the spring member surrounding the socket
13/187 . . . the spring member being in the socket **[3]**
13/193 . . Means for increasing contact pressure at the end of engagement of coupling part **[3]**
13/20 . . Pins, blades, or sockets shaped, or provided with separate member, to retain co-operating parts together
13/207 . . . by screw-in connection **[3]**
13/213 . . . by bayonet connection **[3]**
13/22 . . Contacts for co-operating by abutting
13/24 . . . resilient; resiliently mounted
13/26 . . Pin or blade contacts for sliding co-operation on one side only
13/28 . . Contacts for sliding co-operation with identically-shaped contact, e.g. for hermaphroditic coupling devices
13/33 . . Contact members made of resilient wire **[3]**
13/35 . . for non-simultaneous co-operation with different types of contact member, e.g. socket co-operating with either round or flat pin **[3]**
13/40 . Securing contact members in or to a base or case; Insulating of contact members
13/405 . . Securing in non-demountable manner, e.g. moulding, riveting **[3]**
13/41 . . . by frictional grip in grommet, panel or base **[3]**
13/415 . . . by permanent deformation of contact member **[3]**
13/42 . . Securing in a demountable manner
13/422 . . . in resilient one-piece base or case; One-piece base or case formed with resilient locking means **[3]**
13/424 . . . in base or case composed of a plurality of insulating parts having at least one resilient insulating part **[3]**
13/426 . . . by separate resilient retaining piece supported by base or case, e.g. collar **[3]**
13/428 . . . by resilient locking means on the contact members; by locking means on resilient contact members **[3]**
13/432 . . . . by stamped-out resilient tongue snapping behind shoulder in base or case **[3]**
13/434 . . . . by separate resilient locking means on contact member, e.g. retainer collar or ring around contact member **[3]**
13/436 . . . Securing a plurality of contact members by one locking piece **[3]**
13/44 . Means for preventing access to live contacts
13/443 . . Dummy plugs **[7]**
13/447 . . Shutter or cover plate **[3]**
13/453 . . . Shutter or cover plate opened by engagement of counterpart **[3]**
13/46 . Bases; Cases
13/50 . . formed as an integral body (H01R 13/514 takes precedence) **[3]**
13/502 . . composed of different pieces (H01R 13/514 takes precedence) **[3]**
13/504 . . . different pieces being moulded, cemented, welded, e.g. ultrasonic, or swaged together **[3]**
13/506 . . . assembled by snap action of the parts **[3]**
13/508 . . . assembled by clip or spring **[3]**
13/512 . . . assembled by screw or screws **[3]**
13/514 . . formed as a modular block or assembly, i.e. composed of co-operating parts provided with contact members or holding contact members between them **[3]**
13/516 . . Means for holding or embracing insulating body, e.g. casing **[3]**
13/518 . . . for holding or embracing several coupling parts, e.g. frames **[3]**
13/52 . . Dustproof, splashproof, drip-proof, waterproof, or flameproof cases
13/523 . . . for use under water **[3]**
13/527 . . . Flameproof cases (H01R 13/70 takes precedence) **[3]**
13/53 . . Bases or cases for heavy duty; Bases or cases with means for preventing corona or arcing **[3]**
13/533 . . Bases or cases made for use in extreme conditions, e.g. high temperature, radiation, vibration, corrosive environment, pressure (H01R 13/52 takes precedence) **[3]**
13/56 . Means for preventing chafing or fracture of flexible leads at outlet from coupling part
13/58 . Means for relieving strain on wire connection, e.g. cord grip
13/585 . . Grip increasing with strain force **[3]**
13/59 . . Threaded ferrule or bolt operating in a direction parallel to the cable or wire **[3]**
13/595 . . Bolts operating in a direction transverse to the cable or wire **[3]**
13/60 . Means for supporting coupling part when not engaged
13/62 . Means for facilitating engagement or disengagement of coupling parts or for holding them in engagement **[3]**
13/621 . . Bolt, set screw or screw clamp **[3,5]**
13/622 . . Screw-ring or screw-casing (H01R 13/623 takes precedence) **[5]**
13/623 . . Casing or ring with helicoidal groove **[3,5]**
13/625 . . Casing or ring with bayonet engagement **[3,5]**
13/627 . . Snap-action fastening **[3]**
13/629 . . Additional means for facilitating engagement or disengagement of coupling parts, e.g. aligning or guiding means, levers, gas pressure **[3]**
13/631 . . . for engagement only **[3]**
13/633 . . . for disengagement only **[3]**
13/635 . . . . by mechanical pressure, e.g. spring force **[3]**
13/637 . . . . by fluid pressure, e.g. explosion **[3]**
13/639 . . Additional means for holding or locking coupling parts together after engagement **[3]**
13/64 . Means for preventing, inhibiting or avoiding incorrect coupling
13/641 . . by indicating incorrect coupling; by indicating correct or full engagement **[7]**
13/642 . . by position or shape of contact members **[3]**
13/645 . . by exchangeable elements on case or base **[3]**
13/646 . *specially adapted for high-frequency, e.g. structures providing an impedance match or phase match (non-coaxed protective earth or shield arrangements H01R 13/648 to H01R 13/6599; coaxed connectors specifically adapted for high frequency H01R 24/40 to H01R 24/56)* **[7,2011.01]**
13/6461 . . *Means for preventing cross-talk* **[2011.01]**
13/6463 . . . *using twisted pairs of wires* **[2011.01]**
13/6464 . . . *by adding capacitive elements* **[2011.01]**
13/6466 . . . . *on substrates, e.g. PCBs [Printed Circuit Boards]* **[2011.01]**
13/6467 . . . *by cross-over of signal conductors* **[2011.01]**

13/6469 . . . . *on substrates* **[2011.01]**
13/6471 . . . *by special arrangement of ground and signal conductors, e.g. GSGS [Ground-Signal-Ground-Signal]* **[2011.01]**
13/6473 . . *Impedance matching* **[2011.01]**
13/6474 . . . *by variation of conductive properties, e.g. by variation of dimensions* **[2011.01]**
13/6476 . . . . *by making an aperture, e.g. a hole* **[2011.01]**
13/6477 . . . *by variation of dielectric properties* **[2011.01]**
13/648 . Protective earth or shield arrangements on coupling devices (coaxially arranged shields H01R 24/38) **[3]**
13/652 . . with earth pin, blade or socket **[3]**
13/655 . . with earth brace **[3]**
13/658 . . *High frequency shielding arrangements, e.g. against EMI [Electro-Magnetic Interference] or EMP [Electro-Magnetic Pulse]* **[3,2011.01]**
13/6581 . . . *Shield structure* **[2011.01]**
13/6582 . . . . *with resilient means for engaging mating connector* **[2011.01]**
13/6583 . . . . . *with separate conductive resilient members between mating shield members* **[2011.01]**
13/6584 . . . . . . *formed by conductive elastomeric members, e.g. flat gaskets or O-rings* **[2011.01]**
13/6585 . . . . *Shielding material individually surrounding or interposed between mutually spaced contacts* **[2011.01]**
13/6586 . . . . . *for separating multiple connector modules* **[2011.01]**
13/6587 . . . . . . *for mounting on PCBs* **[2011.01]**
13/6588 . . . . . *with through openings for individual contacts* **[2011.01]**
13/6589 . . . . . *with wires separated by conductive housing parts* **[2011.01]**
13/659 . . . . *with plural ports for distinct connectors* **[2011.01]**
13/6591 . . . *Specific features or arrangements of connection of shield to conductive members* **[2011.01]**
13/6592 . . . . *the conductive member being a shielded cable* **[2011.01]**
13/6593 . . . . . *the shield being composed of different pieces* **[2011.01]**
13/6594 . . . . *the shield being mounted on a PCB and connected to conductive members* **[2011.01]**
13/6595 . . . . . *with separate members fixing the shield to the PCB* **[2011.01]**
13/6596 . . . . *the conductive member being a metal grounding panel* **[2011.01]**
13/6597 . . . . *the conductive member being a contact of the connector* **[2011.01]**
13/6598 . . . *Shield material* **[2011.01]**
13/6599 . . . . *Dielectric material made conductive, e.g. plastic material coated with metal* **[2011.01]**
13/66 . Structural association with built-in electrical component (coupling devices having concentrically or coaxially-arranged contacts H01R 24/38 to H01R 24/56)
13/68 . . *with built-in fuse* **[1,2011.01]**
13/684 . . . *the fuse being removable* **[2011.01]**
13/688 . . . . *with housing part adapted for accessing the fuse* **[2011.01]**
13/692 . . . . . *Turnable housing part* **[2011.01]**
13/696 . . . *the fuse being integral with the terminal, e.g. pin or socket* **[2011.01]**
13/70 . . with built-in switch
13/703 . . . operated by engagement or disengagement of coupling parts (H01R 13/71 takes precedence) **[3]**
13/707 . . . interlocked with contact members or counterpart **[3]**
13/71 . . . Contact members of coupling parts operating as switch **[3]**
13/713 . . . the switch being a safety switch **[3]**
13/717 . . with built-in light source **[3]**
13/719 . . *specially adapted for high frequency, e.g. with filters* **[4,2011.01]**
13/7193 . . . *with ferrite filters* **[2011.01]**
13/7195 . . . *with planar filters with openings for contacts* **[2011.01]**
13/7197 . . . *with filters integral with or fitted onto contacts, e.g. tubular filters* **[2011.01]**
13/72 . Means for accommodating flexible lead within the holder
13/73 . Means for mounting coupling parts to apparatus or structures, e.g. to a wall **[4]**
13/74 . . for mounting coupling parts in openings of a panel **[3]**

24/00 ***Two-part coupling devices, or either of their cooperating parts, characterised by their overall structure*** *(specially adapted for printed circuits, flat or ribbon cables, or like structures H01R 12/00; specially adapted for supporting apparatus H01R 33/00)* **[7,2011.01]**

Note

In this group, it is desirable to add the indexing codes of groups H01R 101/00 to H01R 107/00.

24/20 . *Coupling parts carrying sockets, clips or analogous contacts and secured only to wire or cable* **[2011.01]**
24/22 . . *with additional earth or shield contacts* **[2011.01]**
24/28 . *Coupling parts carrying pins, blades or analogous contacts and secured only to wire or cable* **[2011.01]**
24/30 . . *with additional earth or shield contacts* **[2011.01]**
24/38 . *having concentrically or coaxially arranged contacts* **[2011.01]**
24/40 . . *specially adapted for high frequency* **[2011.01]**
24/42 . . . *comprising impedance matching means or electrical components, e.g. filters or switches* **[2011.01]**
24/44 . . . . *comprising impedance matching means* **[2011.01]**
24/46 . . . . *comprising switches* **[2011.01]**
24/48 . . . . *comprising protection devices, e.g. overvoltage protection* **[2011.01]**
24/50 . . . *mounted on a PCB [Printed Circuit Board]* **[2011.01]**
24/52 . . . *mounted in or to a panel or structure* **[2011.01]**
24/54 . . . *Intermediate parts, e.g. adapters, splitters or elbows* **[2011.01]**
24/56 . . . *specially adapted for specific shapes of cables, e.g. corrugated cables, twisted pair cables, cables with two screens or hollow cables* **[2011.01]**
24/58 . *Contacts spaced along longitudinal axis of engagement* **[2011.01]**
24/60 . *Contacts spaced along planar side wall transverse to longitudinal axis of engagement* **[2011.01]**

24/62 . . *Sliding engagements with one side only, e.g. modular jack coupling devices* **[2011.01]**
24/64 . . . *for high frequency, e.g. RJ 45* **[2011.01]**
24/66 . *with pins, blades or analogous contacts and secured to apparatus or structure, e.g. to a wall* **[2011.01]**
24/68 . . *mounted on directly pluggable apparatus* **[2011.01]**
24/70 . . *with additional earth or shield contacts* **[2011.01]**
24/76 . *with sockets, clips or analogous contacts and secured to apparatus or structure, e.g. to a wall* **[2011.01]**
24/78 . . *with additional earth or shield contacts* **[2011.01]**
24/84 . *Hermaphroditic coupling devices* **[2011.01]**
24/86 . *Parallel contacts arranged about a common axis* **[2011.01]**

25/00 **Coupling parts adapted for simultaneous co-operation with two or more identical counterparts, e.g. for distributing energy to two or more circuits** (supported only by co-operation with a counterpart H01R 31/00; with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/88)
25/14 . Rails or bus-bars constructed so that the counterparts can be connected thereto at any point along their length (supporting elements for lighting devices, displaceable along guiding elements and making electrical contact with conductors running along the guiding elements F21V 21/35; installations of bus-bars H02G 5/00) **[3]**
25/16 . Rails or bus-bars provided with a plurality of discrete connecting locations for counterparts (installations of bus-bars H02G 5/00) **[3]**

27/00 **Coupling parts adapted for co-operation with two or more dissimilar counterparts** (supported only by co-operation with a counterpart H01R 31/00; with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/90)
27/02 . for simultaneous co-operation with two or more counterparts

29/00 **Coupling parts for selective co-operation with a counterpart in different ways to establish different circuits, e.g. for voltage selection, for series/parallel selection**

31/00 **Coupling parts supported only by co-operation with counterpart**
31/02 . Intermediate parts for distributing energy to two or more circuits in parallel, e.g. splitter (for linking two coupling parts H01R 31/06; with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/92)
31/06 . Intermediate parts for linking two coupling parts, e.g. adapter (with a holder adapted for supporting apparatus to which its counterpart is attached H01R 33/94) **[4]**
31/08 . Short-circuiting members for bridging contacts in a counterpart (insulating members inserted between normally-closed contacts H01H 27/04)

33/00 **Coupling devices specially adapted for supporting apparatus and having one part acting as a holder providing support and electrical connection via a counterpart which is structurally associated with the apparatus, e.g. lamp holders**; **Separate parts thereof** (structural association of counterpart with specific apparatus, see the relevant subclass for the apparatus)
33/02 . Single-pole devices, e.g. holder for supporting one end of a tubular incandescent or neon lamp
33/05 . Two-pole devices **[4]**
33/06 . . with two current-carrying pins, blades, or analogous contacts, having their axes parallel to each other **[4]**
33/08 . . . for supporting tubular fluorescent lamp **[4]**
33/09 . . . for baseless lamp bulb **[4]**
33/18 . . having only abutting contacts
33/20 . . having concentrically or coaxially arranged contacts
33/22 . . for screw type base, e.g. for lamp **[4]**
33/46 . . for bayonet type base **[4]**
33/72 . Three-pole devices
33/74 . Devices having four or more poles
33/76 . . Holders with sockets, clips or analogous contacts, adapted for axially-sliding engagement with parallely-arranged pins, blades, or analogous contacts on counterpart, e.g. electronic tube socket
33/88 . adapted for simultaneous co-operation with two or more identical counterparts
33/90 . adapted for co-operation with two or more dissimilar counterparts
33/92 . Holders formed as intermediate parts for distributing energy in parallel through two or more counterparts at least one of which is attached to apparatus to be held
33/94 . Holders formed as intermediate parts for linking a counter-part to a coupling part
33/945 . Holders with built-in electrical component **[4]**
33/95 . . with fuse; with thermal switch **[4]**
33/955 . . with switch operated manually and independent of engagement or disengagement of coupling **[4]**
33/96 . . with switch operated by engagement or disengagement of coupling **[4]**
33/965 . Dustproof, splashproof, drip-proof, waterproof, or flameproof holders **[4]**
33/97 . Holders with separate means to prevent loosening of the coupling or unauthorised removal of apparatus held **[4]**
33/975 . Holders with resilient means for protecting apparatus against vibrations or shocks **[4]**

35/00 **Flexible or turnable line connectors** (rotary current collectors, distributors H01R 39/00)
35/02 . Flexible line connectors **[4]**
35/04 . Turnable line connectors with limited rotation angle **[4]**

39/00 **Rotary current collectors, distributors, or interrupters** (cam-operated switches H01H 19/00; structural associations of current collectors with, or disposition of current collectors in, dynamo-electric motors or generators H02K 13/00)
39/02 . Details
39/04 . . Commutators (wherein the segments are formed by extensions of dynamo-electric machine winding H02K)
39/06 . . . other than with external cylindrical contact surface, e.g. flat commutators
39/08 . . Slip-rings
39/10 . . . other than with external cylindrical contact surface, e.g. flat slip-rings
39/12 . . . using bearing or shaft surface as contact surface
39/14 . . Fastenings of commutators or slip-rings to shafts
39/16 . . . by means of moulded or cast material applied during or after assembly
39/18 . . Contacts for co-operation with commutator or slip-ring, e.g. contact brush

39/20 . . . characterised by the material thereof
39/22 . . . . incorporating lubricating or polishing ingredient
39/24 . . . Laminated contacts; Wire contacts, e.g. metallic brush, carbon fibres
39/26 . . . Solid sliding contacts, e.g. carbon brush
39/27 . . . . End caps on carbon brushes to transmit spring pressure
39/28 . . . Roller contacts; Ball contacts
39/30 . . . Liquid contacts
39/32 . . Connections of conductor to commutator segment
39/34 . . Connections of conductor to slip-ring
39/36 . . Connections of cable or wire to brush
39/38 . . Brush holders
39/39 . . . wherein the brush is fixedly mounted in the holder
39/40 . . . enabling brush movement within holder during current collection
39/41 . . . cartridge type
39/415 . . . . with self-recoiling spring **[4]**
39/42 . . Devices for lifting brushes
39/44 . . Devices for shifting brushes
39/46 . . Auxiliary means for improving current transfer, or for reducing or preventing sparking or arcing
39/48 . . . by air blast; by surrounding collector with non-conducting liquid or gas
39/50 . . . Barriers placed between brushes
39/52 . . . by use of magnets
39/54 . . . by use of impedance between brushes or segments
39/56 . . Devices for lubricating or polishing slip-rings or commutators during operation of the collector
39/58 . . Means structurally associated with the current collector for indicating condition thereof, e.g. for indicating brush wear
39/59 . . Means structurally associated with the brushes for interrupting current (H01R 39/58 takes precedence) **[4]**
39/60 . Devices for interrupted current collection, e.g. commutating device, distributor, interrupter (self-interrupters H01H, e.g. H01H 51/34)
39/62 . . with more than one brush co-operating with the same set of segments
39/64 . Devices for uninterrupted current collection

41/00 Non-rotary current collectors for maintaining contact between moving and stationary parts of an electric circuit (end pieces terminating in a hook or the like H01R 11/12; current collectors for power supply lines of electrically-propelled vehicles B60L 5/00)

41/02 . Devices for interrupted current collection, e.g. distributor (electrically-operated selector switches H01H 67/00)

43/00 Apparatus or processes specially adapted for manufacturing, assembling, maintaining, or repairing of line connectors or current collectors or for joining electric conductors (of trolley lines B60M 1/28; joining cables H02G 1/14)

43/01 . for connecting unstripped conductors to contact members having insulation cutting edges **[4]**
43/02 . for soldered or welded connections (soldering or welding in general B23K)
43/027 . for connecting conductors by clips **[4]**
43/033 . for wrapping or unwrapping wire connections **[4]**
43/04 . for forming connections by deformation, e.g. crimping tool
43/042 . . Hand tools for crimping **[4]**
43/045 . . . with contact member feeding mechanism **[4]**
43/048 . . Crimping apparatus or processes (H01R 43/042 takes precedence) **[4]**
43/05 . . . with wire-insulation stripping **[4]**
43/052 . . . with wire-feeding mechanism **[4]**
43/055 . . . with contact member feeding mechanism **[4]**
43/058 . . Crimping mandrels **[4]**
43/06 . Manufacture of commutators
43/08 . . in which segments are not separated until after assembly
43/10 . Manufacture of slip-rings
43/12 . Manufacture of brushes
43/14 . Maintenance of current collectors, e.g. reshaping of brushes, cleaning of commutators
43/16 . for manufacturing contact members, e.g. by punching and by bending **[4]**
43/18 . for manufacturing bases or cases for contact members **[4]**
43/20 . for assembling or disassembling contact members with insulating base, case or sleeve **[4]**
43/22 . . Hand tools **[4]**
43/24 . . Assembling by moulding on contact members **[4]**
43/26 . for engaging or disengaging the two parts of a coupling device (structural association with coupling device H01R 13/629) **[4]**
43/28 . for wire processing before connecting to contact members (H01R 43/02 to H01R 43/26 take precedence) **[4]**

Indexing scheme associated with group H01R 24/00, relating to the number of poles in a two-part coupling device. [7]

101/00 One pole [7]

103/00 Two poles [7]

105/00 Three poles [7]

107/00 Four or more poles [7]

H01S DEVICES USING STIMULATED EMISSION

Note

This subclass covers:
- devices for the generation or amplification, by using stimulated emission, of coherent electromagnetic waves or other forms of wave energy; **[2]**
- such functions as modulating, demodulating, controlling, or stabilising such waves. **[2]**

Subclass index

1/00 Masers, i.e. devices for generation, amplification, modulation, demodulation, or frequency-changing, using stimulated emission, of electromagnetic waves of wavelength longer than that of infra-red waves

1/02 . solid
1/04 . liquid
1/06 . gaseous

3/00 Lasers, i.e. devices for generation, amplification, modulation, demodulation, or frequency-changing, using stimulated emission, of infra-red, visible, or ultra-violet waves (semiconductor lasers H01S 5/00)

3/02 . Constructional details
3/03 . . of gas laser discharge tubes **[2]**
3/032 . . . for confinement of the discharge, e.g. by special features of the discharge constricting tube **[5]**
3/034 . . . Optical devices within, or forming part of, the tube, e.g. windows, mirrors (reflectors having variable properties or positions for initial adjustment of the resonator H01S 3/086) **[5]**
3/036 . . . Means for obtaining or maintaining the desired gas pressure within the tube, e.g. by gettering, replenishing; Means for circulating the gas, e.g. for equalising the pressure within the tube (cooling arrangements for gas lasers H01S 3/041; gas dynamic lasers H01S 3/0979) **[5]**
3/038 . . . Electrodes, e.g. special shape, configuration or composition **[5]**
3/04 . . Cooling arrangements
3/041 . . . for gas lasers **[5]**
3/042 . . . for solid state lasers **[5]**
3/05 . Construction or shape of optical resonators; Accommodation of active medium therein; Shape of active medium
3/06 . . Construction or shape of active medium
3/063 . . . Waveguide lasers, e.g. laser amplifiers **[7]**
3/067 . . . . Fibre lasers **[7]**
3/07 . . . consisting of a plurality of parts, e.g. segments (H01S 3/067 takes precedence) **[2,7]**
3/08 . . Construction or shape of optical resonators or components thereof **[2]**
3/081 . . . comprising more than two reflectors **[2]**
3/082 . . . . defining a plurality of resonators, e.g. for mode selection **[2]**
3/083 . . . . Ring lasers (ring laser gyrometers G01C 19/66) **[2]**
3/086 . . . One or more reflectors having variable properties or positions for initial adjustment of the resonator (varying a parameter of the laser output during operation H01S 3/10; stabilisation of the laser output H01S 3/13) **[2]**
3/09 . Processes or apparatus for excitation, e.g. pumping
3/091 . . using optical pumping **[2]**
3/0915 . . . by incoherent light **[5]**
3/092 . . . . of flash lamp (H01S 3/0937 takes precedence) **[2,5]**
3/093 . . . . . focusing or directing the excitation energy into the active medium **[2,5]**
3/0933 . . . . of a semiconductor, e.g. light emitting diode **[5]**
3/0937 . . . . produced by exploding or combustible material **[5]**
3/094 . . . by coherent light **[2]**
3/0941 . . . . of a semiconductor laser, e.g. of a laser diode **[6]**
3/0943 . . . . of a gas laser **[5]**
3/0947 . . . . of an organic dye laser **[5]**
3/095 . . using chemical or thermal pumping **[2]**
3/0951 . . . by increasing the pressure in the laser gas medium **[5]**
3/0953 . . . . Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds **[5]**
3/0955 . . using pumping by high energy particles **[5]**
3/0957 . . . by high energy nuclear particles **[5]**
3/0959 . . . by an electron beam **[5]**
3/097 . . by gas discharge of a gas laser **[2]**
3/0971 . . . transversely excited (H01S 3/0975 takes precedence) **[5]**
3/0973 . . . . having a travelling wave passing through the active medium **[5]**
3/0975 . . . using inductive or capacitive excitation **[5]**
3/0977 . . . having auxiliary ionisation means **[5]**
3/0979 . . . Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds **[5]**
3/098 . Mode locking; Mode suppression (mode suppression using a plurality of resonators H01S 3/082) **[2]**
3/10 . Controlling the intensity, frequency, phase, polarisation or direction of the emitted radiation, e.g. switching, gating, modulating or demodulating (mode locking H01S 3/098; controlling of light beams, frequency-changing, non-linear optics, optical logic elements, in general G02F) **[2]**
3/101 . . Lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted (optical scanning systems in general G02B 26/10; devices or arrangements for the electro-, magneto-, or acousto-optical deflection G02F 1/29) **[2]**
3/102 . . by controlling the active medium, e.g. by controlling the processes or apparatus for excitation (H01S 3/13 takes precedence) **[4]**
3/104 . . . in gas lasers **[4]**
3/105 . . by controlling the mutual position or the reflecting properties of the reflectors of the cavity (H01S 3/13 takes precedence) **[4]**
3/1055 . . . one of the reflectors being constituted by a diffraction grating **[4]**
3/106 . . by controlling a device placed within the cavity (H01S 3/13 takes precedence) **[4]**
3/107 . . . using an electro-optical device, e.g. exhibiting Pockels- or Kerr-effect **[4]**

3/108 . . . using a non-linear optical device, e.g. exhibiting Brillouin- or Raman-scattering **[4]**

3/109 . . . . Frequency multiplying, e.g. harmonic generation **[4]**

3/11 . . in which the quality factor of the optical resonator is rapidly changed, i.e. giant-pulse technique

3/113 . . . using bleachable or solarising media **[2]**

3/115 . . . using an electro-optical device **[4]**

3/117 . . . using an acousto-optical device **[4]**

3/121 . . . using a mechanical device **[4]**

3/123 . . . . Rotating mirror **[4]**

3/125 . . . . Rotating prism **[4]**

3/127 . . . Plural Q-switches **[4]**

3/13 . . Stabilisation of laser output parameters, e.g. frequency, amplitude **[2]**

3/131 . . . by controlling the active medium, e.g. by controlling the processes or apparatus for excitation **[4]**

3/134 . . . . in gas lasers **[4]**

3/136 . . . by controlling a device placed within the cavity **[4]**

3/137 . . . . for stabilising of frequency **[4]**

3/139 . . . by controlling the mutual position or the reflecting properties of the reflectors of the cavity **[4]**

3/14 . characterised by the material used as the active medium

3/16 . . Solid materials

3/17 . . . amorphous, e.g. glass **[2]**

3/20 . . Liquids

3/207 . . . including a chelate **[5]**

3/213 . . . including an organic dye **[5]**

3/22 . . Gases

3/223 . . . the active gas being polyatomic, i.e. containing more than one atom (H01S 3/227 takes precedence) **[2,5]**

3/225 . . . . comprising an excimer or exciplex **[5]**

3/227 . . . Metal vapour **[5]**

3/23 . Arrangement of two or more lasers not provided for in groups H01S 3/02 to H01S 3/14, e.g. tandem arrangement of separate active media (involving only semiconductor lasers H01S 5/40) **[2,7]**

3/30 . using scattering effects, e.g. stimulated Brillouin or Raman effects **[2]**

4/00 Devices using stimulated emission of wave energy other than those covered by groups H01S 1/00, H01S 3/00 or H01S 5/00, e.g. phonon maser, gamma maser

5/00 Semiconductor lasers [7]

Note

Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the periodic table of chemical elements the IPC refers. **[2010.01]**

5/02 . Structural details or components not essential to laser action **[7]**

5/022 . . Mountings; Housings **[7]**

5/024 . . Cooling arrangements **[7]**

5/026 . . Monolithically integrated components, e.g. waveguides, monitoring photo-detectors, drivers (stabilisation of output H01S 5/06; coupling light guides with opto-electronic elements G02B 6/42; devices consisting of a plurality of semiconductor or other solid state components formed in or on a common substrate, specially adapted for light emission H01L 27/15) **[7]**

5/028 . . Coatings **[7]**

5/04 . Processes or apparatus for excitation, e.g. pumping (H01S 5/06 takes precedence) **[7]**

5/042 . . Electrical excitation **[7]**

5/06 . Arrangements for controlling the laser output parameters, e.g. by operating on the active medium (transmission systems employing light H04B 10/00) **[7]**

5/062 . . by varying the potential of the electrodes (H01S 5/065 takes precedence) **[7]**

5/0625 . . . in multi-section lasers **[7]**

5/065 . . Mode locking; Mode suppression; Mode selection **[7]**

5/068 . . Stabilisation of laser output parameters (H01S 5/0625 takes precedence) **[7]**

5/0683 . . . by monitoring the optical output parameters **[7]**

5/0687 . . . . Stabilising the frequency of the laser **[7]**

5/10 . Construction or shape of the optical resonator **[7]**

5/12 . . the resonator having a periodic structure, e.g. in distributed feed-back lasers (DFB-lasers) (H01S 5/18 takes precedence) **[7]**

5/125 . . . Distributed Bragg reflector lasers (DBR-lasers) **[7]**

5/14 . . External cavity lasers (H01S 5/18 takes precedence; mode locking H01S 5/065) **[7]**

5/16 . . Window-type lasers, i.e. with a region of non-absorbing material between the active region and the reflecting surface (H01S 5/14 takes precedence) **[7]**

5/18 . . Surface-emitting lasers (SE-lasers) **[7]**

5/183 . . . having a vertical cavity (VCSE-lasers) **[7]**

5/187 . . . using a distributed Bragg reflector (SE-DBR-lasers) (H01S 5/183 takes precedence) **[7]**

5/20 . Structure or shape of the semiconductor body to guide the optical wave **[7]**

5/22 . . having a ridge or a stripe structure **[7]**

5/223 . . . Buried stripe structure (H01S 5/227 takes precedence) **[7]**

5/227 . . . Buried mesa structure **[7]**

5/24 . . having a grooved structure, e.g. V-grooved **[7]**

5/30 . Structure or shape of the active region; Materials used for the active region **[7]**

5/32 . . comprising PN junctions, e.g. hetero- or double-hetero-structures (H01S 5/34, H01S 5/36 take precedence) **[7]**

5/323 . . . in $A_{III}B_{V}$ compounds, e.g. AlGaAs-laser **[7]**

5/327 . . . in $A_{II}B_{VI}$ compounds, e.g. ZnCdSe-laser **[7]**

5/34 . . comprising quantum well or superlattice structures, e.g. single quantum well lasers (SQW-lasers), multiple quantum well lasers (MQW-lasers), graded index separate confinement heterostructure lasers (GRINSCH-lasers) (H01S 5/36 takes precedence) **[7]**

5/343 . . . in $A_{III}B_{V}$ compounds, e.g. AlGaAs-laser **[7]**

5/347 . . . in $A_{II}B_{VI}$ compounds, e.g. ZnCdSe-laser **[7]**

5/36 . . comprising organic materials (dye lasers H01S 3/213) **[8]**

5/40 . Arrangement of two or more semiconductor lasers, not provided for in groups H01S 5/02 to H01S 5/30 (H01S 5/50 takes precedence) **[7]**

5/42 . . Arrays of surface emitting lasers **[7]**

5/50 . Amplifier structures not provided for in groups H01S 5/02 to H01S 5/30 (as repeaters in transmission systems H04B 10/17) **[7]**

H01T **SPARK GAPS**; **OVERVOLTAGE ARRESTERS USING SPARK GAPS**; **SPARKING PLUGS**; **CORONA DEVICES**; **GENERATING IONS TO BE INTRODUCED INTO NON-ENCLOSED GASES** (working of metal by the action of a high concentration of electric current B23H; welding, e.g. arc welding, electron beam welding or electrolytic welding, B23K; gas-filled discharge tubes with solid cathode H01J 17/00; electric arc lamps H05B 31/00)

Note

In this subclass, the following expression is used with the meaning indicated:
– "spark gaps" means enclosed or non-enclosed discharge device having cold electrodes and used exclusively to discharge a quantity of electrical energy in a small time duration. **[4]**

Subclass index

1/00 Details of spark gaps

1/02 . Means for extinguishing arc
1/04 . . using magnetic blow-out
1/06 . . . with permanent magnet
1/08 . . using flow of arc-extinguishing fluid
1/10 . . . with extinguishing fluid evolved from solid material by heat of arc
1/12 . Means structurally associated with spark gap for recording operation thereof
1/14 . Means structurally associated with spark gap for protecting it against overload or for disconnecting it in case of failure (H01T 1/15, H01T 1/16, H01T 1/18 take precedence) **[4]**
1/15 . for protection against excessive pressure **[4]**
1/16 . Series resistor structurally associated with spark gap
1/18 . Electrolytic device structurally associated with spark gap
1/20 . Means for starting arc or facilitating ignition of spark gap **[3]**
1/22 . . by the shape or the composition of the electrodes **[4]**
1/24 . Selection of materials for electrodes (H01T 1/22 takes precedence) **[4]**

2/00 Spark gaps comprising auxiliary triggering means (triggering circuits H01T 15/00) **[4]**

2/02 . comprising a trigger electrode or an auxiliary spark gap **[4]**

4/00 Overvoltage arresters using spark gaps (H01T 2/00 takes precedence; overvoltage protection circuits using spark gaps H02H 9/06) **[4]**

4/02 . Details (of spark gaps H01T 1/00) **[4]**
4/04 . Housings (H01T 4/06 takes precedence) **[4]**
4/06 . Mounting arrangements for a plurality of overvoltage arresters **[4]**
4/08 . structurally associated with protected apparatus (with switches H01H 9/14; with fuses H01H 85/44) **[4]**
4/10 . having a single gap or a plurality of gaps in parallel (sparking plugs H01T 13/00) **[4]**
4/12 . . hermetically sealed **[4]**
4/14 . . Arcing horns (associated with insulators H01B 17/46) **[4]**
4/16 . having a plurality of gaps arranged in series **[4]**
4/18 . . Arrangements for reducing height of stacked spark gaps **[4]**
4/20 . . Arrangements for improving potential distribution **[4]**

7/00 Rotary spark gaps, i.e. devices having one or more rotating electrodes

9/00 Spark gaps specially adapted for generating oscillations

11/00 Spark gaps specially adapted as rectifiers

13/00 Sparking plugs

13/02 . Details
13/04 . . Means providing electrical connection to sparking plug (electric connections in general H01R)
13/05 . . . combined with interference suppressing or shielding means **[4]**
13/06 . . Covers forming a part of the plug and protecting it against adverse environment
13/08 . . Mounting, fixing, or sealing of sparking plugs, e.g. in combustion chamber
13/10 . . . by bayonet-type connection
13/12 . . Means on sparking plugs for facilitating engagement by tool or by hand
13/14 . . Means for self-cleaning
13/16 . . Means for dissipating heat
13/18 . . Means for heating, e.g. for drying

13/20 . characterised by features of the electrodes or insulation

13/22 . . having two or more electrodes embedded in insulation (for two or more sparks H01T 13/46)

13/24 . . having movable electrodes (H01T 13/28 takes precedence)

13/26 . . . for adjusting spark gap otherwise than by bending of electrode

13/28 . . having spherically shaped electrodes, e.g. ball-shaped

13/30 . . . mounted so as to permit free movement

13/32 . . characterised by features of the earthed electrode

13/34 . . characterised by the mounting of electrodes in insulation, e.g. by embedding

13/36 . . characterised by the joint between insulation and body, e.g. using cement

13/38 . . Selection of materials for insulation (in general H01B 3/00)

13/39 . . Selection of materials for electrodes **[4]**

13/40 . structurally combined with other devices (combined or associated with fuel injectors F02M 57/06; structurally combined with other parts of internal-combustion engines F02P 13/00)

13/41 . . with interference suppressing or shielding means **[4]**

13/42 . . with magnetic spark generators

13/44 . . with transformers, e.g. for high-frequency ignition

13/46 . having two or more spark gaps

13/48 . having means for rendering sparks visible

13/50 . having means for ionisation of gap (H01T 13/52 takes precedence) **[4]**

13/52 . characterised by a discharge along a surface

13/54 . having electrodes arranged in a partly-enclosed ignition chamber

13/56 . characterised by having component parts which are easily assembled or disassembled

13/58 . *Testing (testing characteristics of the spark in internal-combustion engine ignition F02P 17/12)* **[2011.01]**

13/60 . . *of electrical properties* **[2011.01]**

14/00 **Spark gaps not provided for in groups H01T 2/00 to H01T 13/00** (devices providing for corona discharge H01T 19/00) **[4]**

15/00 **Circuits specially adapted for spark gaps, e.g. ignition circuits** (ignition circuits for internal-combustion engines F02P; electric spark ignition for combustion apparatus F23Q; protection circuits using spark gaps H02H 9/06) **[4]**

19/00 **Devices providing for corona discharge** (for charging electrographic elements G03G 15/02) **[4]**

19/02 . Corona rings

19/04 . having pointed electrodes

21/00 **Apparatus or processes specially adapted for the manufacture or maintenance of spark gaps or sparking plugs**

21/02 . of sparking plugs

21/04 . . Cleaning (means for self-cleaning H01T 13/14; abrasive blasting devices for cleaning sparking plugs B24C 3/34)

21/06 . Adjustment of spark gaps (sparking plugs having movable electrodes for adjusting the gap H01T 13/26) **[4]**

23/00 **Apparatus for generating ions to be introduced into non-enclosed gases, e.g. into the atmosphere** (discharge tubes with provision for emergence of ions from the vessel H01J 33/00; generating plasma H05H) **[4]**

H02 GENERATION, CONVERSION, OR DISTRIBUTION OF ELECTRIC POWER

H02B BOARDS, SUBSTATIONS, OR SWITCHING ARRANGEMENTS FOR THE SUPPLY OR DISTRIBUTION OF ELECTRIC POWER (basic electric elements, their assembly, including the mounting in enclosures or on bases, or the mounting of covers thereon, see the subclasses for such elements, e.g. transformers H01F, switches, fuses H01H, line connectors H01R; installation of electric cables or lines, or of combined optical and electric cables or lines, or other conductors for supply or distribution H02G)

Note

This subclass covers boards, switchyards, switchgear or their installation, or the association of switching devices with each other or with other devices, e.g. transformers, fuses, meters or distribution boards; such associations constitute substations or distribution points.

Subclass index

1/00 Frameworks, boards, panels, desks, casings; Details of substations or switching arrangements [5]

1/01 . Frameworks **[5]**
1/015 . Boards, panels, desks; Parts thereof or accessories therefor **[5]**
1/03 . . for energy meters **[5]**
1/04 . . Mounting thereon of switches or of other devices in general, the switch or device having, or being without, casing
1/044 . . . Mounting through openings **[5]**
1/048 . . . . Snap mounting **[5]**
1/052 . . . Mounting on rails **[5]**
1/056 . . . Mounting on plugboards **[5]**
1/06 . . having associated enclosures, e.g. for preventing access to live parts (shutters or guards for contacts H02B 1/14)
1/14 . Shutters or guards for preventing access to contacts (shielding of isolating-contacts in withdrawable switchgear H02B 11/24)
1/16 . Earthing arrangements (earthing arrangements for substations H02B 5/01, for switchgear H02B 11/28, H02B 13/075; earth plates, pins, or other contacts H01R 4/66) **[5]**
1/18 . Disposition or arrangement of fuses (for switchgear having a withdrawable carriage H02B 11/26) **[5]**
1/20 . Bus-bar or other wiring layouts, e.g. in cubicles, in switchyards (installations of bus-bars H02G 5/00)
1/21 . . Bus-bar arrangements for rack-mounted devices with withdrawable units **[5]**
1/22 . . Layouts for duplicate bus-bar selection
1/24 . Circuit arrangements for boards or switchyards (devices for displaying diagrams H02B 15/00; service supply H02J 11/00)

Note

In groups H02B 1/26 to H02B 1/56, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

1/26 . Casings; Parts thereof or accessories therefor (adapted for a single switch H01H; enclosures for cables, lines or bus-bars H02G; distribution, connection or junction boxes H02G 3/08; casings in general H05K) **[5]**
1/28 . . dustproof, splashproof, drip-proof, waterproof or flameproof **[5]**
1/30 . . Cabinet-type casings; Parts thereof or accessories therefor **[5]**
1/32 . . . Mounting of devices therein **[5]**
1/34 . . . . Racks **[5]**
1/36 . . . . . with withdrawable units **[5]**
1/38 . . . Hinged covers or doors **[5]**
1/40 . . Wall-mounted casings; Parts thereof or accessories therefor **[5]**
1/42 . . . Mounting of devices therein **[5]**
1/44 . . . Hinged covers or doors **[5]**
1/46 . . Boxes; Parts thereof or accessories therefor **[5]**
1/48 . . . Mounting of devices therein **[5]**
1/50 . . Pedestal- or pad-mounted casings; Parts thereof or accessories therefor **[5]**
1/52 . . Mobile units, e.g. for work sites **[5]**
1/54 . Anti-seismic devices or installations (for buildings in general E04B 1/98) **[5]**
1/56 . Cooling; Ventilation **[5]**

3/00 Apparatus specially adapted for the manufacture, assembly, or maintenance of boards or switchgear

5/00 Non-enclosed substations; Substations with enclosed and non-enclosed equipment

5/01 . Earthing arrangements, e.g. earthing rods **[5]**
5/02 . mounted on pole, e.g. pole transformer substation
5/06 . gas-insulated **[5]**

7/00 Enclosed substations, e.g. compact substations [5]

7/01 . gas-insulated **[5]**
7/06 . Distribution substations, e.g. for urban network (H02B 7/01 takes precedence) **[5]**
7/08 . . Underground substations

11/00 Switchgear having carriage withdrawable for isolation

11/02 . Details
11/04 . . Isolating-contacts, e.g. mountings, shieldings (shutters or guards for isolating contacts H02B 1/14, H02B 11/24; switch contacts H01H; line connectors in general H01R) **[5]**
11/06 . . Means for duplicate bus-bar selection (layouts for duplicate bus-bar selection H02B 1/22)

11/08 . . Oil-tank lowering means associated with withdrawal mechanism
11/10 . . Indicating electrical condition of gear; Arrangement of test sockets
11/12 . with isolation by horizontal withdrawal
11/127 . . Withdrawal mechanism **[5]**
11/133 . . . with interlock (interlock for switches in general H01H) **[5]**
11/167 . . truck type (H02B 11/127 takes precedence) **[5]**
11/173 . . drawer type (H02B 11/127 takes precedence) **[5]**
11/18 . with isolation by vertical withdrawal
11/20 . . having an enclosure
11/22 . . . wherein front of enclosure moves with carriage upon horizontal withdrawal subsequent to isolation
11/24 . Shutters or guards **[5]**
11/26 . Arrangement of fuses, resistors, voltage arresters or the like **[5]**
11/28 . Earthing arrangements **[5]**

13/00 Arrangement of switchgear in which switches are enclosed in, or structurally associated with, a casing, e.g. cubicle (in association with main transformer H02B 5/00, H02B 7/00; switchgear having carriage withdrawable for isolation H02B 11/00) **[5]**

13/01 . with resin casing **[5]**
13/02 . with metal casing
13/025 . . Safety arrangements, e.g. in case of excessive pressure or fire due to electrical defect (for buildings in general E04B 1/94; devices for opening or closing safety wings E05F 1/00; emergency protective circuit arrangements for distribution gear, e.g. bus-bar systems, or for switching devices H02H 7/22) **[5]**
13/035 . . Gas-insulated switchgear **[5]**
13/045 . . . Details of casing, e.g. gas tightness (gas reservoirs for switches H01H 33/56) **[5]**
13/055 . . . Features relating to the gas (selection of fluids for switches H01H 33/22) **[5]**
13/065 . . . Means for detecting or reacting to mechanical or electrical defects (for switches H01H 9/50, H01H 33/26, H01H 33/53) **[5]**
13/075 . . . Earthing arrangements **[5]**
13/08 . with stone, brick, or concrete casing

15/00 Supervisory desks or panels for centralised control or display (desks in general A47B)

15/02 . with mimic diagrams
15/04 . . consisting of building blocks

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

H02G INSTALLATION OF ELECTRIC CABLES OR LINES, OR OF COMBINED OPTICAL AND ELECTRIC CABLES OR LINES (insulated conductors or cables with arrangements for facilitating mounting or securing H01B 7/40; distribution points incorporating switches H02B; guiding telephone cords H04M 1/15; cable ducts or mountings for telephone or telegraph exchange installations H04Q 1/06)

(1) This subclass covers installation of communication cables or lines, including those comprising a combination of optical and electrical conductors, or of lightning conductors as well as installation of power cables or lines.
(2) This subclass does not cover installation of purely optical cables, which is covered by group G02B 6/46. **[6]**
(3) In this subclass, the following expression is used with the meaning indicated: **[6]**
– "electric cable" includes cables comprising optical conductors, e.g. fibres, in combination with electrical conductors. **[6]**

Subclass index

1/00 Methods or apparatus specially adapted for installing, maintaining, repairing, or dismantling electric cables or lines

1/02 . for overhead lines or cables
1/04 . . for mounting or stretching (wire stretchers in general B25B 25/00)
1/06 . for laying cables, e.g. laying apparatus on vehicle (combined with trench digging or back-filling machines or dredgers E02F 5/00)
1/08 . . through tubing or conduit, e.g. rod or draw wire for pushing or pulling
1/10 . . in or under water
1/12 . for removing insulation or armouring from cables, e.g. from the end thereof (pliers in general B25B; cutters in general B26B; insulated conductors or cables with arrangements for facilitating removal of insulation H01B 7/38)
1/14 . for joining or terminating cables (joining electric conductors H01R 43/00)
1/16 . for repairing insulation or armouring of cables

3/00 **Installations of electric cables or lines or protective tubing therefor in or on buildings, equivalent structures or vehicles** (installations of bus-bars H02G 5/00; overhead installations H02G 7/00; installations in or on the ground H02G 9/00; channels or vertical ducts for receiving utility lines E04F 17/08; wiring of electric apparatus in general H05K)

3/02 . Details

3/03 . . Cooling **[2]**

3/04 . . Protective tubing or conduits, e.g. cable ladders, cable troughs (pipes or tubing in general F16L)

3/06 . . Joints for connecting lengths of protective tubing to each other or to casings, e.g. to distribution box; Ensuring electrical continuity in the joint

3/08 . . Distribution boxes; Connection or junction boxes (cable terminations H02G 15/02)

3/10 . . . for surface mounting on a wall

3/12 . . . for flush mounting

3/14 . . . Fastening of cover or lid to box

3/16 . . . structurally associated with support for line-connecting terminals within the box (terminals H01R 9/00)

3/18 . . . providing line outlets

3/20 . . . . Ceiling roses

3/22 . Installations of cables or lines through walls, floors, or ceilings, e.g. into buildings (devices for use where pipes or cables pass through walls or partitions F16L 5/00; lead-in or lead-through insulators H01B 17/26; insulating tubes or sleeves H01B 17/58)

3/30 . Installations of cables or lines on walls, floors or ceilings (supports for pipes, cables or protective tubing F16L 3/00; hose-clips F16L 33/02) **[7]**

3/32 . . using mounting clamps **[7]**

3/34 . . using separate protective tubing **[7]**

3/36 . Installations of cables or lines in walls, floors or ceilings (H02G 3/22 takes precedence) **[7]**

3/38 . . the cables or lines being installed in preestablished conduits or ducts **[7]**

3/40 . . . using separate protective tubing in the conduits or ducts **[7]**

5/00 **Installations of bus-bars**

5/02 . Open installations

5/04 . Partially-enclosed installations, e.g. in ducts and adapted for sliding or rolling current collection (non-rotary current collectors H01R 41/00)

5/06 . Totally-enclosed installations, e.g. in metal casings

5/08 . . Connection boxes therefor

5/10 . Cooling **[2]**

7/00 **Overhead installations of electric lines or cables** (installations of bus-bars H02G 5/00; trolley wires or contact lines for electric railways B60M; fastening conductors to insulators H01B 17/00, e.g. H01B 17/06, H01B 17/16, H01B 17/22; protection against abnormal electric conditions H01H; hook contacts for temporary connections to overhead lines H01R 11/14)

7/02 . Devices for adjusting or maintaining mechanical tension, e.g. take-up device

7/04 . Arrangements or devices for relieving mechanical tension

7/05 . Suspension arrangements or devices for electric cables or lines **[3]**

7/06 . . Suspensions for lines or cables along a separate supporting wire, e.g. S-hook **[3]**

7/08 . . . Members clamped to the supporting wire or to the line or cable **[3]**

7/10 . . . Flexible members or lashings wrapped around both the supporting wire and the line or cable **[3]**

7/12 . Devices for maintaining distance between parallel conductors, e.g. spacer

7/14 . Arrangements or devices for damping mechanical oscillations of lines, e.g. for reducing production of sound

7/16 . Devices for removing snow or ice from lines or cables (from insulators H01B 17/52)

7/18 . Devices affording mechanical protection in the event of breakage of a line or cable, e.g. net for catching broken lines

7/20 . Spatial arrangements or dispositions of lines or cables on poles, posts, or towers (construction of poles, posts, or towers E04H 12/22)

7/22 . Arrangements of earthing wires suspended between mastheads

9/00 **Installations of electric cables or lines in or on the ground or water** (cathodic protection C23F 13/02; detection of buried cables G01V)

9/02 . laid directly in or on the ground, river-bed or sea-bottom; Coverings therefor, e.g. tile

9/04 . in surface ducts; Ducts or covers therefor

9/06 . in underground tubes or conduits; Tubes or conduits therefor

9/08 . in tunnels

9/10 . in cable chambers, e.g. in manhole, in handhole (building aspects of cable chambers section E, e.g. E04H 5/06)

9/12 . supported on or from floats, e.g. in water (floating cables H01B 7/12)

11/00 **Arrangements of electric cables or lines between relatively-movable parts** (current collectors H01R)

11/02 . using take-up reel or drum

13/00 **Installations of lightning conductors**; **Fastening thereof to supporting structure** (indicating, counting or recording lightning strokes G01; lightning arrestors H01C 7/12, H01C 8/04, H01G 9/18, H01T; earth plates, pins or other contacts H01R)

15/00 **Cable fittings**

15/007 . Devices for relieving mechanical stress **[3]**

15/013 . Sealing means for cable inlets (inlets for cables filled with, or surrounded by, gas or oil H02G 15/32) **[3]**

15/02 . Cable terminations (for gas- or oil-filled cables H02G 15/22)

15/04 . . Cable-end sealings

15/06 . . Cable terminating boxes, frames, or other structures (terminal blocks H01R 9/00)

15/064 . . . with devices for relieving electrical stress **[3]**

15/068 . . . . connected to the cable shield only (H02G 15/072 takes precedence) **[3]**

15/072 . . . . of the condenser type **[3]**

15/076 . . . for multi-conductor cables **[3]**

15/08 . Cable junctions (for gas or oil filled cables H02G 15/24; disconnectable junctions, electrical connections H01R)

15/10 . . protected by boxes, e.g. by distribution, connection or junction boxes (terminal blocks H01R 9/00)

15/103 . . . with devices for relieving electrical stress **[3]**

15/105 . . . . connected to the cable shield only (H02G 15/107 takes precedence) **[3]**

15/107 . . . . of the condenser type **[3]**

15/113 . . . Boxes split longitudinally in main cable direction **[3]**
15/115 . . . Boxes split perpendicularly to main cable direction **[3]**
15/117 . . . for multiconductor cables **[3]**
15/12 . . . for incorporating transformers, loading coils or amplifiers
15/14 . . . . specially adapted for submarine cables
15/16 . . . structurally associated with support for line-connecting terminals within the box
15/18 . . protected by sleeves, e.g. for communication cable (two-part covers H02G 15/10)
15/184 . . . with devices for relieving electrical stress **[3]**
15/188 . . . . connected to cable shield only **[3]**
15/192 . . . with support means for ends of the sleeves **[3]**
15/196 . . . having lapped insulation **[3]**
15/20 . Cable fittings for cables filled with or surrounded by gas or oil (H02G 15/34 takes precedence) **[3]**
15/22 . . Cable terminations
15/23 . . . Cable-end sealings **[3]**
15/24 . . Cable junctions
15/25 . . . Stop junctions **[3]**
15/26 . . Expansion vessels; Locking heads; Auxiliary pipe-lines
15/28 . . structurally associated with devices for indicating the presence or location of non-electric faults (combined with electric protective means H02H)
15/30 . . with devices for relieving electrical stress **[3]**
15/32 . . Cable inlets **[3]**
15/34 . Cable fittings for cryogenic cables **[3]**

H02H **EMERGENCY PROTECTIVE CIRCUIT ARRANGEMENTS** (indicating or signalling undesired working conditions G01R, e.g. G01R 31/00, G08B; locating faults along lines G01R 31/08; emergency protective devices H01H)

Note

This subclass covers only circuit arrangements for the automatic protection of electric lines or electric machines or apparatus in the event of an undesired change from normal working conditions.

Subclass index

1/00 **Details of emergency protective circuit arrangements**
1/04 . Arrangements for preventing response to transient abnormal conditions, e.g. to lightning
1/06 . Arrangements for supplying operative power **[3]**

3/00 **Emergency protective circuit arrangements for automatic disconnection directly responsive to an undesired change from normal electric working condition, with or without subsequent reconnection** (specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems H02H 7/00; systems for change-over to standby supply H02J 9/00)
3/02 . Details
3/027 . . with automatic disconnection after a predetermined time (H02H 3/033, H02H 3/06 take precedence) **[3]**
3/033 . . with several disconnections in a preferential order (H02H 3/06 takes precedence) **[3]**
3/04 . . with warning or supervision in addition to disconnection, e.g. for indicating that protective apparatus has functioned
3/05 . . with means for increasing reliability, e.g. redundancy arrangements **[3]**
3/06 . . with automatic reconnection
3/07 . . . and with permanent disconnection after a predetermined number of reconnection cycles **[3]**
3/08 . responsive to excess current (responsive to abnormal temperature caused by excess current H02H 5/04)
3/087 . . for dc applications **[3]**
3/093 . . with timing means **[3]**
3/10 . . additionally responsive to some other abnormal electrical conditions
3/12 . responsive to underload or no-load
3/13 . . for multiphase applications, e.g. phase interruption **[3]**
3/14 . responsive to occurrence of voltage on parts normally at earth potential
3/16 . responsive to fault current to earth, frame or mass (with balanced or differential arrangement H02H 3/26)
3/17 . . by means of an auxiliary voltage injected into the installation to be protected **[3]**
3/18 . responsive to reversal of direct current
3/20 . responsive to excess voltage
3/22 . . of short duration, e.g. lightning
3/24 . responsive to undervoltage or no-voltage
3/247 . . having timing means **[3]**
3/253 . . for multiphase applications, e.g. phase interruption **[3]**
3/26 . responsive to difference between voltages or between currents; responsive to phase angle between voltages or between currents

3/28 . . involving comparison of the voltage or current values at two spaced portions of a single system, e.g. at opposite ends of one line, at input and output of apparatus
3/30 . . . using pilot wires or other signalling channel
3/32 . . involving comparison of the voltage or current values at corresponding points in different conductors of a single system, e.g. of currents in go and return conductors
3/33 . . . using summation current transformers (H02H 3/347 takes precedence) **[3]**
3/34 . . . of a three-phase system
3/347 . . . . using summation current transformers **[3]**
3/353 . . . . involving comparison of phase voltages **[3]**
3/36 . . involving comparison of the voltage or current values at corresponding points of different systems, e.g. of parallel feeder systems
3/38 . responsive to both voltage and current; responsive to phase angle between voltage and current
3/40 . responsive to ratio of voltage and current
3/42 . responsive to product of voltage and current
3/44 . responsive to the rate of change of electrical quantities **[3]**
3/46 . responsive to frequency deviations **[3]**
3/48 . responsive to loss of synchronism **[3]**
3/50 . responsive to the appearance of abnormal wave forms, e.g. ac in dc installations **[3]**
3/52 . . responsive to the appearance of harmonics **[3]**

5/00 Emergency protective circuit arrangements for automatic disconnection directly responsive to an undesired change from normal non-electric working conditions with or without subsequent reconnection (using simulators of the apparatus being protected H02H 6/00; specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems H02H 7/00) **[3]**

5/04 . responsive to abnormal temperature
5/06 . . in oil-filled electric apparatus
5/08 . responsive to abnormal fluid pressure, liquid level or liquid displacement, e.g. Buchholz relays
5/10 . responsive to mechanical injury, e.g. rupture of line, breakage of earth connection
5/12 . responsive to undesired approach to, or touching of, live parts by living beings

6/00 Emergency protective circuit arrangements responsive to undesired changes from normal non-electric working conditions using simulators of the apparatus being protected, e.g. using thermal images [3]

7/00 Emergency protective circuit arrangements specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems, and effecting automatic switching in the event of an undesired change from normal working conditions (structural association of protective devices with specific machines or apparatus and their protection without automatic disconnection, see the relevant subclass for the machine or apparatus)

7/04 . for transformers
7/045 . . Differential protection of transformers **[3]**
7/05 . . for capacitive voltage transformers, e.g. against resonant conditions **[3]**
7/055 . . for tapped transformers or tap-changing means thereof **[3]**
7/06 . for dynamo-electric generators; for synchronous capacitors
7/08 . for dynamo-electric motors
7/085 . . against excessive load
7/09 . . against over-voltage; against reduction of voltage; against phase interruption
7/093 . . against increase beyond, or decrease below, a predetermined level of rotational speed (centrifugal switches H01H 35/10)
7/097 . . against wrong direction of rotation
7/10 . for converters; for rectifiers
7/12 . . for static converters or rectifiers
7/122 . . . for inverters, i.e. dc/ac converters **[2]**
7/125 . . . for rectifiers **[2]**
7/127 . . . . having auxiliary control electrode to which blocking control voltages or currents are applied in case of emergency **[2]**
7/16 . for capacitors (for synchronous capacitors H02H 7/06)
7/18 . for batteries; for accumulators
7/20 . for electronic equipment (for converters H02H 7/10; for electric measuring instruments G01R 1/36; for dc voltage or current semiconductor regulators G05F 1/569; for amplifiers H03F 1/52; for electronic switching circuits H03K 17/08)
7/22 . for distribution gear, e.g. bus-bar systems; for switching devices
7/24 . for spark-gap arresters
7/26 . Sectionalised protection of cable or line systems, e.g. for disconnecting a section on which a short-circuit, earth fault, or arc discharge has occurred (locating faults in cables G01R 31/08)
7/28 . . for meshed systems
7/30 . . Staggered disconnection **[3]**

9/00 Emergency protective circuit arrangements for limiting excess current or voltage without disconnection (structural association of protective devices with specific machines or apparatus, see the relevant subclass for the machine or apparatus)

9/02 . responsive to excess current
9/04 . responsive to excess voltage (lightning arrestors H01C 7/12, H01C 8/04, H01G 9/18, H01T)
9/06 . . using spark-gap arresters
9/08 . Limitation or suppression of earth fault currents, e.g. Petersen coil **[3]**

11/00 Emergency protective circuit arrangements for preventing the switching-on in case an undesired electric working condition might result

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

H02J CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (power supply circuits for apparatus for measuring X-radiation, gamma radiation, corpuscular radiation or cosmic radiation G01T 1/175; electric power supply circuits specially adapted for use in electronic time-pieces with no moving parts G04G 19/00; for digital computers G06F 1/18; for discharge tubes H01J 37/248; circuits or apparatus for the conversion of electric power, arrangements for control or regulation of such circuits or apparatus H02M; interrelated control of several motors, control of a prime-mover/generator combination H02P; control of high-frequency power H03L; additional use of power line or power network for transmission of information H04B)

(1) This subclass covers:
- ac or dc mains or distribution networks;
- circuit arrangements for battery supplies, including charging or control thereof, or co-ordinated supply from two or more sources of any kind;
- systems for supplying or distributing electric power by electromagnetic waves.

(2) This subclass does not cover:
- control of a single motor, generator or dynamo-electric converter, of the types covered by subclass H01F or H02K, which is covered by subclass H02P;
- control of a single motor or generator, of the types covered by subclass H02N, which is covered by that subclass.

Subclass index

1/00 Circuit arrangements for dc mains or dc distribution networks

1/02 . Arrangements for reducing harmonics or ripples (in converters H02M 1/14)

1/04 . Constant-current supply systems

1/06 . Two-wire systems

1/08 . Three-wire systems; Systems having more than three wires

1/10 . Parallel operation of dc sources (involving batteries H02J 7/34)

1/12 . . Parallel operation of dc generators with converters, e.g. with mercury-arc rectifier

1/14 . Balancing the load in a network (by batteries H02J 7/34)

1/16 . . using dynamo-electric machines coupled to flywheels

3/00 Circuit arrangements for ac mains or ac distribution networks

3/01 . Arrangements for reducing harmonics or ripples (in converters H02M 1/12) **[3]**

3/02 . using a single network for simultaneous distribution of power at different frequencies; using a single network for simultaneous distribution of ac power and of dc power

3/04 . for connecting networks of the same frequency but supplied from different sources

3/06 . . Controlling transfer of power between connected networks; Controlling sharing of load between connected networks

3/08 . . Synchronising of networks

3/10 . Constant-current supply systems

3/12 . for adjusting voltage in ac networks by changing a characteristic of the network load

3/14 . . by switching loads on to, or off from, network, e.g. progressively balanced loading

3/16 . . by adjustment of reactive power

3/18 . Arrangements for adjusting, eliminating, or compensating reactive power in networks (for adjustment of voltage H02J 3/12; use of Petersen coils H02H 9/08)

3/20 . . in long overhead lines

3/22 . . in cables

3/24 . Arrangements for preventing or reducing oscillations of power in networks (by control effected upon a single generator H02P 9/00)

3/26 . Arrangements for eliminating or reducing asymmetry in polyphase networks

3/28 . Arrangements for balancing the load in a network by storage of energy

3/30 . . using dynamo-electric machines coupled to flywheels

3/32 . . using batteries with converting means

3/34 . Arrangements for transfer of electric power between networks of substantially different frequency (frequency converters H02M)

3/36 . Arrangements for transfer of electric power between ac networks via a high-tension dc link

3/38 . Arrangements for parallelly feeding a single network by two or more generators, converters, or transformers

3/40 . . Synchronising a generator for connection to a network or to another generator

3/42 . . . with automatic parallel connection when synchronism is achieved

3/44 . . . with means for ensuring correct phase sequence

3/46 . . Controlling the sharing of output between the generators, converters, or transformers

3/48 . . . Controlling the sharing of the in-phase component

3/50 . . . Controlling the sharing of the out-of-phase component

4/00 Circuit arrangements for mains or distribution networks not specified as ac or dc [2]

5/00 Circuit arrangements for transfer of electric power between ac networks and dc networks (H02J 3/36 takes precedence)

7/00 Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries

7/02 . for charging batteries from ac mains by converters

7/04 . . Regulation of the charging current or voltage

7/06 . . . using discharge tubes or semiconductor devices

7/08 . . . . using discharge tubes only

7/10 . . . . using semiconductor devices only

7/12 . . . using magnetic devices having controllable degree of saturation, i.e. transductors

7/14 . for charging batteries from dynamo-electric generators driven at varying speed, e.g. on vehicle

7/16 . . Regulation of the charging current or voltage by variation of field

7/18 . . . due to variation of ohmic resistance in field circuit, using resistance switching in or out of circuit step by step

7/20 . . . due to variation of continuously-variable ohmic resistor

7/22 . . . due to variation of make-to-break ratio of intermittently-operating contacts, e.g. using Tirrill regulator

7/24 . . . using discharge tubes or semiconductor devices

7/26 . . . using magnetic devices with controllable degree of saturation

7/28 . . . using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device

7/30 . . . using armature-reaction-excited machines

7/32 . for charging batteries from a charging set comprising a non-electric prime mover

7/34 . Parallel operation in networks using both storage and other dc sources, e.g. providing buffering (H02J 7/14 takes precedence) **[4]**

7/35 . . with light sensitive cells **[4]**

7/36 . Arrangements using end-cell switching

9/00 Circuit arrangements for emergency or stand-by power supply, e.g. for emergency lighting (with provision for charging standby battery H02J 7/00)

9/02 . in which an auxiliary distribution system and its associated lamps are brought into service

9/04 . in which the distribution system is disconnected from the normal source and connected to a standby source

9/06 . . with automatic change-over

9/08 . . . requiring starting of a prime-mover

11/00 Circuit arrangements for providing service supply to auxiliaries of stations in which electric power is generated, distributed, or converted (emergency or standby arrangements H02J 9/00)

13/00 Circuit arrangements for providing remote indication of network conditions, e.g. an instantaneous record of the open or closed condition of each circuitbreaker in the network; **Circuit arrangements for providing remote control of switching means in a power distribution network, e.g. switching in and out of current consumers by using a pulse code signal carried by the network**

15/00 Systems for storing electric energy (mechanical systems therefor F01 to F04; in chemical form H01M) **[2]**

17/00 Systems for supplying or distributing electric power by electromagnetic waves [3]

H02K DYNAMO-ELECTRIC MACHINES (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R)

(1) This subclass covers the structural adaptation of the machines for the purposes of their control.

(2) This subclass does not cover starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators or dynamo-electric converters, in general, which are covered by subclass H02P.

(3) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to “micro-structural devices” and “micro-structural systems”. **[7]**

Subclass index

1/00 **Details of the magnetic circuit** (magnetic circuits or magnets in general, magnetic circuits for transformers for power supply H01F; magnetic circuits for relays H01H 50/16)

1/02 . characterised by the magnetic material

1/04 . characterised by the material used for insulating the magnetic circuit or parts thereof (insulation of windings H02K 3/30)

1/06 . characterised by the shape, form, or construction

1/08 . . Salient poles

1/10 . . . Commutating poles

1/12 . . Stationary parts of the magnetic circuit

1/14 . . . Stator cores with salient poles

1/16 . . . Stator cores with slots for windings

1/17 . . . Stator cores with permanent magnets **[5]**

1/18 . . . Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures

1/20 . . . with channels or ducts for flow of cooling medium

1/22 . . Rotating parts of magnetic circuit

1/24 . . . Rotor cores with salient poles

1/26 . . . Rotor cores with slots for windings

1/27 . . . Rotor cores with permanent magnets **[5]**

1/28 . . . Means for mounting or fastening rotating magnetic parts on to, or to, the rotor structures

1/30 . . . . using intermediate part or parts, e.g. spider

1/32 . . . with channels or ducts for flow of cooling medium

1/34 . . Reciprocating, oscillating, or vibrating part of magnetic circuit

3/00 **Details of windings** (coils in general H01F 5/00)

3/02 . Windings characterised by the conductor material (conductors in general H01B 1/00, H01B 5/00)

3/04 . Windings characterised by the conductor shape, form, or construction, e.g. with bar conductor

3/12 . . arranged in slots

3/14 . . . with transposed conductors, e.g. twisted conductor

3/16 . . . for damping, commutating, or other auxiliary purposes

3/18 . . Windings for salient poles

3/20 . . . for damping, commutating, or other auxiliary purposes

3/22 . . consisting of hollow conductors

3/24 . . with channels or ducts between the conductors for flow of cooling medium

3/26 . . consisting of printed conductors

3/28 . . Layout of windings or of connections between windings (windings for pole-changing H02K 17/06, H02K 17/14, H02K 19/12, H02K 19/32)

3/30 . Windings characterised by the insulating material (insulating bodies in general H01B 3/00, H01B 17/00)

3/32 . Windings characterised by the shape, form, or construction of the insulation

3/34 . . between conductors or between conductor and core, e.g. slot insulation **[3]**

3/38 . . around winding heads, equalising connectors, or connections thereto

3/40 . . for high voltage, e.g. affording protection against corona

3/42 . Means for preventing or reducing eddy-current losses in the winding heads, e.g. by shielding **[2]**

3/44 . Protection against moisture or chemical attack; Windings specially adapted for operation in liquid or gas

3/46 . Fastening of windings on stator or rotor structure

3/47 . . Air-gap windings, i.e. iron-free windings **[3]**

3/48 . . in slots

3/487 . . . Slot-closing devices **[3]**

3/493 . . . . where the devices are magnetic **[3]**

3/50 . . Fastening of winding heads, equalising connectors, or connections thereto

3/51 . . . applicable to rotors only **[3]**

3/52 . . Fastening salient pole windings or connections thereto

5/00 **Casings**; **Enclosures**; **Supports** (casings for electric apparatus in general H05K 5/00)

5/02 . Casings or enclosures characterised by the material thereof

5/04 . Casings or enclosures characterised by the shape, form, or construction thereof

5/06 . . Cast metal casings

5/08 . . Insulating casings

5/10 . . affording protection from ingress, e.g. of water, of fingers

5/12 . . specially adapted for operating in liquid or gas (combined with cooling arrangements H02K 9/00)

5/124 . . . Sealing of the shaft **[3]**

5/128 . . . using air-gap sleeve or air-gap disc **[3]**

5/132 . . . Submersible electric motor (H02K 5/128 takes precedence; pumping installations or systems for submerged use F04D 13/08) **[3]**

5/136 . . . explosion-proof **[3]**

5/14 . . Means for supporting or protecting brushes or brush holders **[3]**

5/15 . . Mounting arrangements for bearing-shields or end plates **[3]**

5/16 . . Means for supporting bearings, e.g. insulating support, means for fitting the bearing in the bearing-shield (magnetic bearings H02K 7/09)

5/167 . . . using sliding-contact or spherical cap bearings **[3]**

5/173 . . . using ball bearings or bearings with rolling contact **[3]**

5/18 . . with ribs or fins for improving heat transfer

5/20 . . with channels or ducts for flow of cooling medium

5/22 . . Other additional parts of casings, e.g. shaped to form connection or terminal box

5/24 . specially adapted for suppression or reduction of noise or vibration

5/26 . Means for adjusting the casing relative to its support

7/00 Arrangements for handling mechanical energy structurally associated with the machine, e.g. structural association with mechanical driving motor or auxiliary dynamo-electric machine

7/02 . Additional mass for increasing inertia, e.g. flywheel

7/04 . Balancing means

7/06 . Means for converting reciprocating into rotary motion or vice versa

7/065 . . Electromechanical oscillators; Vibrating magnetic drives (in time-pieces G04C 5/00) **[3]**

7/07 . . using pawl and ratchet wheel **[3]**

7/075 . . using crankshaft or eccentric **[3]**

7/08 . Structural association with bearings (support in machine casing H02K 5/16)

7/09 . . with magnetic bearings **[3]**

7/10 . Structural association with clutches, brakes, gears, pulleys, mechanical starters

7/102 . . with friction brakes

7/104 . . with eddy-current brakes

7/106 . . with dynamo-electric brakes

7/108 . . with friction clutches

7/11 . . with dynamo-electric clutches

7/112 . . with friction clutches and brakes

7/114 . . with dynamo-electric clutches and brakes

7/116 . . with gears

7/118 . . with starting device

7/12 . . with auxiliary limited movement of stator, rotor, or core parts, e.g. rotor axially movable for the purpose of clutching or braking

7/14 . Structural association with mechanical load, e.g. hand-held machine tool, fan (with fan or impeller for cooling the machine H02K 9/06; for suction cleaners A47L)

7/16 . . for operation above critical speed of vibration of rotating parts

7/18 . Structural association of electric generator with mechanical driving motor, e.g. turbine (if the driving-motor aspect predominates, see the relevant place of section F, e.g. F03B 13/00)

7/20 . Structural association with auxiliary dynamo-electric machine, e.g. with electric starter motor, with exciter

9/00 Systems for cooling or ventilating (channels or ducts in parts of the magnetic circuit H02K 1/20, H02K 1/32; channels or ducts in or between conductors H02K 3/22, H02K 3/24)

9/02 . by ambient air flowing through the machine

9/04 . . having means for generating flow of cooling medium, e.g. having fan

9/06 . . . with fan or impeller driven by the machine shaft

9/08 . by gaseous cooling medium circulating wholly within the machine casing (H02K 9/10 takes precedence)

9/10 . by gaseous cooling medium flowing in closed circuit, a part of which is external to the machine casing

9/12 . . wherein the cooling medium circulates freely within the casing

9/14 . wherein gaseous cooling medium circulates between the machine casing and a surrounding mantle

9/16 . . wherein the cooling medium circulates through ducts or tubes within the casing

9/18 . . wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing

9/19 . for machines with closed casing and with closed-circuit cooling using a liquid cooling medium, e.g. oil

9/193 . . with provision for replenishing the cooling medium; with means for preventing leakage of the cooling medium

9/197 . . in which the rotor or stator space is fluid-tight, e.g. to provide for different cooling media for rotor and stator

9/20 . . wherein the cooling medium vaporises within the machine casing

9/22 . by solid heat conducting material embedded in, or arranged in contact with, stator or rotor, e.g. heat bridge

9/24 . Protection against failure of cooling arrangements, e.g. due to loss of cooling medium, due to interruption of the circulation of cooling medium (circuit arrangements affording such protection H02H 7/00)

9/26 . Structural association with machine of devices for cleaning or drying cooling medium, e.g. of filter

9/28 . Cooling of commutators, slip-rings, or brushes, e.g. by ventilating (current collectors in general H01R 39/00)

11/00 Structural association with measuring or protective devices or electric components, e.g. with resistor, with switch, with suppressor for radio interference

11/02 . for suppression of radio interference **[6]**

11/04 . for rectification **[6]**

13/00 Structural associations of current collectors with motors or generators, e.g. brush mounting plates, connections to windings (supporting or protecting brushes or brush holders in motor casings or enclosures H02K 5/14); **Disposition of current collectors in motors or generators**; **Arrangements for improving commutation**

13/02 . Connections of slip-rings with the winding

13/04 . Connections of commutator segments with the winding

13/06 . . Resistive connections between winding and commutator segments, e.g. by high-resistance choke, by transistor

13/08 . . Segments formed by extensions of winding

13/10 . Special arrangements of brushes or commutators for the purpose of improving commutation

13/12 . Means for producing an axial reciprocation of the rotor and its associated current collector part, e.g. for polishing commutator surface

13/14 . Circuit arrangements for improvement of commutation, e.g. by use of unidirectionally conductive element

15/00 Methods or apparatus specially adapted for manufacturing, assembling, maintaining, or repairing dynamo-electric machines (manufacture of current collectors in general H01R 43/00)

15/02 . of stator or rotor bodies

15/03 . . having permanent magnets **[5]**

15/04 . of windings, prior to mounting into the machine (insulating windings H02K 15/10, H02K 15/12; coil manufacture in general H01F 41/02)

15/06 . Embedding prefabricated windings in the machine

15/08 . Forming windings by laying conductors into or around core part

15/085 . . by laying conductors into slotted stators

15/09 . . by laying conductors into slotted rotors

15/095 . . by laying conductors around salient poles

15/10 . Applying solid insulation to the windings, the stator, or the rotor

15/12 . Impregnating, heating or drying of windings, stators, rotors, or machines

15/14 . Casings; Enclosures; Supports

15/16 . Centering the rotor within the stator; Balancing the rotor (balancing in general G01M)

16/00 Machines with more than one rotor or stator [2]

16/02 . Machines with one stator and two rotors **[2]**

16/04 . Machines with one rotor and two stators **[2]**

Note

Group H02K 16/00 takes precedence over groups H02K 17/00 to H02K 53/00. **[2]**

17/00 Asynchronous induction motors; **Asynchronous induction generators**

17/02 . Asynchronous induction motors

17/04 . . for single phase current

17/06 . . . having windings arranged for permitting pole-changing

17/08 . . . Motors with auxiliary phase obtained by externally fed auxiliary winding, e.g. capacitor motor

17/10 . . . Motors with auxiliary phase obtained by split-pole carrying short-circuited winding

17/12 . . for multi-phase current

17/14 . . . having windings arranged for permitting pole-changing

17/16 . . having rotor with internally short-circuited windings, e.g. cage rotor

17/18 . . . having double- or multiple-cage rotor

17/20 . . . having deep-bar rotor

17/22 . . having rotor with windings connected to slip-rings

17/24 . . . in which both stator and rotor are fed with ac

17/26 . . having rotor or stator designed to permit synchronous operation

17/28 . . having compensating winding for improving phase angle

17/30 . . Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the motor, e.g. with impedance, with switch (control arrangements external to the motor H02P)

17/32 . . Structural association with auxiliary mechanical devices, e.g. clutch, brake (control arrangements external to the motor H02P)

17/34 . . Cascade arrangement of an asynchronous motor with another dynamo-electric motor or converter (control of cascade arrangements H02P)

17/36 . . . with another asynchronous induction motor

17/38 . . . with a commutator machine

17/40 . . . with a rotary ac/dc converter (cascade ac/dc converters H02K 47/06)

17/42 . Asynchronous induction generators (H02K 17/02 takes precedence) **[4]**

17/44 . . Structural association with exciting machine

19/00 Synchronous motors or generators (having permanent magnet H02K 21/00)

19/02 . Synchronous motors

19/04 . . for single-phase current

19/06 . . . Motors having windings on the stator and a variable-reluctance soft-iron rotor without windings, e.g. inductor motor

19/08 . . . Motors having windings on the stator and a smooth rotor of material with large hysteresis without windings, e.g. hysteresis motor

19/10 . . for multi-phase current

19/12 . . . characterised by the arrangement of exciting windings, e.g. for self-excitation, for compounding, for pole-changing

19/14 . . having additional short-circuited winding for starting as an asynchronous motor

19/16 . Synchronous generators

19/18 . . having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar generator

19/20 . . . with variable-reluctance soft-iron rotor without winding

19/22 . . having windings each turn of which co-operates alternately with poles of opposite polarity, e.g. heteropolar generator

19/24 . . . with variable-reluctance soft-iron rotor without winding

19/26 . . characterised by the arrangement of exciting winding

19/28 . . . for self-excitation

19/30 . . . for compounding

19/32 . . . for pole-changing

19/34 . . Generators with two or more outputs

19/36 . . Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the generator, e.g. with impedance, with switch (control arrangements external to the generator H02P)

19/38 . . Structural association with exciting machine

21/00 Synchronous motors having permanent magnet; **Synchronous generators having permanent magnet** (stator cores with permanent magnets H02K 1/17; rotor cores with permanent magnets H02K 1/27)

21/02 . Details

21/04 . . Windings on magnet for additional excitation

21/10 . . Rotating armatures

21/12 . with stationary armature and rotating magnet

21/14 . . magnet rotating within armature
21/16 . . . having an annular armature core with salient poles (with homopolar co-operation H02K 21/20)
21/18 . . . having horse-shoe armature core (with homopolar co-operation H02K 21/20)
21/20 . . . having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar machine
21/22 . . magnet rotating around armature, e.g. flywheel magneto
21/24 . . magnet axially facing armature, e.g. hub-type cycle dynamo
21/26 . with rotating armature and stationary magnet
21/28 . . armature rotating within magnet
21/30 . . . having an annular armature core with salient poles (with homopolar co-operation H02K 21/36)
21/32 . . . having a horse-shoe magnet (with homopolar co-operation H02K 21/36)
21/34 . . . having bell-shaped or bar-shaped magnet, e.g. for cycle lighting (with homopolar co-operation H02K 21/36)
21/36 . . . with homopolar co-operation
21/38 . with rotating flux distributor, and armature and magnet both stationary
21/40 . . flux distributor rotating around magnet and within armature
21/42 . . flux distributor rotating around armature and within magnet
21/44 . . armature windings wound upon magnet
21/46 . Motors having additional short-circuited winding for starting as an asynchronous motor
21/48 . Generators with two or more outputs

23/00 Dc commutator motors or generators having mechanical commutator; **Universal ac/dc commutator motors**

23/02 . characterised by the exciting arrangement
23/04 . . having permanent magnet excitation
23/06 . . having shunt connection of excitation windings
23/08 . . having series connection of excitation windings
23/10 . . having compound connection of excitation windings
23/12 . . having excitation produced by a current source independent of the armature circuit
23/14 . . having high-speed excitation or de-excitation, e.g. by neutralising the remanent excitation field
23/16 . . having angularly adjustable excitation field, e.g. by pole reversing, by pole switching
23/18 . . having displaceable main or auxiliary brushes
23/20 . . having additional brushes spaced intermediately of the main brushes on the commutator, e.g. cross-field machine, metadyne, amplidyne, other armature-reaction excited machine
23/22 . . having compensating or damping winding
23/24 . . having commutating-pole winding
23/26 . characterised by the armature winding
23/28 . . having open winding, i.e. not closed within armature
23/30 . . having lap winding; having loop winding
23/32 . . having wave winding; having undulating winding
23/34 . . having mixed windings
23/36 . . having more than one winding; having more than one commutator; having more than one stator
23/38 . . having winding or connection for improving commutation, e.g. equipotential connection
23/40 . characterised by the arrangement of the magnet circuit
23/42 . . having split poles, i.e. zones for varying reluctance by gaps in poles or by poles with different spacing of the air gap
23/44 . . having movable or turnable iron parts
23/46 . . having stationary shunts, i.e. magnetic cross flux
23/48 . . having adjustable armature
23/50 . Generators with two or more outputs
23/52 . Motors acting also as generators, e.g. starting motor used as generator for ignition or lighting
23/54 . Disc armature motors or generators
23/56 . Motors or generators having the iron core separated from armature winding
23/58 . Motors or generators having no iron core
23/60 . Motors or generators having a rotating armature and a rotating excitation field
23/62 . Motors or generators with stationary armature and rotating excitation field
23/64 . Motors specially adapted for running on dc or ac by choice
23/66 . Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine, e.g. with impedance, with switch (control arrangements external to the machine H02P)
23/68 . Structural association with auxiliary mechanical devices, e.g. with clutch, with brake (control arrangements external to the machine H02P)

24/00 Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchro, selsyn

25/00 Dc interrupter motors or generators

26/00 Machines adapted to function as torque motors, i.e. to exert a torque when stalled

27/00 Ac commutator motors or generators having mechanical commutator (universal ac/dc motors H02K 23/64)

27/02 . characterised by the armature winding
27/04 . having single-phase operation in series or shunt connection
27/06 . . with a single or multiple short-circuited commutator, e.g. repulsion motor
27/08 . . with multiple-fed armature
27/10 . . with switching devices for different modes of operation, e.g. repulsion-induction motor
27/12 . having multi-phase operation
27/14 . . in series connection
27/16 . . in shunt connection with stator feeding
27/18 . . in shunt connection with rotor feeding
27/20 . Structural association with a speed regulating device
27/22 . having means for improving commutation, e.g. auxiliary fields, double windings, double brushes
27/24 . having two or more commutators
27/26 . having disc armature
27/28 . Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine (control arrangements external to the machine H02P)
27/30 . Structural association with auxiliary mechanical devices, e.g. clutch, brake (control arrangements external to the machine H02P)

29/00 Motors or generators having non-mechanical commutating devices, e.g. discharge tubes, semiconductor devices

29/03 . with a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems **[6]**

29/06 . with position sensing devices (H02K 29/03 takes precedence) **[4,6]**

29/08 . . using magnetic effect devices, e.g. Hall-plates, magneto-resistors (H02K 29/12 takes precedence) **[4]**

29/10 . . using light effect devices **[4]**

29/12 . . using detecting coils **[4]**

29/14 . with speed sensing devices (H02K 29/03 takes precedence) **[4,6]**

31/00 Acyclic motors or generators, i.e. dc machines having a drum or disc armature with continuous current collectors

31/02 . with solid-contact collectors

31/04 . with at least one liquid-contact collector

33/00 Motors with reciprocating, oscillating, or vibrating magnet, armature, or coil system (arrangements for handling mechanical energy structurally associated with motors H02K 7/00, e.g. H02K 7/06)

33/02 . with armature moved one way by energisation of a single coil system and returned by mechanical force, e.g. by spring

33/04 . . wherein the frequency of operation is determined by the frequency of uninterrupted ac energisation

33/06 . . . with polarised armature

33/08 . . . with dc energisation superimposed on ac energisation

33/10 . . wherein the alternate energisation and de-energisation of the single coil system is effected or controlled by movement of the armature

33/12 . with armature moving in alternate directions by alternate energisation of two coil systems

33/14 . . wherein the alternate energisation and de-energisation of the two coil systems are effected or controlled by movement of the armature

33/16 . with polarised armature moving in alternate directions by reversal or energisation of a single coil system

33/18 . with coil system moving upon intermittent or reversed energisation thereof by interaction with a fixed field system, e.g. permanent magnet

35/00 Generators with reciprocating, oscillating, or vibrating coil system, magnet, armature, or other part of the magnetic circuit (arrangements for handling mechanical energy structurally associated with generators H02K 7/00, e.g. H02K 7/06)

35/02 . with moving magnet and stationary coil system

35/04 . with moving coil system and stationary magnet

35/06 . with moving flux distributor, and both coil system and magnet stationary

37/00 Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors

37/02 . variable reluctance type **[4]**

37/04 . . Rotor situated within stator **[4]**

37/06 . . Rotor situated around stator **[4]**

37/08 . . Rotor axially facing stator **[4]**

37/10 . permanent magnet type (H02K 37/02 takes precedence) **[4]**

37/12 . . with stationary armature and rotating magnet **[4]**

37/14 . . . Magnet rotating within armature **[4]**

37/16 . . . . having horseshoe armature core **[4]**

37/18 . . . . homopolar type **[4]**

37/20 . . with rotating flux distributor, the armature and magnet both being stationary **[4]**

37/22 . Damping units **[4]**

37/24 . Structural association with auxiliary mechanical devices **[4]**

39/00 Generators specially adapted for producing a desired non-sinusoidal waveform

41/00 Propulsion systems in which a rigid body is moved along a path due to dynamo-electric interaction between the body and a magnetic field travelling along the path

41/02 . Linear motors; Sectional motors **[3]**

41/025 . . Asynchronous motors **[3]**

41/03 . . Synchronous motors; Motors moving step by step; Reluctance motors (H02K 41/035 takes precedence) **[3]**

41/035 . . Dc motors; Unipolar motors **[3]**

41/06 . Rolling motors, i.e. having the rotor axis parallel to the stator axis and following a circular path as the rotor rolls around the inside or outside of the stator

44/00 Machines in which the dynamo-electric interaction between a plasma or flow of conductive liquid or of fluid-borne conductive or magnetic particles and a coil system or magnetic field converts energy of mass flow into electrical energy or vice versa [3]

44/02 . Electrodynamic pumps **[3]**

44/04 . . Conduction pumps **[3]**

44/06 . . Induction pumps **[3]**

44/08 . Magnetohydrodynamic (MHD) generators **[3]**

44/10 . . Constructional details of electrodes **[3]**

44/12 . . Constructional details of fluid channel **[3]**

44/14 . . . Circular or screw-shaped channel **[3]**

44/16 . . Constructional details of the magnetic circuit **[3]**

44/18 . . for generating ac power **[3]**

44/20 . . . by changing the polarity of the magnetic field **[3]**

44/22 . . . by changing the conductivity of the fluid **[3]**

44/24 . . . by reversing the direction of fluid **[3]**

44/26 . . . by creating a travelling magnetic field **[3]**

44/28 . Association of MHD generators with conventional generators (nuclear power plants including a MHD generator G21D 7/02) **[3]**

47/00 Dynamo-electric converters

47/02 . Ac/dc converters or vice versa

47/04 . . Motor/generators

47/06 . . Cascade converters

47/08 . . Single-armature converters

47/10 . . . with booster machine on the ac side

47/12 . Dc/dc converters

47/14 . . Motor/generators

47/16 . . Single-armature converters, e.g. metadyne

47/18 . Ac/ac converters

47/20 . . Motor/generators

47/22 . . Single-armature frequency converters with or without phase-number conversion

47/24 . . . having windings for different numbers of poles

47/26 . . . operating as under- or over-synchronously running asynchronous induction machines, e.g. cascade arrangement of asynchronous and synchronous machines

47/28 . . . operating as commutator machines with added slip-rings
47/30 . . Single-armature phase-number converters without frequency conversion

49/00 Dynamo-electric clutches; **Dynamo-electric brakes** (electrically or magnetically actuated clutches or brakes F16D 27/00, F16D 29/00, F16D 65/34, F16D 65/36; magnetic-particle clutches F16D 37/02; adapted for use as dynamometers G01L)
49/02 . of the asynchronous induction type
49/04 . . of the eddy-current hysteresis type
49/06 . of the synchronous type
49/08 . of the collector armature type
49/10 . of the permanent-magnet type
49/12 . of the acyclic type

51/00 Dynamo-electric gears, i.e. dynamo-electric means for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts

53/00 Alleged dynamo-electric perpetua mobilia

55/00 Dynamo-electric machines having windings operating at cryogenic temperatures [3]
55/02 . of the synchronous type **[3]**
55/04 . . with rotating field windings **[3]**
55/06 . of the homopolar type **[3]**

57/00 Dynamo-electric machines not provided for in groups H02K 17/00 to H02K 55/00 [3]

H02M APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; **CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER**; **CONTROL OR REGULATION THEREOF** (conversion of current or voltage specially adapted for use in electronic time-pieces with no moving parts G04G 19/02; systems for regulating electric or magnetic variables in general, e.g. using transformers, reactors or choke coils, combination of such systems with static converters G05F; for digital computers G06F 1/00; transformers H01F; connection or control of one converter with regard to conjoint operation with a similar or other source of supply H02J; dynamo-electric converters H02K 47/00; controlling transformers, reactors or choke coils, control or regulation of electric motors, generators or dynamo-electric converters H02P; pulse generators H03K) **[4,5]**

(1) This subclass covers only circuits or apparatus for the conversion of electric power, or arrangements for control or regulation of such circuits or apparatus.
(2) This subclass does not cover the individual electro-technical devices employed when converting electric power. Such devices are covered by the relevant subclasses, e.g. inductors, transformers H01F, capacitors, electrolytic rectifiers H01G, mercury-vapour rectifying or other discharge tubes H01J, semiconductor devices H01L, impedance networks or resonant circuits not primarily concerned with the transfer of electric power H03H.
(3) In this subclass, the following term is used with the meaning indicated:
– "conversion", in respect of an electric variable, e.g. voltage or current, means the change of one or more of the parameters of the variable, e.g. amplitude, frequency, phase, polarity. **[4]**

Subclass index

1/00 Details of apparatus for conversion [1,2007.01]
1/02 . Circuits specially adapted for the generation of grid-control or igniter-control voltages for discharge tubes incorporated in static converters
1/04 . . for tubes with grid control
1/06 . Circuits specially adapted for rendering non-conductive gas discharge tubes or equivalent semiconductor devices, e.g. thyratrons, thyristors **[2]**
1/08 . Circuits specially adapted for the generation of control voltages for semiconductor devices incorporated in static converters
1/084 . . using a control circuit common to several phases of a multi-phase system **[4]**
1/088 . . for the simultaneous control of series or parallel connected semiconductor devices **[4]**
1/092 . . . the control signals being transmitted optically **[4]**
1/096 . . . the power supply of the control circuit being connected in parallel to the main switching element (H02M 1/092 takes precedence) **[4]**
1/10 . Arrangements incorporating converting means for enabling loads to be operated at will from different kinds of power supplies, e.g. from ac or dc
1/12 . Arrangements for reducing harmonics from ac input or output
1/14 . Arrangements for reducing ripples from dc input or output
1/15 . . using active elements **[4]**
1/16 . Means for providing current step on switching, e.g. with saturable reactor
1/20 . Contact mechanisms of dynamic converters
1/22 . . incorporating collectors and brushes
1/24 . . incorporating rolling or tumbling contacts
1/26 . . incorporating cam-operated contacts
1/28 . . incorporating electromagnetically-operated vibrating contacts

1/30 . . incorporating liquid contacts
1/32 . Means for protecting converters other than by automatic disconnection (emergency protective circuit arrangements specially adapted for converters with automatic disconnection H02H 7/10) **[2007.01]**
1/34 . . Snubber circuits **[2007.01]**
1/36 . Means for starting or stopping converters **[2007.01]**
1/38 . Means for preventing simultaneous conduction of switches **[2007.01]**
1/40 . Means for preventing magnetic saturation **[2007.01]**
1/42 . Circuits or arrangements for compensating for or adjusting power factor in converters or inverters **[2007.01]**
1/44 . Circuits or arrangements for compensating for electromagnetic interference in converters or inverters **[2007.01]**

3/00 Conversion of dc power input into dc power output
3/02 . without intermediate conversion into ac
3/04 . . by static converters
3/06 . . . using resistors or capacitors, e.g. potential divider
3/07 . . . . using capacitors charged and discharged alternately by semiconductor devices with control electrode **[4]**
3/08 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
3/10 . . . using discharge tubes with control electrode or semiconductor devices with control electrode (H02M 3/07 takes precedence) **[4]**
3/125 . . . . using devices of a thyratron or thyristor type requiring extinguishing means **[2]**
3/13 . . . . . using discharge tubes only **[2]**
3/135 . . . . . using semiconductor devices only **[2]**
3/137 . . . . . with automatic control of output voltage or current, e.g. switching regulators **[4]**
3/139 . . . . . with digital control **[4]**
3/142 . . . . . including plural semiconductor devices as final control devices for a single load **[4]**
3/145 . . . . using devices of a triode or transistor type requiring continuous application of a control signal **[2]**
3/15 . . . . . using discharge tubes only **[2]**
3/155 . . . . . using semiconductor devices only **[2]**
3/156 . . . . . with automatic control of output voltage or current, e.g. switching regulators **[4]**
3/157 . . . . . with digital control **[4]**
3/158 . . . . . including plural semiconductor devices as final control devices for a single load **[4]**
3/16 . . by dynamic converters
3/18 . . . using capacitors or batteries which are alternately charged and discharged, e.g. charged in parallel and discharged in series
3/20 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
3/22 . with intermediate conversion into ac
3/24 . . by static converters
3/26 . . . using discharge tubes without control electrode or semiconductor devices without control electrode to produce the intermediate ac
3/28 . . . using discharge tubes with control electrode or semiconductor devices with control electrode to produce the intermediate ac
3/305 . . . . using devices of a thyratron or thyristor type requiring extinguishing means **[2]**
3/31 . . . . . using discharge tubes only **[2]**
3/315 . . . . . using semiconductor devices only **[2]**
3/325 . . . . using devices of a triode or a transistor type requiring continuous application of a control signal **[2]**
3/33 . . . . . using discharge tubes only **[2]**
3/335 . . . . . using semiconductor devices only **[2]**
3/337 . . . . . in push-pull configuration **[4]**
3/338 . . . . . in a self-oscillating arrangement (H02M 3/337 takes precedence) **[4]**
3/34 . . by dynamic converters
3/36 . . . using mechanical parts to select progressively or to vary continuously the input potential
3/38 . . . using mechanical contact-making and -breaking parts to interrupt a single potential
3/40 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
3/42 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)
3/44 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

5/00 Conversion of ac power input into ac power output, e.g. for change of voltage, for change of frequency, for change of number of phases
5/02 . without intermediate conversion into dc
5/04 . . by static converters (controlling transformers, reactors or choke coils, e.g. by tap changing, H02P 13/00) **[4]**
5/06 . . . using impedances
5/08 . . . . using capacitors only
5/10 . . . using transformers
5/12 . . . . for conversion of voltage or current amplitude only
5/14 . . . . for conversion between circuits of different phase number
5/16 . . . . for conversion of frequency
5/18 . . . . for conversion of waveform
5/20 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
5/22 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
5/25 . . . . using devices of a thyratron or thyristor type requiring extinguishing means (H02M 5/27 takes precedence) **[2]**
5/253 . . . . . using discharge tubes only **[2]**
5/257 . . . . . using semiconductor devices only **[2]**
5/27 . . . . . for conversion of frequency **[2]**
5/275 . . . . using devices of a triode or transistor type requiring continuous application of a control signal (H02M 5/297 takes precedence) **[2]**
5/29 . . . . . using discharge tubes only **[2]**
5/293 . . . . . using semiconductor devices only **[2]**
5/297 . . . . . for conversion of frequency **[2]**
5/32 . . by dynamic converters
5/34 . . . using mechanical contact-making and -breaking parts

5/36 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
5/38 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
5/40 . with intermediate conversion into dc
5/42 . . by static converters
5/44 . . . using discharge tubes or semiconductor devices to convert the intermediate dc into ac
5/443 . . . . using devices of a thyratron or thyristor type requiring extinguishing means **[2]**
5/447 . . . . . using discharge tubes only **[2]**
5/45 . . . . . using semiconductor devices only **[2]**
5/451 . . . . . with automatic control of output voltage or frequency **[4]**
5/452 . . . . . with automatic control of output waveform **[4]**
5/453 . . . . using devices of a triode or transistor type requiring continuous application of a control signal **[2]**
5/456 . . . . . using discharge tubes only **[2]**
5/458 . . . . . using semiconductor devices only **[2]**
5/46 . . by dynamic converters
5/48 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

7/00 Conversion of ac power input into dc power output; Conversion of dc power input into ac power output
7/02 . Conversion of ac power input into dc power output without possibility of reversal
7/04 . . by static converters
7/06 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
7/08 . . . . arranged for operation in parallel
7/10 . . . . arranged for operation in series, e.g. for multiplication of voltage
7/12 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
7/145 . . . . using devices of a thyratron or thyristor type requiring extinguishing means **[2,4]**
7/15 . . . . . using discharge tubes only **[2]**
7/155 . . . . . using semiconductor devices only **[2]**
7/162 . . . . . in a bridge configuration **[4]**
7/17 . . . . . arranged for operation in parallel **[2,4]**
7/19 . . . . . arranged for operation in series, e.g. for voltage multiplication **[2,4]**
7/21 . . . . using devices of a triode or transistor type requiring continuous application of a control signal **[2,4]**
7/213 . . . . . using discharge tubes only **[2]**
7/217 . . . . . using semiconductor devices only **[2]**
7/219 . . . . . in a bridge configuration **[4]**
7/23 . . . . . arranged for operation in parallel **[2,4]**
7/25 . . . . . arranged for operation in series, e.g. for multiplication of voltage **[2,4]**
7/26 . . . using open-spark devices, e.g. Marx rectifier
7/28 . . . using electrolytic rectifiers
7/30 . . by dynamic converters
7/32 . . . using mechanical contact-making and -breaking parts
7/34 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
7/36 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)
7/38 . . . using one or more sparking electrodes rotating over counterelectrodes
7/40 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
7/42 . Conversion of dc power input into ac power output without possibility of reversal
7/44 . . by static converters
7/46 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
7/48 . . . using discharge tubes with control electrode or semiconductor devices with control electrode **[1,2007.01]**
7/483 . . . . Converters with outputs that each can have more than two voltage levels **[2007.01]**
7/487 . . . . . Neutral point clamped inverters **[2007.01]**
7/49 . . . . . Combination of the output voltage waveforms of a plurality of converters **[2007.01]**
7/493 . . . . the static converters being arranged for operation in parallel **[2007.01]**
7/497 . . . . sinusoidal output voltages being obtained by combination of several voltages being out of phase **[2007.01]**
7/501 . . . . sinusoidal output voltages being obtained by the combination of several pulse-voltages having different amplitude and width **[2007.01]**
7/505 . . . . using devices of a thyratron or thyristor type requiring extinguishing means **[2]**
7/51 . . . . . using discharge tubes only **[2]**
7/515 . . . . . using semiconductor devices only **[2,2007.01]**
7/516 . . . . . Self-oscillating arrangements **[2007.01]**
7/517 . . . . . with special starting equipment **[4]**
7/519 . . . . . in a push-pull configuration (H02M 7/517 takes precedence) **[4]**
7/521 . . . . . in a bridge configuration **[4]**
7/523 . . . . . with LC-resonance circuit in the main circuit **[4]**
7/525 . . . . . with automatic control of output waveform or frequency (H02M 7/517 to H02M 7/523 take precedence) **[4]**
7/527 . . . . . by pulse width modulation **[4]**
7/529 . . . . . using digital control **[4]**
7/53 . . . . using devices of a triode or transistor type requiring continuous application of a control signal **[2]**
7/533 . . . . . using discharge tubes only **[2]**
7/537 . . . . . using semiconductor devices only, e.g. single switched pulse inverters **[2]**
7/5375 . . . . . with special starting equipment **[4]**
7/538 . . . . . in a push-pull configuration (H02M 7/5375 takes precedence) **[4,2007.01]**
7/5381 . . . . . Parallel type **[2007.01]**
7/5383 . . . . . in a self-oscillating arrangement (H02M 7/538 takes precedence) **[4,2007.01]**
7/53838 . . . . . using a single commutation path **[2007.01]**
7/53846 . . . . . Control circuits **[2007.01]**

7/53854 . . . . . using thyristor type converters **[2007.01]**
7/53862 . . . . . using transistor type converters **[2007.01]**
7/5387 . . . . . in a bridge configuration **[4,2007.01]**
7/5388 . . . . . with asymmetrical configuration of switches **[2007.01]**
7/539 . . . . . with automatic control of output wave form or frequency (H02M 7/5375 to H02M 7/5387 take precedence) **[4]**
7/5395 . . . . . by pulse-width modulation **[4]**
7/54 . . by dynamic converters
7/56 . . . using mechanical parts to select progressively, or to vary continuously, the input potential
7/58 . . . using mechanical contact-making and -breaking parts to interrupt a single potential
7/60 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
7/62 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)
7/64 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
7/66 . with possibility of reversal
7/68 . . by static converters
7/70 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
7/72 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
7/75 . . . . using devices of a thyratron or thyristor type requiring extinguishing means (H02M 7/77 takes precedence) **[2]**
7/753 . . . . . using discharge tubes only **[2]**
7/757 . . . . . using semiconductor devices only **[2]**
7/758 . . . . . with automatic control of output waveform or frequency **[4]**
7/77 . . . . . arranged for operation in parallel **[2]**
7/79 . . . . using devices of a triode or transistor type requiring continuous application of a control signal (H02M 7/81 takes precedence) **[2]**
7/793 . . . . . using discharge tubes only **[2]**
7/797 . . . . . using semiconductor devices only **[2]**
7/81 . . . . . arranged for operation in parallel **[2]**
7/82 . . . using open-spark devices, e.g. Marx rectifier
7/84 . . . using electrolytic rectifiers
7/86 . . by dynamic converters
7/88 . . . using mechanical parts to select progressively or to vary continuously the input potential
7/90 . . . using mechanical contact-making and -breaking parts to interrupt a single potential
7/92 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
7/94 . . . . wherein the parts are operated by rotating cams or cam-like devices
7/95 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)
7/96 . . . . with moving liquid contacts
7/98 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

9/00 Conversion of dc or ac input power into surge output power [2]
9/02 . with dc input power **[2]**
9/04 . . using capacitative stores **[2]**
9/06 . with ac input power **[2]**

11/00 Power conversion systems not covered by the other groups of this subclass [4]

H02N ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR

(1) This subclass covers:
- electrostatic generators, motors, clutches, or holding devices;
- other non-dynamo-electric generators or motors;
- holding or levitation devices using magnetic attraction or repulsion;
- arrangements for starting, regulating, braking, or otherwise controlling such machines unless in conjoint operation with a second machine.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to “micro-structural devices” and “micro-structural systems”. **[7]**

(3) Specific provision for generators, motors, or other means for converting between electric and other forms of energy also exists in other subclasses, e.g. in subclasses H01L, H01M, H02K, H04R.

Subclass index

1/00 **Electrostatic generators or motors using a solid moving electrostatic charge carrier**
1/04 . Friction generators
1/06 . Influence generators
1/08 . . with conductive charge carrier, i.e. capacitor machines
1/10 . . with non-conductive charge carrier
1/12 . . . in the form of a conveyer belt, e.g. van de Graaff machine

2/00 **Electric machines in general using piezo-electric effect, electrostriction or magnetostriction** (generating mechanical vibrations in general B06B; piezo-electric, electrostrictive or magnetostrictive elements in general H01L 41/00) **[4]**
2/02 . producing linear motion, e.g. actuators; Linear positioners **[6]**
2/04 . . Constructional details **[6]**
2/06 . . Drive circuits; Control arrangements **[6]**
2/08 . . using travelling waves, e.g. linear motors **[6]**
2/10 . producing rotary motion, e.g. rotary motors **[6]**
2/12 . . Constructional details **[6]**
2/14 . . Drive circuits; Control arrangements **[6]**
2/16 . . using travelling waves **[6]**
2/18 . producing electrical output from mechanical input, e.g. generators (for measurement devices G01) **[6]**

3/00 **Generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom** (discharge tubes functioning as thermionic generators H01J 45/00) **[3]**

6/00 **Generators in which light radiation is directly converted into electrical energy** (solar cells or assemblies thereof H01L 25/00, H01L 31/00) **[4]**

10/00 **Electric motors using thermal effects [3]**

11/00 **Generators or motors not provided for elsewhere**; **Alleged perpetua mobilia obtained by electric or magnetic means** (by hydrostatic pressure F03B 17/04; by dynamo-electric means H02K 53/00)

13/00 **Clutches or holding devices using electrostatic attraction, e.g. using Johnson-Rahbek effect**

15/00 **Holding or levitation devices using magnetic attraction or repulsion, not otherwise provided for** (electric or magnetic devices for holding work on machine tools B23Q 3/15; sliding or levitation devices for railway systems B61B 13/08; material handling devices associated with conveyers incorporating devices with electrostatic or magnetic grippers B65G 47/92; separating thin or filamentary articles from piles using magnetic force B65H 3/16; delivering thin or filamentary articles from magnetic holders by air blast or suction B65H 29/24; bearings using magnetic or electric supporting means F16C 32/04; relieving bearing loads using magnetic means F16C 39/06; magnets H01F 7/00; dynamo-electric clutches or brakes H02K 49/00) **[3]**
15/02 . by Foucault currents **[3]**
15/04 . Repulsion by the Meissner effect (superconductors or hyperconductors in general H01L 39/00) **[3]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H02P **CONTROL OR REGULATION OF ELECTRIC MOTORS, GENERATORS, OR DYNAMO-ELECTRIC CONVERTERS**; **CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS** (structure of the starter, brake, or other control devices, see the relevant subclasses, e.g. mechanical brake F16D, mechanical speed regulator G05D, variable resistor H01C, starter switch H01H; systems for regulating electric or magnetic variables using transformers, reactors or choke coils G05F; arrangements structurally associated with motors, generators, dynamo-electric converters, transformers, reactors or choke coils, see the relevant subclasses, e.g. H01F, H02K; connection or control of one generator, transformer, reactor, choke coil, or dynamo-electric converter with regard to conjoint operation with similar or other source of supply H02J; control or regulation of static converters H02M) **[4]**

(1) This subclass covers arrangements for starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators, dynamo-electric converters, clutches, brakes, gears, transformers, reactors or choke coils, of the types classified in the relevant subclasses, e.g. H01F, H02K.
(2) This subclass does not cover similar arrangements for the apparatus of the types classified in subclass H02N, which arrangements are covered by that subclass.
(3) In this subclass, the following terms or expressions are used with the meanings indicated: **[6]**
– "control" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation; **[6]**
– "regulation" means maintaining a variable at a desired value, or within a desired range of values, by comparison of the actual value with the desired value. **[6]**

Subclass index

1/00 **Arrangements for starting electric motors or dynamo-electric converters** (starting of synchronous motors with electronic commutators H02P 6/20, H02P 6/22; starting dynamo-electric motors rotating step by step H02P 8/04; vector control H02P 21/00) **[4,8]**

1/02 . Details

1/04 . . Means for controlling progress of starting sequence in dependence upon time or upon current, speed, or other motor parameter

1/06 . . . Manually-operated multi-position starters

1/08 . . . Manually-operated on/off switch controlling power-operated multi-position switch or impedances for starting a motor

1/10 . . . Manually-operated on/off switch controlling relays or contactors operating sequentially for starting a motor (sequence determined by power-operated multi-position switch H02P 1/08)

1/12 . . . Switching devices centrifugally operated by the motor

1/14 . . . Pressure-sensitive resistors centrifugally operated by the motor

1/16 . for starting dynamo-electric motors or dynamo-electric converters

1/18 . . for starting an individual dc motor

1/20 . . . by progressive reduction of resistance in series with armature winding

1/22 . . . in either direction of rotation

1/24 . . for starting an individual ac commutator motor (starting of ac/dc commutator motors H02P 1/18)

1/26 . . for starting an individual polyphase induction motor

1/28 . . . by progressive increase of voltage applied to primary circuit of motor

1/30 . . . by progressive increase of frequency of supply to primary circuit of motor

1/32 . . . by star/delta switching

1/34 . . . by progressive reduction of impedance in secondary circuit

1/36 . . . . the impedance being a liquid resistance

1/38 . . . by pole-changing

1/40 . . . in either direction of rotation

1/42 . . for starting an individual single-phase induction motor

1/44 . . . by phase-splitting with a capacitor

1/46 . . for starting an individual synchronous motor

1/48 . . . by pole-changing

1/50 . . . by changing over from asynchronous to synchronous operation (H02P 1/48 takes precedence)

1/52 . . . by progressive increase of frequency of supply to motor

1/54 . . for starting two or more dynamo-electric motors

1/56 . . . simultaneously

1/58 . . . sequentially

3/00 **Arrangements for stopping or slowing electric motors, generators, or dynamo-electric converters** (stopping of synchronous motors with electronic commutators H02P 6/24; stopping dynamo-electric motors rotating step by step H02P 8/24; vector control H02P 21/00) **[2,4,8]**

3/02 . Details

3/04 . . Means for stopping or slowing by a separate brake, e.g. friction brake, eddy-current brake (brakes F16D, H02K 49/00) **[2]**

3/06 . for stopping or slowing an individual dynamo-electric motor or dynamo-electric converter **[2]**

3/08 . . for stopping or slowing a dc motor **[2]**

3/10 . . . by reversal of supply connections

3/12 . . . by short-circuit or resistive braking

3/14 . . . by regenerative braking

3/16 . . . by combined electrical and mechanical braking

3/18 . . for stopping or slowing an ac motor **[2]**

3/20 . . . by reversal of phase sequence of connections to the motor

3/22 . . . by short-circuit or resistive braking

3/24 . . . by applying dc to the motor

3/26 . . . by combined electrical and mechanical braking

4/00 **Arrangements specially adapted for regulating or controlling the speed or torque of electric motors that can be connected to two or more different voltage or current supplies** (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00) **[8]**

5/00 **Arrangements specially adapted for regulating or controlling the speed or torque of two or more electric motors** (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00) **[1,8]**

5/46 . for speed regulation of two or more dynamo-electric motors in relation to one another

5/48 . . by comparing mechanical values representing the speeds

5/50 . . by comparing electrical values representing the speeds

5/52 . . additionally providing control of relative angular displacement

5/60 . controlling combinations of dc and ac dynamo-electric motors (H02P 5/46 takes precedence) **[8]**

5/68 . controlling two or more dc dynamo-electric motors (H02P 5/46, H02P 5/60 take precedence) **[8]**

5/685 . . electrically connected in series, i.e. carrying the same current **[8]**
5/69 . . mechanically coupled by gearing **[8]**
5/695 . . . Differential gearing **[8]**
5/74 . controlling two or more ac dynamo-electric motors (H02P 5/46, H02P 5/60 take precedence) **[8]**
5/747 . . mechanically coupled by gearing **[8]**
5/753 . . . Differential gearing **[8]**

6/00 Arrangements for controlling synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position; Electronic commutators therefor (stepping motors H02P 8/00; vector control H02P 21/00) **[3,4,6]**

6/04 . Arrangements for controlling or regulating speed or torque of more than one motor **[6]**
6/06 . Arrangements for speed regulation of a single motor wherein the motor speed is measured and compared with a given physical value so as to adjust the motor speed **[6]**
6/08 . Arrangements for controlling the speed or torque of a single motor **[6]**
6/10 . . providing reduced torque ripple; controlling torque ripple **[6]**
6/12 . Monitoring commutation; Providing indication of commutation failure **[6]**
6/14 . Electronic commutators **[6]**
6/16 . . Circuit arrangements for detecting position (structural arrangement of position sensors H02K 29/06) **[6]**
6/18 . . . without separate position detecting element, e.g. using back-emf in windings **[6]**
6/20 . Arrangements for starting (H02P 6/08, H02P 6/22 take precedence) **[6]**
6/22 . Arrangements for starting in a selected direction of rotation **[6]**
6/24 . Arrangements for stopping **[6]**

7/00 Arrangements for regulating or controlling the speed or torque of electric dc-motors (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00) **[2,8]**

7/06 . for regulating or controlling an individual dc dynamo-electric motor by varying field or armature current
7/08 . . by manual control without auxiliary power
7/10 . . . of motor field only
7/12 . . . . Switching field from series to shunt excitation or vice versa
7/14 . . . of voltage applied to the armature with or without control of field
7/18 . . by master control with auxiliary power
7/20 . . . using multi-position switch, e.g. drum, controlling motor circuit by means of relays (H02P 7/24, H02P 7/30 take precedence)
7/22 . . . using multi-position switch, e.g. drum, controlling motor circuit by means of pilot-motor-operated multi-position switch or pilot-motor-operated variable resistance (H02P 7/24, H02P 7/30 take precedence)
7/24 . . . using discharge tubes or semiconductor devices
7/26 . . . . using discharge tubes
7/28 . . . . using semiconductor devices
7/282 . . . . . controlling field supply only **[4]**
7/285 . . . . . controlling armature supply only **[4]**
7/288 . . . . . using variable impedance **[4]**
7/29 . . . . . using pulse modulation **[4]**
7/292 . . . . . using static converters, e.g. ac to dc **[4]**
7/295 . . . . . of the kind having one thyristor or the like in series with the power supply and the motor **[4]**
7/298 . . . . . controlling armature and field supply **[4]**
7/30 . . . using magnetic devices with controllable degree of saturation, i.e. transductors
7/32 . . . using armature-reaction-excited machines, e.g. metadyne, amplidyne, rototrol
7/34 . . . using Ward-Leonard arrangements

8/00 Arrangements for controlling dynamo-electric motors rotating step by step (vector control H02P 21/00) **[2,6,8]**

8/02 . specially adapted for single-phase or bi-pole stepper motors, e.g. watch-motors, clock-motors **[6]**
8/04 . Arrangements for starting **[6]**
8/06 . . in selected direction of rotation **[6]**
8/08 . . Determining position before starting **[6]**
8/10 . . Shaping pulses for starting; Boosting current during starting **[6]**
8/12 . Control or stabilisation of current **[6]**
8/14 . Arrangements for controlling speed or speed and torque (H02P 8/12, H02P 8/22 take precedence) **[6]**
8/16 . . Reducing energy dissipated or supplied **[6]**
8/18 . . Shaping of pulses, e.g. to reduce torque ripple **[6]**
8/20 . . characterised by bidirectional operation **[6]**
8/22 . Control of step size; Intermediate stepping, e.g. micro-stepping **[6]**
8/24 . Arrangements for stopping (H02P 8/32 take precedence) **[6]**
8/26 . . Memorising final pulse when stopping **[6]**
8/28 . . Disconnecting power source when stopping **[6]**
8/30 . . Holding position when stopped **[6]**
8/32 . Reducing overshoot or oscillation, e.g. damping **[6]**
8/34 . Monitoring operation (H02P 8/36 takes precedence) **[6]**
8/36 . Protection against faults, e.g. against overheating, step-out; Indicating faults (emergency protective arrangements with automatic interruption of supply H02H 7/08) **[6]**
8/38 . . the fault being step-out **[6]**
8/40 . Special adaptations for controlling two or more stepping motors **[6]**
8/42 . characterised by non-stepper motors being operated step by step **[6]**

9/00 Arrangements for controlling electric generators for the purpose of obtaining a desired output (Ward-Leonard arrangements H02P 7/34; vector control H02P 21/00; feeding a network by two or more generators H02J; for charging batteries H02J 7/14) **[1,8]**

9/02 . Details
9/04 . Control effected upon non-electric prime mover and dependent upon electric output value of the generator (effecting control of the prime mover in general, see the relevant class for such prime mover) **[2]**
9/06 . Control effected upon clutch or other mechanical power transmission means and dependent upon electric output value of the generator (effecting control of the power transmission means, see the relevant class for such means) **[2]**
9/08 . Control of generator circuit during starting or stopping of driving means, e.g. for initiating excitation **[2]**

9/10 . Control effected upon generator excitation circuit to reduce harmful effects of overloads or transients, e.g. sudden application of load, sudden removal of load, sudden change of load **[2]**

9/12 . . for demagnetising; for reducing effects of remanence; for preventing pole reversal **[2]**

9/14 . by variation of field (H02P 9/08, H02P 9/10 take precedence) **[2]**

9/16 . . due to variation of ohmic resistance in field circuit, using resistances switched in or out of circuit step by step

9/18 . . . the switching being caused by a servomotor, measuring instrument, or relay

9/20 . . due to variation of continuously-variable ohmic resistance

9/22 . . . comprising carbon pile resistance

9/24 . . due to variation of make-to-break ratio of intermittently-operating contacts, e.g. using Tirrill regulator

9/26 . . using discharge tubes or semiconductor devices (H02P 9/34 takes precedence) **[2]**

9/28 . . . using discharge tubes

9/30 . . . using semiconductor devices

9/32 . . using magnetic devices with controllable degree of saturation (H02P 9/34 takes precedence) **[2]**

9/34 . . using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device

9/36 . . using armature-reaction-excited machines

9/38 . . Self-excitation by current derived from rectification of both output voltage and output current of generator

9/40 . by variation of reluctance of magnetic circuit of generator

9/42 . to obtain desired frequency without varying speed of the generator

9/44 . Control of frequency and voltage in predetermined relation, e.g. constant ratio

9/46 . Control of asynchronous generator by variation of capacitor

9/48 . Arrangements for obtaining a constant output value at varying speed of the generator, e.g. on vehicle (H02P 9/04 to H02P 9/46 take precedence) **[3]**

11/00 Arrangements for controlling dynamo-electric converters (starting H02P 1/00; stopping or slowing H02P 3/00; vector control H02P 21/00; feeding a network in conjunction with a generator or another converter H02J) **[4,8]**

11/04 . for controlling dynamo-electric converters having a dc output

11/06 . for controlling dynamo-electric converters having an ac output

13/00 Arrangements for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output (regulation systems using transformers, reactors or choke coils G05F; transformers H01F; feeding a network in conjunction with a generator or a converter H02J; control or regulation of converters H02M) **[4]**

13/06 . by tap-changing; by rearranging interconnections of windings

13/08 . by sliding current collector along winding

13/10 . by moving core, coil winding, or shield, e.g. by induction regulator

13/12 . by varying magnetic bias

15/00 Arrangements for controlling dynamo-electric brakes or clutches (controlling speed of dynamo-electric motors by means of a separate brake H02P 29/04, vector control H02P 21/00) **[1,8]**

15/02 . Conjoint control of brakes and clutches **[3]**

17/00 Arrangements for controlling dynamo-electric gears (vector control H02P 21/00) **[3,8]**

21/00 Arrangements or methods for the control of electric machines by vector control, e.g. by control of field orientation [6,8]

Note

When classifying in this group, it is desirable to also classify in groups H02P 25/00 to H02P 27/00 if the kind of ac-motor, structural details, or the kind of supply voltage are of interest. **[8]**

21/02 . specially adapted for optimising the efficiency at low load **[8]**

21/04 . specially adapted for very low speeds **[8]**

21/05 . specially adapted for damping motor oscillations, e.g. for reducing hunting **[8]**

21/06 . Rotor flux based control **[8]**

21/08 . . Indirect field-oriented control, e.g. field phase angle calculation based on rotor voltage equation by adding slip frequency and speed proportional frequency **[8]**

21/10 . . Direct field-oriented control **[8]**

21/12 . Stator flux based control **[8]**

21/13 . Observer control, e.g. using Luenberger observers or Kalman filters **[8]**

21/14 . Estimation or adaptation of machine parameters, e.g. rotor time constant, flux, speed, current or voltage **[8]**

23/00 Arrangements or methods for the control of ac-motors characterised by a control method other than vector control (starting H02P 1/00; stopping or slowing H02P 3/00; of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of dc-motors H02P 7/00; of stepping motors H02P 8/00) **[8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 25/00 to H02P 27/00 if the kind of ac-motor, structural details, or the kind of supply voltage are of interest. **[8]**

23/02 . specially adapted for optimising the efficiency at low load **[8]**

23/03 . specially adapted for very low speeds **[8]**

23/04 . specially adapted for damping motor oscillations, e.g. for reducing hunting **[8]**

23/06 . Controlling the motor in four quadrants **[8]**

23/08 . Controlling based on slip frequency, e.g. adding slip frequency and speed proportional frequency **[8]**

23/10 . Controlling by adding a dc current (dc current braking H02P 3/24) **[8]**

23/12 . Observer control, e.g. using Luenberger observers or Kalman filters **[8]**

23/14 . Estimation or adaptation of motor parameters, e.g. rotor time constant, flux, speed, current or voltage **[8]**

25/00 **Arrangements or methods for the control of ac-motors characterised by the kind of ac-motor or by structural details** (starting H02P 1/00; stopping or slowing H02P 3/00; of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of dc-motors H02P 7/00; of stepping motors H02P 8/00) **[8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 21/00, H02P 23/00 or H02P 27/00 if the control method or the kind of supply voltage are of interest. **[8]**

25/02 . characterised by the kind of motor **[8]**
25/04 . . Single phase motors, e.g. capacitor motors **[8]**
25/06 . . Linear motors **[8]**
25/08 . . Reluctance motors **[8]**
25/10 . . Commutator motors, e.g. repulsion motors **[8]**
25/12 . . . with shiftable brushes **[8]**
25/14 . . . Universal motors (H02P 25/12 takes precedence) **[8]**
25/16 . characterised by the circuit arrangement or by the kind of wiring **[8]**
25/18 . . with arrangements for switching the windings, e.g. with mechanical switches or relays **[8]**
25/20 . . . for pole-changing **[8]**
25/22 . . Multiple windings; Windings for more than three phases **[8]**
25/24 . . Variable impedance in stator or rotor circuit **[8]**
25/26 . . . with arrangements for controlling secondary impedance **[8]**
25/28 . . using magnetic devices with controllable degree of saturation, e.g. transductors **[8]**
25/30 . . the motor being controlled by a control effected upon an ac generator supplying it **[8]**
25/32 . . using discharge tubes **[8]**

27/00 **Arrangements or methods for the control of ac-motors characterised by the kind of supply voltage** (starting H02P 1/00; stopping or slowing H02P 3/00; of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of dc-motors H02P 7/00; of stepping motors H02P 8/00) **[8]**

Note

When classifying in this group, it is desirable to also classify in groups H02P 21/00, H02P 23/00 or H02P 25/00 if the control method, the kind of the ac-motor or structural details are of interest. **[8]**

27/02 . using supply voltage with constant frequency and variable amplitude **[8]**
27/04 . using variable-frequency supply voltage, e.g. inverter or converter supply voltage **[8]**
27/05 . . using ac supply for both rotor and stator circuits, the frequency of supply to at least one circuit being variable **[8]**
27/06 . . using dc to ac converters or inverters (H02P 27/05 takes precedence) **[8]**
27/08 . . . with pulse width modulation **[8]**
27/10 . . . . using bang-bang controllers **[8]**
27/12 . . . . pulsing by guiding the flux-, current-, or voltage-vector on a circle or a closed curve, e.g. direct torque control **[8]**
27/14 . . . . with three or more levels of voltage **[8]**
27/16 . . using ac to ac converters without intermediate conversion to dc (H02P 27/05 takes precedence) **[8]**
27/18 . . . varying the frequency by omitting half waves **[8]**

29/00 **Arrangements for regulating or controlling electric motors, appropriate for both ac- and dc-motors** (starting H02P 1/00; stopping or slowing H02P 3/00; control of motors that can be connected to two or more different voltage or current supplies H02P 4/00; vector control H02P 21/00) **[8]**

29/02 . Providing protection against overload without automatic interruption of supply, e.g. monitoring **[8]**
29/04 . by means of a separate brake **[8]**

31/00 **Arrangements for regulating or controlling electric motors not provided for in groups H02P 1/00 to H02P 5/00, H02P 7/00 or H02P 21/00 to H02P 29/00 [8]**

H03 BASIC ELECTRONIC CIRCUITRY

H03B GENERATION OF OSCILLATIONS, DIRECTLY OR BY FREQUENCY-CHANGING, BY CIRCUITS EMPLOYING ACTIVE ELEMENTS WHICH OPERATE IN A NON-SWITCHING MANNER; GENERATION OF NOISE BY SUCH CIRCUITS

(measuring, testing G01R; generators adapted for electrophonic musical instruments G10H; speech synthesis G10L 13/00; masers, lasers H01S; dynamo-electric machines H02K; power inverter circuits H02M; by using pulse techniques H03K; automatic control of generators H03L; starting, synchronisation or stabilisation of generators where the type of generator is irrelevant or unspecified H03L; generation of oscillations in plasma H05H)

Subclass index

1/00 Details

1/02 . Structural details of power oscillators, e.g. for heating

1/04 . Reducing undesired oscillations, e.g. harmonics

5/00 Generation of oscillations using amplifier with regenerative feedback from output to input (H03B 9/00, H03B 15/00 take precedence)

5/02 . Details

5/04 . . Modifications of generator to compensate for variations in physical values, e.g. power supply, load, temperature

5/06 . . Modifications of generator to ensure starting of oscillations

5/08 . with frequency-determining element comprising lumped inductance and capacitance

5/10 . . active element in amplifier being vacuum tube (H03B 5/14 takes precedence)

5/12 . . active element in amplifier being semiconductor device (H03B 5/14 takes precedence)

5/14 . . frequency-determining element connected via bridge circuit to closed ring around which signal is transmitted

5/16 . . . active element in amplifier being vacuum tube

5/18 . with frequency-determining element comprising distributed inductance and capacitance

5/20 . with frequency-determining element comprising resistance and either capacitance or inductance, e.g. phase-shift oscillator

5/22 . . active element in amplifier being vacuum tube (H03B 5/26 takes precedence)

5/24 . . active element in amplifier being semiconductor device (H03B 5/26 takes precedence)

5/26 . . frequency-determining element being part of bridge circuit in closed ring around which signal is transmitted; frequency-determining element being connected via a bridge circuit to such a closed ring, e.g. Wien-Bridge oscillator, parallel-T oscillator

5/28 . . . active element in amplifier being vacuum tube

5/30 . with frequency-determining element being electromechanical resonator

5/32 . . being a piezo-electric resonator (piezo-electric elements in general H01L 41/00)

5/34 . . . active element in amplifier being vacuum tube (H03B 5/38 takes precedence)

5/36 . . . active element in amplifier being semiconductor device (H03B 5/38 takes precedence)

5/38 . . . frequency-determining element being connected via bridge circuit to closed ring around which signal is transmitted

5/40 . . being a magnetostrictive resonator (H03B 5/42 takes precedence; magnetostrictive elements in general H01L 41/00)

5/42 . . frequency-determining element connected via bridge circuit to closed ring around which signal is transmitted

7/00 Generation of oscillations using active element having a negative resistance between two of its electrodes (H03B 9/00 takes precedence)

7/02 . with frequency-determining element comprising lumped inductance and capacitance

7/04 . . active element being vacuum tube

7/06 . . active element being semiconductor device

7/08 . . . being a tunnel diode

7/10 . . active element being gas-discharge or arc-discharge tube

7/12 . with frequency-determining element comprising distributed inductance and capacitance

7/14 . . active element being semiconductor device

9/00 Generation of oscillations using transit-time effects [2]

9/01 . using discharge tubes **[2]**

9/02 . . using a retarding-field tube (using klystrons H03B 9/04) **[2]**

9/04 . . using a klystron **[2]**

9/06 . . . using a reflex klystron **[2]**

9/08 . . using a travelling-wave tube **[2]**

9/10 . . using a magnetron **[2]**
9/12 . using solid state devices, e.g. Gunn-effect devices **[2]**
9/14 . . and elements comprising distributed inductance and capacitance **[3]**

11/00 Generation of oscillations using a shock-excited tuned circuit (with feedback H03B 5/00)
11/02 . excited by spark (spark gaps therefor H01T 9/00)
11/04 . excited by interrupter
11/06 . . by mechanical interrupter
11/08 . . interrupter being discharge tube
11/10 . . interrupter being semiconductor device

13/00 Generation of oscillations using deflection of electron beam in a cathode-ray tube

15/00 Generation of oscillations using galvano-magnetic devices, e.g. Hall-effect devices, or using super-conductivity effects (galvano-magnetic devices per se H01L 43/00)

17/00 Generation of oscillations using radiation source and detector, e.g. with interposed variable obturator

19/00 Generation of oscillations by non-regenerative frequency multiplication or division of a signal from a separate source (transference of modulation from one carrier to another H03D 7/00)
19/03 . using non-linear inductance **[3]**
19/05 . using non-linear capacitance, e.g. varactor diodes **[3]**
19/06 . by means of discharge device or semiconductor device with more than two electrodes
19/08 . . by means of a discharge device
19/10 . . . using multiplication only
19/12 . . . using division only
19/14 . . by means of a semiconductor device
19/16 . using uncontrolled rectifying devices, e.g. rectifying diodes or Schottky diodes **[3]**
19/18 . . and elements comprising distributed inductance and capacitance **[3]**
19/20 . . being diodes exhibiting charge storage or enhancement effects **[3]**

21/00 Generation of oscillations by combining unmodulated signals of different frequencies (H03B 19/00 takes precedence; frequency changing circuits in general H03D) **[3]**
21/01 . by beating unmodulated signals of different frequencies **[3]**
21/02 . . by plural beating, i.e. for frequency synthesis **[3]**
21/04 . . using several similar stages **[3]**

23/00 Generation of oscillations periodically swept over a predetermined frequency range (angle-modulating circuits in general H03C 3/00)

25/00 Simultaneous generation by a free-running oscillator of oscillations having different frequencies

27/00 Generation of oscillations providing a plurality of outputs of the same frequency but differing in phase, other than merely two anti-phase outputs

28/00 Generation of oscillations by methods not covered by groups H03B 5/00 to H03B 27/00, including modification of the waveform to produce sinusoidal oscillations (analogue function generators for performing computing operations G06G 7/26; use of transformers for conversion of waveform in ac–ac converters H02M 5/18) **[4]**

29/00 Generation of noise currents and voltages

H03C MODULATION (measuring, testing G01R; masers, lasers H01S; modulators specially adapted for use in dc amplifiers H03F 3/38; modulating pulses H03K 7/00; so-called modulators capable only of switching between predetermined states of amplitude, frequency or phase H03K 17/00, H04L; coding, decoding or code conversion, in general H03M; synchronous modulators specially adapted for colour television H04N 9/65)

(1) This subclass covers only modulation, keying, or interruption of sinusoidal oscillations or electromagnetic waves, the modulating signal having any desired waveform.
(2) In this subclass, circuits usable both as modulator and demodulator are classified in the group dealing with the type of modulator involved.

1/00 Amplitude modulation (H03C 5/00, H03C 7/00 take precedence)
1/02 . Details
1/04 . . Means in, or combined with, modulating stage for reducing angle modulation
1/06 . . Modifications of modulator to reduce distortion, e.g. by feedback, and clearly applicable to more than one type of modulator
1/08 . by means of variable impedance element (H03C 1/28 to H03C 1/34, H03C 1/46 to H03C 1/52, H03C 1/62 take precedence)
1/10 . . the element being a current-dependent inductor
1/12 . . the element being a voltage-dependent capacitor
1/14 . . the element being a diode
1/16 . by means of discharge device having at least three electrodes (H03C 1/28 to H03C 1/34, H03C 1/50, H03C 1/52, H03C 1/62 take precedence)
1/18 . . carrier applied to control grid
1/20 . . . modulating signal applied to anode
1/22 . . . modulating signal applied to same grid
1/24 . . . modulating signal applied to different grid
1/26 . . . modulating signal applied to cathode
1/28 . by means of transit-time tube
1/30 . . by means of a magnetron
1/32 . by deflection of electron beam in discharge tube
1/34 . by means of light-sensitive element
1/36 . by means of semiconductor device having at least three electrodes (H03C 1/34, H03C 1/50, H03C 1/52, H03C 1/62 take precedence)
1/38 . . carrier applied to base of a transistor

1/40 . . . modulating signal applied to collector
1/42 . . . modulating signal applied to base
1/44 . . . modulating signal applied to emitter
1/46 . Modulators with mechanically- or acoustically-driven parts
1/48 . by means of Hall-effect devices
1/50 . by converting angle modulation to amplitude modulation (H03C 1/28 to H03C 1/34, H03C 1/46, H03C 1/48 take precedence)
1/52 . Modulators in which carrier or one sideband is wholly or partially suppressed (H03C 1/28 to H03C 1/34, H03C 1/46, H03C 1/48 take precedence)
1/54 . . Balanced modulators, e.g. bridge type, ring type, double balanced type
1/56 . . . comprising variable two-pole elements only
1/58 . . . . comprising diodes
1/60 . . with one sideband wholly or partially suppressed
1/62 . Modulators in which amplitude of carrier component in output is dependent upon strength of modulating signal, e.g. no carrier output when no modulating signal is present (H03C 1/28 to H03C 1/34, H03C 1/46, H03C 1/48 take precedence)

3/00 **Angle modulation** (H03C 5/00, H03C 7/00 take precedence)
3/02 . Details
3/04 . . Means in, or combined with, modulating stage for reducing amplitude modulation
3/06 . . Means for changing frequency deviation
3/08 . . Modifications of modulator to linearise modulation, e.g. by feedback, and clearly applicable to more than one type of modulator
3/09 . . Modifications of modulator for regulating the mean frequency **[3]**
3/10 . by means of variable impedance (H03C 3/30 to H03C 3/38 take precedence)
3/12 . . by means of a variable reactive element
3/14 . . . simulated by circuit comprising active element with at least three electrodes, e.g. reactance-tube circuit
3/16 . . . . in which the active element simultaneously serves as the active element of an oscillator
3/18 . . . the element being a current-dependent inductor
3/20 . . . the element being a voltage-dependent capacitor
3/22 . . . the element being a semiconductor diode, e.g. varicap diode
3/24 . . by means of a variable resistive element, e.g. tube
3/26 . . . comprising two elements controlled in push-pull by modulating signal
3/28 . . using variable impedance driven mechanically or acoustically
3/30 . by means of transit-time tube
3/32 . . the tube being a magnetron
3/34 . by deflection of electron beam in discharge tube
3/36 . by means of light-sensitive element
3/38 . by converting amplitude modulation to angle modulation
3/40 . . using two signal paths the outputs of which have a predetermined phase difference and at least one output being amplitude-modulated
3/42 . by means of electromechanical devices (H03C 3/28 takes precedence) **[3]**

5/00 **Amplitude modulation and angle modulation produced simultaneously or at will by the same modulating signal** (H03C 7/00 takes precedence)
5/02 . by means of transit-time tube
5/04 . . the tube being a magnetron
5/06 . by deflection of electron beam in discharge tube

7/00 **Modulating electromagnetic waves** (devices or arrangements for the modulation of light G02F 1/00; for generating oscillations H03B, H03K)
7/02 . in transmission line, waveguide, cavity resonator, or radiation field of aerial
7/04 . . Polarisation of transmitted wave being modulated

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H03D **DEMODULATION OR TRANSFERENCE OF MODULATION FROM ONE CARRIER TO ANOTHER** (masers, lasers H01S; circuits capable of acting both as modulator and demodulator H03C; details applicable to both modulators and frequency-changers H03C; demodulating pulses H03K 9/00; transforming types of pulse modulation H03K 11/00; coding, decoding or code conversion, in general H03M; repeater stations H04B 7/14; demodulators adapted for digitally modulated-carrier systems H04L 27/00; synchronous demodulators adapted for colour television H04N 9/66)

Note

This subclass covers only:
– demodulation or transference of signals modulated on a sinusoidal carrier or on electromagnetic waves;
– comparing phase or frequency of two mutually-independent oscillations.

Subclass index

1/00 **Demodulation of amplitude-modulated oscillations** (H03D 5/00, H03D 9/00, H03D 11/00 take precedence)
1/02 . Details
1/04 . . Modifications of demodulators to reduce interference by undesired signals
1/06 . . Modifications of demodulators to reduce distortion, e.g. by negative feedback

1/08 . by means of non-linear two-pole elements (H03D 1/22, H03D 1/26, H03D 1/28 take precedence)
1/10 . . of diodes
1/12 . . . with provision for equalising ac and dc loads
1/14 . by means of non-linear elements having more than two poles (H03D 1/22, H03D 1/26, H03D 1/28 take precedence)
1/16 . . of discharge tubes
1/18 . . of semiconductor devices
1/20 . . with provision for preventing undesired type of demodulation, e.g. preventing anode detection in a grid detection circuit
1/22 . Homodyne or synchrodyne circuits
1/24 . . for demodulation of signals wherein one sideband or the carrier has been wholly or partially suppressed
1/26 . by means of transit-time tubes
1/28 . by deflecting an electron beam in a discharge tube (H03D 1/26 takes precedence)

3/00 Demodulation of angle-modulated oscillations (H03D 5/00, H03D 9/00, H03D 11/00 take precedence)
3/02 . by detecting phase difference between two signals obtained from input signal (H03D 3/28 to H03D 3/32 take precedence; limiting arrangements H03G 11/00)
3/04 . . by counting or integrating cycles of oscillations
3/06 . . by combining signals additively or in product demodulators
3/08 . . . by means of diodes, e.g. Foster-Seeley discriminator
3/10 . . . . in which the diodes are simultaneously conducting during the same half period of the signal, e.g. ratio detector
3/12 . . . by means of discharge tubes having more than two electrodes
3/14 . . . by means of semiconductor devices having more than two electrodes
3/16 . . . by means of electromechanical resonators
3/18 . . by means of synchronous gating arrangements
3/20 . . . producing pulses whose amplitude or duration depends on the phase difference
3/22 . . by means of active elements with more than two electrodes to which two signals are applied derived from the signal to be demodulated and having a phase difference related to the frequency deviation, e.g. phase detector
3/24 . . Modifications of demodulators to reject or remove amplitude variations by means of locked-in oscillator circuits
3/26 . by means of sloping amplitude/frequency characteristic of tuned or reactive circuit (H03D 3/28 to H03D 3/32 take precedence)
3/28 . Modifications of demodulators to reduce effect of temperature variations (automatic frequency control H03L)
3/30 . by means of transit-time tubes
3/32 . by deflecting an electron beam in a discharge tube (H03D 3/30 takes precedence)
3/34 . by means of electromechanical devices (H03D 3/16 takes precedence) **[3]**

5/00 Circuits for demodulating amplitude-modulated or angle-modulated oscillations at will (H03D 9/00, H03D 11/00 take precedence)

7/00 Transference of modulation from one carrier to another, e.g. frequency-changing (H03D 9/00, H03D 11/00 take precedence; dielectric amplifiers, magnetic amplifiers, parametric amplifiers used as frequency-changers H03F)
7/02 . by means of diodes (H03D 7/14 to H03D 7/22 take precedence)
7/04 . . having negative resistance characteristic, e.g. tunnel diode
7/06 . by means of discharge tubes having more than two electrodes (H03D 7/14 to H03D 7/22 take precedence)
7/08 . . the signals to be mixed being applied between the same two electrodes
7/10 . . the signals to be mixed being applied between different pairs of electrodes
7/12 . by means of semiconductor devices having more than two electrodes (H03D 7/14 to H03D 7/22 take precedence)
7/14 . Balanced arrangements
7/16 . Multiple frequency-changing
7/18 . Modifications of frequency-changers for eliminating image frequencies
7/20 . by means of transit-time tubes
7/22 . by deflecting an electron beam in a discharge tube (H03D 7/20 takes precedence)

9/00 Demodulation or transference of modulation of modulated electromagnetic waves (devices or arrangements for demodulating light, transferring modulation in light waves G02F 2/00)
9/02 . Demodulation using distributed inductance and capacitance, e.g. in feeder lines
9/04 . . for angle-modulated oscillations
9/06 . Transference of modulation using distributed inductance and capacitance

11/00 Super-regenerative demodulator circuits
11/02 . for amplitude-modulated oscillations
11/04 . . by means of semiconductor devices having more than two electrodes
11/06 . for angle-modulated oscillations
11/08 . . by means of semiconductor devices having more than two electrodes

13/00 Circuits for comparing the phase or frequency of two mutually-independent oscillations

99/00 Subject matter not provided for in other groups of this subclass [8]

H03F **AMPLIFIERS** (measuring, testing G01R; optical parametric amplifiers G02F; circuit arrangements with secondary emission tubes H01J 43/30; masers, lasers H01S; dynamo-electric amplifiers H02K; control of amplification H03G; coupling arrangements independent of the nature of the amplifier, voltage dividers H03H; amplifiers capable only of dealing with pulses H03K; repeater circuits in transmission lines H04B 3/36, H04B 3/58; application of speech amplifiers in telephonic communication H04M 1/60, H04M 3/40)

Note

This subclass covers:
- linear amplification, there being linear relationship between the amplitudes of input and output, and the output having substantially the same waveform as the input;
- dielectric amplifiers, magnetic amplifiers, and parametric amplifiers when used as oscillators or frequency-changers;
- constructions of active elements of dielectric amplifiers and parametric amplifiers if no provision exists elsewhere.

Subclass index

1/00 Details of amplifiers with only discharge tubes, only semiconductor devices or only unspecified devices as amplifying elements

1/02 . Modifications of amplifiers to raise the efficiency, e.g. gliding Class A stages, use of an auxiliary oscillation

1/04 . . in discharge-tube amplifiers

1/06 . . . to raise the efficiency of amplifying modulated radio frequency waves; to raise the efficiency of amplifiers acting also as modulators **[2]**

1/07 . . . . Doherty-type amplifiers **[2]**

1/08 . Modifications of amplifiers to reduce detrimental influences of internal impedances of amplifying elements (wide-band amplifiers with inter-stage coupling networks incorporating these impedances H03F 1/42; eliminating transit-time effects in vacuum tubes H01J 21/34)

1/10 . . by use of amplifying elements with multiple electrode connections

1/12 . . by use of attenuating means

1/13 . . . in discharge-tube amplifiers **[2]**

1/14 . . by use of neutralising means

1/16 . . . in discharge-tube amplifiers

1/18 . . by use of distributed coupling

1/20 . . . in discharge-tube amplifiers

1/22 . . by use of cascode coupling, i.e. earthed cathode or emitter stage followed by earthed grid or base stage respectively

1/24 . . . in discharge-tube amplifiers

1/26 . Modifications of amplifiers to reduce influence of noise generated by amplifying elements

1/28 . . in discharge-tube amplifiers

1/30 . Modifications of amplifiers to reduce influence of variations of temperature or supply voltage

1/32 . Modifications of amplifiers to reduce non-linear distortion (by negative feedback H03F 1/34)

1/33 . . in discharge-tube amplifiers **[2]**

1/34 . Negative-feedback-circuit arrangements with or without positive feedback (H03F 1/02 to H03F 1/30, H03F 1/38 to H03F 1/50, H03F 3/50 take precedence) **[3]**

1/36 . . in discharge-tube amplifiers

1/38 . Positive-feedback circuit arrangements without negative feedback

1/40 . . in discharge-tube amplifiers

1/42 . Modifications of amplifiers to extend the bandwidth

1/44 . . of tuned amplifiers

1/46 . . . with tubes only

1/48 . . of aperiodic amplifiers

1/50 . . . with tubes only

1/52 . Circuit arrangements for protecting such amplifiers **[3]**

1/54 . . with tubes only **[3]**

1/56 . Modifications of input or output impedances, not otherwise provided for **[3]**

3/00 Amplifiers with only discharge tubes or only semiconductor devices as amplifying elements

Note

Groups H03F 3/20 to H03F 3/72 take precedence over groups H03F 3/02 to H03F 3/189. **[2]**

3/02 . with tubes only (subsequent subgroups take precedence)

3/04 . with semiconductor devices only (subsequent subgroups take precedence)

3/06 . . using hole storage effect

3/08 . . controlled by light

3/10 . . with diodes

3/12 . . . with Esaki diodes

3/14 . . with amplifying devices having more than three electrodes or more than two PN junctions

3/16 . . with field-effect devices

3/18 . with semiconductor devices of complementary types (subsequent subgroups take precedence)

3/181 . Low-frequency amplifiers, e.g. audio preamplifiers **[2]**

3/183 . . with semiconductor devices only **[2]**

3/185 . . . with field-effect devices (H03F 3/187 takes precedence) **[2]**

3/187 . . . in integrated circuits **[2]**

3/189 . High-frequency amplifiers, e.g. radio frequency amplifiers **[2]**
3/19 . . with semiconductor devices only **[2]**
3/191 . . . Tuned amplifiers (H03F 3/193, H03F 3/195 take precedence) **[2]**
3/193 . . . with field-effect devices (H03F 3/195 takes precedence) **[2]**
3/195 . . . in integrated circuits **[2]**
3/20 . Power amplifiers, e.g. Class B amplifiers, Class C amplifiers (H03F 3/26 to H03F 3/30 take precedence)
3/21 . . with semiconductor devices only **[2]**
3/213 . . . in integrated circuits **[2]**
3/217 . . . Class D power amplifiers; Switching amplifiers **[2]**
3/22 . . with tubes only (H03F 3/24 takes precedence)
3/24 . . of transmitter output stages
3/26 . Push-pull amplifiers; Phase-splitters therefor (duplicated single-ended push-pull arrangements or phase-splitters therefor H03F 3/30)
3/28 . . with tubes only
3/30 . Single-ended push-pull amplifiers; Phase-splitters therefor
3/32 . . with tubes only
3/34 . Dc amplifiers in which all stages are dc-coupled (H03F 3/45 takes precedence) **[3]**
3/343 . . with semiconductor devices only **[2]**
3/345 . . . with field-effect devices (H03F 3/347 takes precedence) **[2]**
3/347 . . . in integrated circuits **[2]**
3/36 . . with tubes only
3/38 . Dc amplifiers with modulator at input and demodulator at output; Modulators or demodulators specially adapted for use in such amplifiers (modulators in general H03C; demodulators in general H03D; amplitude modulation of pulses in general H03K 7/02; amplitude demodulation of pulses in general H03K 9/02)
3/387 . . with semiconductor devices only **[2]**
3/393 . . . with field-effect devices **[2]**
3/40 . . with tubes only
3/42 . Amplifiers with two or more amplifying elements having their dc paths in series with the load, the control electrode of each element being excited by at least part of the input signal, e.g. so-called totem-pole amplifiers
3/44 . . with tubes only
3/45 . Differential amplifiers **[2]**
3/46 . Reflex amplifiers
3/48 . . with tubes only
3/50 . Amplifiers in which input is applied to, or output is derived from, an impedance common to input and output circuits of the amplifying element, e.g. cathode follower
3/52 . . with tubes only
3/54 . Amplifiers using transit-time effect in tubes or semiconductor devices (parametric amplifiers H03F 7/00; solid state travelling-wave devices H01L 45/02)
3/55 . . with semiconductor devices only **[2]**
3/56 . . using klystrons
3/58 . . using travelling-wave tubes
3/60 . Amplifiers in which coupling networks have distributed constants, e.g. with waveguide resonators (H03F 3/54 takes precedence)
3/62 . Two-way amplifiers
3/64 . . with tubes only
3/66 . Amplifiers simultaneously generating oscillations of one frequency and amplifying signals of another frequency
3/68 . Combinations of amplifiers, e.g. multi-channel amplifiers for stereophonics
3/70 . Charge amplifiers **[2]**
3/72 . Gated amplifiers, i.e. amplifiers which are rendered operative or inoperative by means of a control signal **[2]**

5/00 Amplifiers with both discharge tubes and semiconductor devices as amplifying elements

7/00 Parametric amplifiers (devices or arrangements for the parametric generation or amplification of light, infra-red or ultra-violet waves G02F 1/39)
7/02 . using variable-inductance element; using variable-permeability element
7/04 . using variable-capacitance element; using variable-permitivity element
7/06 . with electron beam tube

9/00 Magnetic amplifiers
9/02 . current-controlled, i.e. the load current flowing in both directions through a main coil **[2]**
9/04 . voltage-controlled, i.e. the load current flowing in only one direction through a main coil, e.g. Logan circuits (H03F 9/06 takes precedence) **[2]**
9/06 . Control by voltage time integral, i.e. the load current flowing in only one direction through a main coil, whereby the main coil winding also can be used as a control winding, e.g. Ramey circuits **[2]**

11/00 Dielectric amplifiers

13/00 Amplifiers using amplifying element consisting of two mechanically- or acoustically-coupled transducers, e.g. telephone-microphone amplifier

15/00 Amplifiers using galvano-magnetic effects not involving mechanical movement, e.g. using Hall effect

17/00 Amplifiers using electroluminescent element or photocell

19/00 Amplifiers using superconductivity effects

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

H03G CONTROL OF AMPLIFICATION (impedance networks, e.g. attenuators, H03H; control of transmission in lines H04B 3/04)

(1) This subclass covers:
– control of gain of amplifiers or frequency-changers;

– control of frequency range of amplifiers;
– limiting amplitude or rate of change of amplitude.

(2) Attention is drawn to the Note following the title of subclass H03F. **[3]**

Subclass index

1/00 Details of arrangements for controlling amplification

1/02 . Remote control of amplification, tone, or bandwidth (remote control in general G05, G08; combined with remote tuning or selection of resonant circuits H03J)

1/04 . Modifications of control circuit to reduce distortion caused by control (modifications to reduce influence of variations of internal impedance of amplifying elements caused by control H03F 1/08)

3/00 Gain control in amplifiers or frequency changers (gated amplifiers H03F 3/72; peculiar to television receivers H04N)

3/02 . Manually-operated control
3/04 . . in untuned amplifiers
3/06 . . . having discharge tubes
3/08 . . . . incorporating negative feedback
3/10 . . . having semiconductor devices
3/12 . . . . incorporating negative feedback
3/14 . . in frequency-selective amplifiers
3/16 . . . having discharge tubes
3/18 . . . having semiconductor devices
3/20 . Automatic control (combined with volume compression or expansion H03G 7/00)
3/22 . . in amplifiers having discharge tubes
3/24 . . . Control dependent upon ambient noise level or sound level
3/26 . . . Muting amplifier when no signal is present
3/28 . . . . in frequency-modulation receivers
3/30 . . in amplifiers having semiconductor devices
3/32 . . . the control being dependent upon ambient noise level or sound level
3/34 . . . Muting amplifier when no signal is present

5/00 Tone control or bandwidth control in amplifiers

5/02 . Manually-operated control (variable bandpass or bandstop filters H03H 7/12)
5/04 . . in untuned amplifiers
5/06 . . . having discharge tubes
5/08 . . . . incorporating negative feedback
5/10 . . . having semiconductor devices
5/12 . . . . incorporating negative feedback
5/14 . . in frequency-selective amplifiers
5/16 . Automatic control
5/18 . . in untuned amplifiers
5/20 . . . having discharge tubes
5/22 . . . having semiconductor devices
5/24 . . in frequency-selective amplifiers
5/26 . . . having discharge tubes
5/28 . . . having semiconductor devices

7/00 Volume compression or expansion in amplifiers

7/02 . having discharge tubes
7/04 . . incorporating negative feedback
7/06 . having semiconductor devices
7/08 . . incorporating negative feedback

9/00 Combinations of two or more types of control, e.g. gain control and tone control

9/02 . in untuned amplifiers (combined tone controls for low and high frequencies H03G 5/00)
9/04 . . having discharge tubes
9/06 . . . for gain control and tone control
9/08 . . . . incorporating negative feedback
9/10 . . . for tone control and volume expansion or compression
9/12 . . having semiconductor devices
9/14 . . . for gain control and tone control
9/16 . . . . incorporating negative feedback
9/18 . . . for tone control and volume expansion or compression
9/20 . in frequency-selective amplifiers
9/22 . . having discharge tubes
9/24 . . having semiconductor devices
9/26 . in untuned amplifying stages as well as in frequency-selective amplifying stages (gain control in both stages H03G 3/00; tone control or bandwidth control H03G 5/00)
9/28 . . all amplifying stages having discharge tubes
9/30 . . all amplifying stages having semiconductor devices

11/00 Limiting amplitude; **Limiting rate of change of amplitude**

11/02 . by means of diodes (H03G 11/04, H03G 11/06, H03G 11/08 take precedence)
11/04 . Limiting level dependent on strength of signal; Limiting level dependent on strength of carrier on which signal is modulated
11/06 . Limiters of angle-modulated signals; such limiters combined with discriminators (discriminators having an inherent limiting action H03D 3/00)
11/08 . Limiting rate of change of amplitude

99/00 Subject matter not provided for in other groups of this subclass [8]

H03H IMPEDANCE NETWORKS, E.G. RESONANT CIRCUITS; **RESONATORS** (measuring, testing G01R; arrangements for producing a reverberation or echo sound G10K 15/08; impedance networks or resonators consisting of distributed impedances, e.g. of the waveguide type, H01P; control of amplification, e.g. bandwidth control of amplifiers, H03G; tuning resonant circuits, e.g. tuning coupled resonant circuits, H03J; networks for modifying the frequency characteristics of communication systems H04B)

(1) This subclass covers:
- networks comprising lumped impedance elements;
- networks comprising distributed impedance elements together with lumped impedance elements;
- networks comprising electromechanical or electro-acoustic elements;
- networks simulating reactances and comprising discharge tubes or semiconductor devices;
- constructions of electromechanical resonators.

(2) In this subclass, the following expression is used with the meaning indicated:
- "passive elements" means resistors, capacitors, inductors, mutual inductors, or diodes. **[3]**

(3) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

(4) In this subclass, main groups with a higher number take precedence. **[3]**

Subclass index

1/00 Constructional details of impedance networks whose electrical mode of operation is not specified or applicable to more than one type of network (constructional details of electromechanical transducers H03H 9/00)

1/02 . RC networks, e.g. filters (structural combinations of capacitors with other electric elements H01G) **[3]**

2/00 Networks using elements or techniques not provided for in groups H03H 3/00 to H03H 21/00 [3]

3/00 Apparatus or processes specially adapted for the manufacture of impedance networks, resonating circuits, resonators

3/007 . for the manufacture of electromechanical resonators or networks **[3]**

3/013 . . for obtaining desired frequency or temperature coefficient (H03H 3/04, H03H 3/10 take precedence) **[3]**

3/02 . . for the manufacture of piezo-electric or electrostrictive resonators or networks (H03H 3/08 takes precedence) **[3]**

3/04 . . . for obtaining desired frequency or temperature coefficient **[3]**

3/06 . . for the manufacture of magnetostrictive resonators or networks **[3]**

3/08 . . for the manufacture of resonators or networks using surface acoustic waves **[3]**

3/10 . . . for obtaining desired frequency or temperature coefficient **[3]**

5/00 One-port networks comprising only passive electrical elements as network components [3]

5/02 . without voltage- or current-dependent elements

5/10 . . comprising at least one element with prescribed temperature coefficient

5/12 . with at least one voltage- or current-dependent element

7/00 Multiple-port networks comprising only passive electrical elements as network components (receiver input circuits H04B 1/18; networks simulating a length of communication cable H04B 3/40) **[3]**

7/01 . Frequency selective two-port networks **[3]**

7/03 . . comprising means for compensation of loss **[3]**

7/06 . . including resistors (H03H 7/075, H03H 7/09, H03H 7/12, H03H 7/13 take precedence) **[3]**

7/065 . . . Parallel T-filters **[3]**

7/07 . . . Bridged T-filters **[3]**

7/075 . . Ladder networks, e.g. electric wave filters **[3]**

7/09 . . Filters comprising mutual inductance **[3]**

7/12 . . Bandpass or bandstop filters with adjustable bandwidth and fixed centre frequency (H03H 7/09 takes precedence; automatic control of bandwidth in amplifiers H03G 5/16)

7/13 . . using electro-optical elements **[3]**

7/18 . Networks for phase shifting

7/19 . . Two-port phase shifters providing a predetermined phase shift, e.g. "all-pass" filters **[3]**

7/20 . . Two-port phase shifters providing an adjustable phase shift **[3]**

7/21 . . providing two or more phase shifted output signals, e.g. n-phase output **[3]**

7/24 . Frequency-independent attenuators

7/25 . . comprising an element controlled by an electric or magnetic variable (H03H 7/27 takes precedence) **[3]**

7/27 . . comprising a photo-electric element **[3]**

7/30 . Time-delay networks

7/32 . . with lumped inductance and capacitance

7/34 . . with lumped and distributed reactance

7/38 . Impedance-matching networks

7/40 . . Automatic matching of load impedance to source impedance

7/42 . Balance/unbalance networks
7/46 . Networks for connecting several sources or loads, working on different frequencies or frequency bands, to a common load or source (for use in multiplex transmission systems H04J 1/00)
7/48 . Networks for connecting several sources or loads, working on the same frequency or frequency band, to a common load or source (phase shifters providing two or more output signals H03H 7/21) **[3]**
7/52 . One-way transmission networks, i.e. unilines
7/54 . Modifications of networks to reduce influence of variations of temperature **[3]**

9/00 Networks comprising electromechanical or electro-acoustic elements; **Electromechanical resonators** (manufacture of piezo-electric or magnetostrictive elements H01L 41/00; loudspeakers, microphones, gramophone pick-ups or the like H04R)
9/02 . Details **[3]**
9/05 . . Holders; Supports **[3]**
9/08 . . . Holders with means for regulating temperature
9/09 . . . Elastic or damping supports **[3]**
9/10 . . . Mounting in enclosures
9/12 . . . . for networks with interaction of optical and acoustic waves
9/125 . . Driving means, e.g. electrodes, coils **[3]**
9/13 . . . for networks consisting of piezo-electric or electrostrictive materials (H03H 9/145 takes precedence) **[3]**
9/135 . . . for networks consisting of magnetostrictive materials (H03H 9/145 takes precedence) **[3]**
9/145 . . . for networks using surface acoustic waves **[3]**
9/15 . Constructional features of resonators consisting of piezo-electric or electrostrictive material (H03H 9/25 takes precedence) **[3]**
9/17 . . having a single resonator (crystal tuning forks H03H 9/21) **[3]**
9/19 . . . consisting of quartz **[3]**
9/205 . . having multiple resonators (crystal tuning forks H03H 9/21) **[3]**
9/21 . . Crystal tuning forks **[3]**
9/215 . . . consisting of quartz **[3]**
9/22 . Constructional features of resonators consisting of magnetostricitve material
9/24 . Constructional features of resonators of material which is not piezo-electric, electrostrictive, or magnetostrictive
9/25 . Constructional features of resonators using surface acoustic waves **[3]**

Note

Groups H03H 9/15 to H03H 9/25 take precedence over groups H03H 9/30 to H03H 9/74. **[3]**

9/30 . Time-delay networks
9/36 . . with non-adjustable delay time (H03H 9/40, H03H 9/42 take precedence) **[3]**
9/38 . . with adjustable delay time (H03H 9/40, H03H 9/42 take precedence) **[3]**
9/40 . . Frequency-dependent delay lines, e.g. dispersive delay lines (H03H 9/42 takes precedence) **[3]**
9/42 . . using surface acoustic waves **[3]**
9/44 . . . Frequency-dependent delay lines, e.g. dispersive delay lines **[3]**
9/46 . Filters (multiple-port electromechanical filters H03H 9/70) **[3]**
9/48 . . Coupling means therefor **[3]**
9/50 . . . Mechanical coupling means **[3]**
9/52 . . . Electric coupling means **[3]**
9/54 . . comprising resonators of piezo-electric or electrostrictive material (H03H 9/64 takes precedence) **[3]**
9/56 . . . Monolithic crystal filters **[3]**
9/58 . . . Multiple crystal filters **[3]**
9/60 . . . . Electric coupling means therefor **[3]**
9/62 . . comprising resonators of magnetostrictive material (H03H 9/64 takes precedence) **[3]**
9/64 . . using surface acoustic waves **[3]**
9/66 . Phase shifters **[3]**
9/68 . . using surface acoustic waves **[3]**
9/70 . Multiple-port networks for connecting several sources or loads, working on different frequencies or frequency bands, to a common or source **[3]**
9/72 . . Networks using surface acoustic waves **[3]**
9/74 . Multiple-port networks for connecting several sources or loads, working on the same frequency or frequency band, to a common load or source (networks for phase shifting H03H 9/66) **[3]**
9/76 . . Networks using surface acoustic waves **[3]**

11/00 Networks using active elements
11/02 . Multiple-port networks **[3]**
11/04 . . Frequency selective two-port networks **[3]**
11/06 . . . comprising means for compensation of loss **[3]**
11/08 . . . using gyrators **[3]**
11/10 . . . using negative impedance converters (H03H 11/08 takes precedence) **[3]**
11/12 . . . using amplifiers with feedback (H03H 11/08, H03H 11/10 take precedence) **[3]**
11/14 . . . using electro-optical devices **[3]**
11/16 . . Networks for phase shifting **[3]**
11/18 . . . Two-port phase shifters providing a predetermined phase shift, e.g. "all-pass" filters **[3]**
11/20 . . . Two-port phase shifters providing an adjustable phase shift **[3]**
11/22 . . . providing two or more phase shifted output signals, e.g. n-phase output **[3]**
11/24 . . Frequency-independent attenuators **[3]**
11/26 . . Time-delay networks (analogue shift registers G11C 27/04) **[3]**
11/28 . . Impedance matching networks **[3]**
11/30 . . . Automatic matching of source impedance to load impedance **[3]**
11/32 . . Balance-unbalance networks **[3]**
11/34 . . Networks for connecting several sources or loads working on different frequencies or frequency bands, to a common load or source (for use in multiplex transmission systems H04J 1/00) **[3]**
11/36 . . Networks for connecting several sources or loads, working on the same frequency or frequency band, to a common load or source (phase shifters providing two or more output signals H03H 11/22) **[3]**
11/38 . . One-way transmission networks, i.e. unilines **[3]**
11/40 . . Impedance converters **[3]**
11/42 . . . Gyrators (used in frequency selective networks H03H 11/08) **[3]**
11/44 . . . Negative impedance converters (H03H 11/42 takes precedence; used in frequency-selective networks H03H 11/10) **[3]**
11/46 . One-port networks **[3]**

11/48 . . simulating reactances **[3]**
11/50 . . . using gyrators **[3]**
11/52 . . simulating negative resistances **[3]**
11/54 . Modifications of networks to reduce influence of variations of temperature **[3]**

15/00 **Transversal filters** (electromechanical filters H03H 9/46, H03H 9/70) **[3]**
15/02 . using analogue shift registers **[3]**

17/00 **Networks using digital techniques [3]**
17/02 . Frequency-selective networks **[3]**
17/04 . . Recursive filters **[3]**
17/06 . . Non-recursive filters **[3]**
17/08 . Networks for phase-shifting **[3]**

19/00 **Networks using time-varying elements, e.g. N-path filters [3]**

21/00 **Adaptive networks [3]**

H03J **TUNING RESONANT CIRCUITS**; **SELECTING RESONANT CIRCUITS** (indicating arrangements for measuring G01D; measuring, testing G01R; remote-control in general G05, G08; automatic control or stabilisation of generators H03L)

Note

This subclass covers also the control of tuning, including the combined control of tuning and other functions, e.g. combinations of tuning control and volume control, combinations of control of local oscillator and of supplementary resonant circuits. **[3]**

Subclass index

1/00 **Details of adjusting, driving, indicating, or mechanical control arrangements for resonant circuits in general** (machine elements in general F16; coupling of knobs to shafts F16D) **[3]**
1/02 . Indicating arrangements
1/04 . . with optical indicating means
1/06 . Driving or adjusting arrangements; combined with other driving or adjusting arrangements, e.g. of gain control

Note

Groups H03J 1/14, H03J 1/16 take precedence over groups H03J 1/08 to H03J 1/12.

1/08 . . Toothed-gear drive; Worm drive
1/10 . . Rope drive; Chain drive
1/12 . . Friction drive
1/14 . . Special arrangements for fine and coarse tuning
1/16 . . Single control means independently performing two or more functions
1/18 . Control by auxiliary power
1/20 . . the auxiliary power being switched on as long as controlling current is switched on
1/22 . . with stepping arrangements actuated by control pulses

3/00 **Continuous tuning** (H03J 7/00, H03J 9/00 take precedence; combination of continuous and discontinuous tuning other than for bandspreading H03J 5/00) **[3]**
3/02 . Details
3/04 . . Arrangements for compensating for variations of physical values, e.g. temperature (automatic control of ambient conditions G05D)
3/06 . . Arrangements for obtaining constant bandwidth or gain throughout tuning range or ranges (automatic gain control H03G)
3/08 . . . by varying a second parameter simultaneously with the tuning, e.g. coupling bandpass filter
3/10 . . Circuit arrangements for fine tuning, e.g. bandspreading
3/12 . . Electrically-operated arrangements for indicating correct tuning
3/14 . . . Visual indication, e.g. magic eye
3/16 . . Tuning without displacement of reactive element, e.g. by varying permeability
3/18 . . . by discharge tube or semiconductor device simulating variable reactance
3/20 . of single resonant circuit by varying inductance only or capacitance only
3/22 . of single resonant circuit by varying inductance and capacitance simultaneously
3/24 . of more than one resonant circuit simultaneously, the circuits being tuned to substantially the same frequency, e.g. for single-knob tuning
3/26 . . the circuits being coupled so as to form a bandpass filter
3/28 . of more than one resonant circuit simultaneously, the tuning frequencies of the circuits having a substantially constant difference throughout the tuning range
3/30 . . Arrangements for ensuring tracking with variable inductors
3/32 . . Arrangements for ensuring tracking with variable capacitors

5/00 **Discontinuous tuning**; **Selecting predetermined frequencies**; **Selecting frequency bands with or without continuous tuning in one or more of the bands, e.g. push-button tuning, turret tuner** (H03J 7/00, H03J 9/00 take precedence; for bandspreading H03J 3/10) **[3]**
5/02 . with variable tuning element having a number of predetermined settings and adjustable to a desired one of these settings
5/04 . . operated by hand

5/06 . . . Settings determined by single indexing means with snap action

5/08 . . . Settings determined by a number of separately-actuated positioning means

5/10 . . . Settings determined by a number of positioning means mounted on a common support, which is adjustable to desired positions, a different positioning means being in operation in each position

5/12 . . . Settings determined by a number of separately-actuated driving means which adjust the tuning element directly to desired settings

5/14 . . operated by auxiliary power

5/16 . . . Settings determined by a number of separate positioning means actuated by hand

5/18 . . . Settings determined by a number of separate positioning means actuated by electromagnets

5/20 . . . Settings determined by a number of positioning means actuated by a second means adjustable to different positions by the same or by a second auxiliary power

5/22 . . . Settings determined by a number of separately actuated driving means which adjust the tuning element directly to desired settings

5/24 . with a number of separate pretuned tuning circuits or separate tuning elements selectively brought into circuit, e.g. for waveband selection, for television channel selection (switches in general H01H)

5/26 . . operated by hand

5/28 . . . Tuning circuits or elements supported on a revolving member with contacts arranged in a plane perpendicular to the axis

5/30 . . . Tuning circuits or elements supported on a revolving member with contacts arranged in lines parallel to the axis

5/32 . . . Stationary tuning circuits or elements selected by push-button

7/00 Automatic frequency control; **Automatic scanning over a band of frequencies [3]**

7/02 . Automatic frequency control (H03J 7/18 takes precedence; automatic tuning control for television receivers H04N 5/50) **[3]**

7/04 . . where the frequency control is accomplished by varying the electrical characteristics of a non-mechanically adjustable element or where the nature of the frequency controlling element is not significant **[3]**

7/06 . . . using counters or frequency dividers **[3]**

7/08 . . . using varactors, i.e. voltage variable reactive diodes (H03J 7/06 takes precedence) **[3]**

7/10 . . . . Modification of automatic frequency control sensitivity or linearising automatic frequency control operation **[3]**

7/12 . . . . Combination of automatic frequency control voltage with stabilised varactor supply voltage **[3]**

7/14 . . . Controlling the magnetic state of inductor cores (H03J 7/06 takes precedence) **[3]**

7/16 . . where the frequency control is accomplished by mechanical means, e.g. by a motor **[3]**

7/18 . Automatic scanning over a band of frequencies **[3]**

7/20 . . where the scanning is accomplished by varying the electrical characteristics of a non-mechanically adjustable element **[3]**

7/22 . . . in which an automatic frequency control circuit is brought into action after the scanning action has been stopped (H03J 7/24 takes precedence) **[3]**

7/24 . . . using varactors, i.e. voltage variable reactive diodes (H03J 7/28 takes precedence) **[3]**

7/26 . . . . in which an automatic frequency control circuit is brought into action after the scanning action has been stopped **[3]**

7/28 . . . using counters or frequency dividers **[3]**

7/30 . . where the scanning is accomplished by mechanical means, e.g. by a motor **[3]**

7/32 . . with simultaneous display of received frequencies, e.g. panoramic receivers **[3]**

9/00 Remote-control of tuned circuits; **Combined remote-control of tuning and other functions, e.g. brightness, amplification** (mechanical remote-control arrangements H03J 1/00) **[3]**

9/02 . using radio transmission; using near-field transmission **[3]**

9/04 . using ultrasonic, sonic or infrasonic waves **[3]**

9/06 . using electromagnetic waves other than radio waves, e.g. light **[3]**

H03K PULSE TECHNIQUE (measuring pulse characteristics G01R; mechanical counters having an electrical input G06M; information storage devices in general G11; sample-and-hold arrangements in electric analogue stores G11C 27/02; construction of switches involving contact making and breaking for generation of pulses, e.g. by using a moving magnet, H01H; static conversion of electric power H02M; generation of oscillations by circuits employing active elements which operate in a non-switching manner H03B; modulating sinusoidal oscillations with pulses H03C, H04L; discriminator circuits involving pulse counting H03D; automatic control of generators H03L; starting, synchronisation, or stabilisation of generators where the type of generator is irrelevant or unspecified H03L; coding, decoding or code conversion, in general H03M) **[4]**

(1) This subclass covers :
- methods, circuits, devices, or apparatus using active elements operating in a discontinuous or switching manner for generating, counting, amplifying, shaping, modulating, demodulating, or otherwise manipulating signals;
- electronic switching not involving contact-making and breaking;
- logic circuits handling electric pulses.

(2) In this subclass, the following expression is used with the meaning indicated:
- "active element" exercises control over the conversion of input energy into an oscillation or a discontinuous flow of energy.

(3) In this subclass, where the claims of a patent document are not limited to a specific circuit element, the document is classified at least according to the elements used in the described embodiment. **[6]**

Subclass index

3/00 **Circuits for generating electric pulses**; **Monostable, bistable or multistable circuits** (H03K 4/00 takes precedence; for digital computers G06F 1/025) **[5]**

3/01 . Details **[3]**

3/011 . . Modifications of generator to compensate for variations in physical values, e.g. voltage, temperature **[6]**

3/012 . . Modifications of generator to improve response time or to decrease power consumption **[6]**

3/013 . . Modifications of generator to prevent operation by noise or interference **[3]**

3/014 . . Modifications of generator to ensure starting of oscillations **[6]**

3/015 . . Modifications of generator to maintain energy constant **[6]**

3/017 . . Adjustment of width or dutycycle of pulses (pulse width modulation H03K 7/08) **[3]**

3/02 . Generators characterised by the type of circuit or by the means used for producing pulses (H03K 3/64 to H03K 3/84 take precedence)

3/021 . . by the use, as active elements, of more than one type of element or means, e.g. BIMOS, composite devices such as IGBT **[6]**

3/023 . . by the use of differential amplifiers or comparators, with internal or external positive feedback **[3]**

3/0231 . . . Astable circuits **[6]**

3/0232 . . . Monostable circuits **[6]**

3/0233 . . . Bistable circuits **[6]**

3/0234 . . . Multistable circuits **[6]**

3/027 . . by the use of logic circuits, with internal or external positive feedback **[3]**

3/03 . . . Astable circuits **[3]**

3/033 . . . Monostable circuits **[3]**

3/037 . . . Bistable circuits **[3]**

3/038 . . . Multistable circuits **[6]**

3/04 . . by the use, as active elements, of vacuum tubes only, with positive feedback (H03K 3/023, H03K 3/027 take precedence) **[3]**

3/05 . . . using means other than a transformer for feedback

3/06 . . . . using at least two tubes so coupled that the input of one is derived from the output of another, e.g. multivibrator

3/08 . . . . . astable

3/09 . . . . . Stabilisation of output **[2]**

3/10 . . . . . monostable

3/12 . . . . . bistable

3/13 . . . . . Bistables with hysteresis, e.g. Schmitt trigger **[6]**

3/14 . . . . . multistable

3/16 . . . using a transformer for feedback, e.g. blocking oscillator with saturable core

3/22 . . . . specially adapted for amplitude comparison, i.e. Multiar

3/26 . . by the use, as active elements, of bipolar transistors with internal or external positive feedback (H03K 3/023, H03K 3/027 take precedence) **[2]**

3/28 . . . using means other than a transformer for feedback

3/281 . . . . using at least two transistors so coupled that the input of one is derived from the output of another, e.g. multivibrator

3/282 . . . . . astable

3/283 . . . . . Stabilisation of output **[2]**

3/284 . . . . . monostable

3/286 . . . . . bistable **[3]**

3/287 . . . . . using additional transistors in the feedback circuit (H03K 3/289 takes precedence) **[3]**

3/288 . . . . . using additional transistors in the input circuit (H03K 3/289 takes precedence) **[3]**

3/2885 . . . . . the input circuit having a differential configuration **[5]**

3/289 . . . . . of the master-slave type **[3]**

3/2893 . . . . . Bistables with hysteresis, e.g. Schmitt trigger **[6]**

3/2897 . . . . . with an input circuit of differential configuration **[6]**

3/29 . . . . . multistable

3/30 . . . using a transformer for feedback, e.g. blocking oscillator

3/313 . . by the use, as active elements, of semiconductor devices with two electrodes, one or two potential-jump barriers, and exhibiting a negative resistance characteristic **[3]**

3/315 . . . the devices being tunnel diodes

3/33 . . by the use, as active elements, of semiconductor devices exhibiting hole storage or enhancement effect

3/335 . . by the use, as active elements, of semiconductor devices with more than two electrodes and exhibiting avalanche effect

3/35 . . by the use, as active elements, of bipolar semiconductor devices with more than two PN junctions, or more than three electrodes, or more than one electrode connected to the same conductivity region (H03K 3/023, H03K 3/027 take precedence) **[3]**

3/351 . . . the devices being unijunction transistors (H03K 3/352 takes precedence) **[3]**

3/352 . . . the devices being thyristors **[3]**

3/3525 . . . . Anode gate thyristors or programmable unijunction transistors **[6]**

3/353 . . by the use, as active elements, of field-effect transistors with internal or external positive feedback (H03K 3/023, H03K 3/027 take precedence) **[2,3]**

3/354 . . . Astable circuits **[3]**

3/355 . . . Monostable circuits **[3]**

3/356 . . . Bistable circuits **[3]**

3/3562 . . . . of the master-slave type **[6]**

3/3565 . . . . Bistables with hysteresis, e.g. Schmitt trigger **[6]**

3/3568 . . . Multistable circuits **[6]**

3/357 . . by the use, as active elements, of bulk negative resistance devices, e.g. Gunn-effect devices **[2]**

3/36 . . by the use, as active elements, of semiconductors, not otherwise provided for **[2]**

3/37 . . by the use, as active elements, of gas-filled tubes, e.g. astable trigger circuits (H03K 3/55 takes precedence)

3/38 . . by the use, as active elements, of superconductive devices **[3]**

3/40 . . by the use, as active elements, of electrochemical cells

3/42 . . by the use, as active elements, of opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled

3/43 . . by the use, as active elements, of beam deflection tubes

3/45 . . by the use, as active elements, of non-linear magnetic or dielectric devices

3/47 . . . the devices being parametrons

3/49 . . . the devices being ferro-resonant

3/51 . . . the devices being multi-aperture magnetic cores, e.g. transfluxors

3/53 . . by the use of an energy-accumulating element discharged through the load by a switching device controlled by an external signal and not incorporating positive feedback (H03K 3/335 takes precedence)

3/537 . . . the switching device being a spark gap **[3]**

3/543 . . . the switching device being a vacuum tube **[3]**

3/55 . . . the switching device being a gas-filled tube having a control electrode

3/57 . . . the switching device being a semiconductor device

3/59 . . by the use of galvano-magnetic devices, e.g. Hall-effect devices **[2]**

3/64 . Generators producing trains of pulses, i.e. finite sequences of pulses

3/66 . . by interrupting the output of a generator

3/70 . . . time intervals between all adjacent pulses of one train being equal

3/72 . . with means for varying repetition rate of trains

3/78 . Generating a single train of pulses having a predetermined pattern, e.g. a predetermined number

3/80 . Generating trains of sinusoidal oscillations (by interrupting H03C, H04L)

3/84 . Generating pulses having a predetermined statistical distribution of a parameter, e.g. random pulse generators **[2]**

3/86 . Generating pulses by means of delay lines and not covered by the preceding subgroups **[2]**

4/00 Generating pulses having essentially a finite slope or stepped portions (generation of supply voltages from deflection waveforms H04N 3/18)

4/02 . having stepped portions, e.g. staircase waveform

4/04 . having parabolic shape

4/06 . having triangular shape

4/08 . . having sawtooth shape

4/10 . . . using as active elements vacuum tubes only

4/12 . . . . in which a sawtooth voltage is produced across a capacitor

4/14 . . . . . using two tubes so coupled that the input of each one is derived from the output of the other, e.g. multivibrator

4/16 . . . . . using a single tube with positive feedback through transformer, e.g. blocking oscillator

4/18 . . . . . using a single tube exhibiting negative resistance between two of its electrodes, e.g. transitron, dynatron

4/20 . . . . . using a tube with negative feedback by capacitor, e.g. Miller integrator

4/22 . . . . . combined with transitron, e.g. phantastron, sanatron

4/24 . . . . . Boot-strap generators

4/26 . . . . in which a sawtooth current is produced through an inductor

4/28 . . . . . using a tube operating as a switching device **[3]**

4/32 . . . . . combined with means for generating the driving pulses

4/34 . . . . . using a single tube with positive feedback through a transformer

4/36 . . . . . using a single tube exhibiting negative resistance between two of its electrodes, e.g. transitron, dynatron

4/38 . . . . . combined with Miller integrator

4/39 . . . . . using a tube operating as an amplifier **[3]**

4/41 . . . . . with negative feedback through a capacitor, e.g. Miller integrator **[3]**

4/43 . . . . . combined with means for generating the driving pulses **[3]**

4/48 . . . using as active elements semiconductor devices (H03K 4/787 to H03K 4/84 take precedence)

4/50 . . . . in which a sawtooth voltage is produced across a capacitor

4/501 . . . . . the starting point of the flyback period being determined by the amplitude of the voltage across the capacitor, e.g. by a comparator **[6]**

4/502 . . . . . the capacitor being charged from a constant-current source **[6]**

4/52 . . . . . using two semiconductor devices so coupled that the input of each one is derived from the output of the other, e.g. multivibrator

4/54 . . . . . using a single semiconductor device with positive feedback through a transformer, e.g. blocking oscillator

4/56 . . . . . using a semiconductor device with negative feedback through a capacitor, e.g. Miller integrator
4/58 . . . . . Boot-strap generators
4/60 . . . . in which a sawtooth current is produced through an inductor
4/62 . . . . . using a semiconductor device operating as a switching device **[3]**
4/64 . . . . . combined with means for generating the driving pulses
4/66 . . . . . using a single device with positive feedback, e.g. blocking oscillator
4/68 . . . . . Generators in which the switching device is conducting during the fly-back part of the cycle
4/69 . . . . . using a semiconductor device operating as an amplifier **[3]**
4/71 . . . . . with negative feedback through a capacitor, e.g. Miller integrator **[3]**
4/72 . . . . . combined with means for generating the driving pulses
4/787 . . . using as active elements semiconductor devices with two electrodes and exhibiting a negative resistance characteristic **[2]**
4/793 . . . . using tunnel diodes **[2]**
4/80 . . . using as active elements multi-layer diodes
4/83 . . . using as active elements semiconductor devices with more than two PN junctions or with more than three electrodes or more than one electrode connected to the same conductivity region **[2]**
4/84 . . . . Generators in which the semiconductor device is conducting during the fly-back part of the cycle
4/86 . . . using as active elements gas-filled tubes
4/88 . . . using as active elements electrochemical cells
4/90 . . . Linearisation of ramp (modifying slopes of pulses H03K 6/04; scanning correction for television receivers H04N 3/16); Synchronisation of pulses (in pictorial communication systems H04N 1/36, H04N 5/04; colour synchronisation H04N 9/44) **[2]**
4/92 . having a waveform comprising a portion of a sinusoid (generating sinusoidal oscillations H03B) **[2]**
4/94 . having trapezoidal shape **[2]**

5/00 Manipulating pulses not covered by one of the other main groups in this subclass (circuits with regenerative action H03K 3/00, H03K 4/00; by the use of non-linear magnetic or dielectric devices H03K 3/45)

Note

In this group, the input signals are of the pulse type. **[3]**

5/003 . Changing the DC level (television signals H04N 3/00) **[6]**
5/007 . . Base line stabilisation (thresholding H03K 5/08) **[6]**
5/01 . Shaping pulses (discrimination against noise or interference H03K 5/125)
5/02 . . by amplifying (H03K 5/04 takes precedence; wide-band amplifiers in general H03F)
5/04 . . by increasing duration; by decreasing duration
5/05 . . . by the use of clock signals or other time reference signals **[3]**
5/06 . . . by the use of delay lines or other analogue delay elements **[3]**
5/07 . . . by the use of resonant circuits **[3]**
5/08 . . by limiting, by thresholding, by slicing, i.e. combined limiting and thresholding (H03K 5/07 takes precedence; comparing one pulse with another H03K 5/22; providing a determined threshold for switching H03K 17/30) **[3]**
5/12 . . by steepening leading or trailing edges
5/125 . Discriminating pulses (measuring or indicating G01R 19/00, G01R 23/00, G01R 25/00, G01R 29/00; separation of synchronising signals in television systems H04N 5/08) **[6]**
5/1252 . . Suppression or limitation of noise or interference (specially adapted for transmission systems H04B 15/00, H04L 25/08) **[6]**
5/1254 . . . specially adapted for pulses generated by closure of switches, i.e. anti-bouncing devices (debouncing circuits for electronic time-pieces G04G 5/00) **[6]**
5/13 . Arrangements having a single output and transforming input signals into pulses delivered at desired time intervals
5/135 . . by the use of time reference signals, e.g. clock signals **[3]**
5/14 . . by the use of delay lines **[3]**
5/145 . . by the use of resonant circuits **[3]**
5/15 . Arrangements in which pulses are delivered at different times at several outputs, i.e. pulse distributors (distributing, switching, or gating arrangements H03K 17/00) **[2]**
5/151 . . with two complementary outputs **[6]**
5/153 . Arrangements in which a pulse is delivered at the instant when a predetermined characteristic of an input signal is present or at a fixed time interval after this instant (switching at zero crossing H03K 17/13)
5/1532 . . Peak detectors (measuring characteristics of individual pulses G01R 29/02) **[6]**
5/1534 . . Transition or edge detectors **[6]**
5/1536 . . Zero-crossing detectors (in measuring circuits G01R 19/175) **[6]**
5/156 . Arrangements in which a continuous pulse train is transformed into a train having a desired pattern
5/159 . Applications of delay lines not covered by the preceding subgroups
5/19 . Monitoring patterns of pulse trains (indicating amplitude G01R 19/00; indicating frequency G01R 23/00; measuring characteristics of individual pulses G01R 29/02) **[3]**
5/22 . Circuits having more than one input and one output for comparing pulses or pulse trains with each other according to input signal characteristics, e.g. slope, integral (indicating phase difference of two cyclic pulse trains G01R 25/00) **[3]**
5/24 . . the characteristic being amplitude **[3]**
5/26 . . the characteristic being duration, interval, position, frequency, or sequence **[3]**

6/00 **Manipulating pulses having a finite slope and not covered by one of the other main groups of this subclass** (circuits with regenerative action H03K 4/00)

Note

In this group, the input signals are of the pulse type. **[3]**

6/02 . Amplifying pulses
6/04 . Modifying slopes of pulses, e.g. S-correction (S-correction in television H04N 3/23)

7/00 **Modulating pulses with a continuously-variable modulating signal**

7/02 . Amplitude modulation, i.e. PAM
7/04 . Position modulation, i.e. PPM
7/06 . Frequency or rate modulation, i.e. PFM or PRM
7/08 . Duration or width modulation
7/10 . Combined modulation, e.g. rate modulation and amplitude modulation

9/00 **Demodulating pulses which have been modulated with a continuously-variable signal**

9/02 . of amplitude-modulated pulses
9/04 . of position-modulated pulses
9/06 . of frequency- or rate-modulated pulses
9/08 . of duration- or width-modulated pulses
9/10 . of pulses having combined modulation

11/00 **Transforming types of modulation, e.g. position-modulated pulses into duration-modulated pulses**

12/00 **Producing pulses by distorting or combining sinusoidal waveforms** (shaping pulses H03K 5/01; combining sinewaves using elements operating in a non-switching manner H03B) **[3]**

17/00 **Electronic switching or gating, i.e. not by contact-making and -breaking** (selection of the stylus or auxiliary electrode in electric printing B41J 2/405; sample-and-hold arrangements G11C 27/02; switching or interrupting devices in waveguides H01P; gated amplifiers H03F 3/72; switching arrangements for exchange systems using static devices H04Q 3/52)

17/04 . Modifications for accelerating switching **[3]**
17/041 . . without feedback from the output circuit to the control circuit **[6]**
17/0412 . . . by measures taken in the control circuit **[6]**
17/0414 . . . . Anti-saturation measures **[6]**
17/0416 . . . by measures taken in the output circuit **[6]**
17/042 . . by feedback from the output circuit to the control circuit **[6]**
17/0422 . . . Anti-saturation measures **[6]**
17/0424 . . . by the use of a transformer **[6]**
17/06 . Modifications for ensuring a fully conducting state **[3]**
17/08 . Modifications for protecting switching circuit against overcurrent or overvoltage **[3]**
17/081 . . without feedback from the output circuit to the control circuit **[6]**
17/0812 . . . by measures taken in the control circuit **[6]**
17/0814 . . . by measures taken in the output circuit **[6]**
17/082 . . by feedback from the output to the control circuit **[6]**
17/10 . Modifications for increasing the maximum permissible switched voltage **[3]**
17/12 . Modifications for increasing the maximum permissible switched current **[3]**
17/13 . Modifications for switching at zero crossing (generating an impulse at zero crossing H03K 5/1536) **[3]**
17/14 . Modifications for compensating variations of physical values, e.g. of temperature **[3]**
17/16 . Modifications for eliminating interference voltages or currents **[3]**
17/18 . Modifications for indicating state of switch **[3]**
17/20 . Modifications for resetting core switching units to a predetermined state **[3]**
17/22 . Modifications for ensuring a predetermined initial state when the supply voltage has been applied (bi-stable generators H03K 3/12) **[3]**
17/24 . . Storing the actual state when the supply voltage fails **[3]**
17/26 . Modifications for temporary blocking after receipt of control pulses **[3]**
17/28 . Modifications for introducing a time delay before switching (modifications to provide a choice of time-intervals for executing more than one switching action H03K 17/296) **[3]**
17/284 . . in field-effect transistor switches **[3]**
17/288 . . in tube switches **[3]**
17/292 . . in thyristor, unijunction transistor or programmable unijunction transistor switches **[3]**
17/296 . Modifications to provide a choice of time-intervals for executing more than one switching action and automatically terminating their operation after the programme is completed (electronic clocks comprising means to be operated at preselected times or after preselected time-intervals G04G 15/00) **[3]**
17/30 . Modifications for providing a predetermined threshold before switching (shaping pulses by thresholding H03K 5/08) **[3]**
17/51 . characterised by the use of specified components (H03K 17/04 to H03K 17/30, H03K 17/94 take precedence) **[3]**
17/52 . . by the use, as active elements, of gas-filled tubes **[3]**
17/54 . . by the use, as active elements, of vacuum tubes (using diodes H03K 17/74) **[3]**
17/56 . . by the use, as active elements, of semiconductor devices (using diodes H03K 17/74) **[3]**
17/567 . . . Circuits characterised by the use of more than one type of semiconductor device, e.g. BIMOS, composite devices such as IGBT **[6]**
17/58 . . . the devices being tunnel diodes **[3]**
17/60 . . . the devices being bipolar transistors (bipolar transistors having four or more electrodes H03K 17/72) **[3]**
17/605 . . . . with galvanic isolation between the control circuit and the output circuit (H03K 17/78 takes precedence) **[5]**
17/61 . . . . . using transformer coupling **[5]**
17/615 . . . . in a Darlington configuration **[5]**
17/62 . . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00) **[3]**
17/64 . . . . having inductive loads **[3]**
17/66 . . . . Switching arrangements for passing the current in either direction at will; Switching arrangements for reversing the current at will **[3]**
17/68 . . . . specially adapted for switching ac currents or voltages **[3]**
17/687 . . . the devices being field-effect transistors **[3]**

17/689 . . . . with galvanic isolation between the control circuit and the output circuit (H03K 17/78 takes precedence) **[5]**
17/691 . . . . . using transformer coupling **[5]**
17/693 . . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00) **[3]**
17/695 . . . . having inductive loads (protecting switching circuit against inductive flyback voltage H03K 17/08) **[6]**
17/70 . . . the devices having only two electrodes and exhibiting negative resistance (the devices being tunnel diodes H03K 17/58) **[3]**
17/72 . . . Bipolar semiconductor devices with more than two PN junctions, e.g. thyristors, programmable unijunction transistors, or with more than three electrodes, e.g. silicon controlled switches, or with more than one electrode connected to the same conductivity region, e.g. unijunction transistors **[3]**
17/722 . . . . with galvanic isolation between the control circuit and the output circuit (H03K 17/78 takes precedence) **[5]**
17/723 . . . . . using transformer coupling **[5]**
17/725 . . . . for ac voltages or currents (H03K 17/722, H03K 17/735 take precedence) **[3,5]**
17/73 . . . . for dc voltages or currents (H03K 17/722, H03K 17/735 take precedence) **[3,5]**
17/732 . . . . . Measures for enabling turn-off **[5]**
17/735 . . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (H03K 17/722 takes precedence; logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00) **[3,5]**
17/74 . . by the use, as active elements, of diodes (by the use of more than one type of semiconductor device H03K 17/567; by the use of tunnel diodes H03K 17/58; by the use of negative resistance diodes H03K 17/70) **[3]**
17/76 . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code H03M 5/00, H03M 7/00) **[3]**
17/78 . . by the use, as active elements, of opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled **[3]**
17/785 . . . controlling field-effect transistor switches **[5]**
17/79 . . . controlling semiconductor switches with more than two PN-junctions, or more than three electrodes, or more than one electrode connected to the same conductivity region **[5]**
17/795 . . . controlling bipolar transistors **[5]**
17/80 . . by the use, as active elements, of non-linear magnetic or dielectric devices **[3]**
17/81 . . . Switching arrangements with several input- or output-terminals, e.g. multiplexers, distributors (logic circuits H03K 19/00; code converters H03M 5/00, H03M 7/00) **[3]**
17/82 . . . the devices being transfluxors **[3]**
17/84 . . . the devices being thin-film devices **[3]**
17/86 . . . the devices being twistors **[3]**
17/88 . . by the use, as active elements, of beam-deflection tubes **[3]**
17/90 . . by the use, as active elements, of galvano-magnetic devices, e.g. Hall-effect devices (H03K 17/95, H03K 17/97 take precedence) **[2,3]**
17/92 . . by the use, as active elements, of superconductive devices **[2,3]**
17/94 . characterised by the way in which the control signals are generated (mechanical structural details of control members of switches or keyboards, such as keys, push-buttons, levers or other mechanisms for transferring force to the activated elements, not directly producing electronic effects H01H; keyboards for special applications, see the relevant places, e.g. B41J, G06F 3/023, H04L 15/00, H04L 17/00, H04M 1/00) **[3,4]**
17/945 . . Proximity switches (H03K 17/96 takes precedence) **[3]**
17/95 . . . using a magnetic detector **[3]**
17/955 . . . using a capacitive detector **[3]**
17/96 . . Touch switches (specially adapted for electronic time-pieces with no moving parts G04G 21/08) **[3]**
17/965 . . Switches controlled by moving an element forming part of the switch **[3]**
17/967 . . . having a plurality of control members, e.g. keyboard (H03K 17/969, H03K 17/972, H03K 17/98 take precedence) **[4]**
17/968 . . . using opto-electronic devices **[4]**
17/969 . . . . having a plurality of control members, e.g. keyboard **[4]**
17/97 . . . using a magnetic movable element **[3]**
17/972 . . . . having a plurality of control members, e.g. keyboard **[4]**
17/975 . . . using a capacitive movable element **[3]**
17/98 . . . . having a plurality of control members, e.g. keyboard **[4]**

19/00 Logic circuits, i.e. having at least two inputs acting on one output (circuits for computer systems using fuzzy logic G06N 7/02); **Inverting circuits**
19/003 . Modifications for increasing the reliability **[3]**
19/007 . Fail-safe circuits **[3]**
19/01 . Modifications for accelerating switching **[3]**
19/013 . . in bipolar transistor circuits **[3]**
19/017 . . in field-effect transistor circuits **[3]**
19/0175 . Coupling arrangements; Interface arrangements (interface arrangements for digital computers G06F 3/00, G06F 13/00) **[5]**
19/018 . . using bipolar transistors only **[5]**
19/0185 . . using field-effect transistors only **[5]**
19/02 . using specified components (H03K 19/003 to H03K 19/0175 take precedence) **[3,5]**
19/04 . . using gas-filled tubes
19/06 . . using vacuum tubes (using diode rectifiers H03K 19/12)
19/08 . . using semiconductor devices (H03K 19/173 takes precedence; wherein the semiconductor devices are only diode rectifiers H03K 19/12) **[3]**
19/082 . . . using bipolar transistors **[3]**
19/084 . . . . Diode−transistor logic **[3]**
19/086 . . . . Emitter coupled logic **[3]**
19/088 . . . . Transistor−transistor logic **[3]**
19/09 . . . . Resistor−transistor logic **[3]**
19/091 . . . . Integrated injection logic or merged transistor logic **[3]**
19/094 . . . using field-effect transistors **[3]**
19/0944 . . . . using MOSFET (H03K 19/096 takes precedence) **[5]**
19/0948 . . . . . using CMOS **[5]**
19/0952 . . . . using Schottky type FET (H03K 19/096 takes precedence) **[5]**

19/0956 . . . . Schottky diode FET logic (H03K 19/096 takes precedence) **[5]**
19/096 . . . . Synchronous circuits, i.e. using clock signals **[3]**
19/098 . . . using thyristors **[3]**
19/10 . . . using tunnel diodes **[3]**
19/12 . . using diode rectifiers
19/14 . . using opto-electronic devices, i.e. light-emitting and photoelectric devices electrically- or optically-coupled (optical logic elements G02F 3/00)
19/16 . . using saturable magnetic devices
19/162 . . . using parametrons
19/164 . . . using ferro-resonant devices
19/166 . . . using transfluxors
19/168 . . . using thin-film devices
19/17 . . using twistors
19/173 . . using elementary logic circuits as components **[3]**
19/177 . . . arranged in matrix form **[3]**
19/18 . . using galvano-magnetic devices, e.g. Hall-effect devices **[2]**
19/185 . . using dielectric elements with variable dielectric constant, e.g. ferro-electric capacitors **[2]**
19/19 . . . using ferro-resonant devices **[2]**
19/195 . . using superconductive devices **[2,3]**
19/20 . characterised by logic function, e.g. AND, OR, NOR, NOT circuits (H03K 19/003 to H03K 19/01 take precedence)
19/21 . . EXCLUSIVE-OR circuits, i.e. giving output if input signal exists at only one input; COINCIDENCE circuits, i.e. giving output only if all input signals are identical **[3]**
19/23 . . Majority or minority circuits, i.e. giving output having the state of the majority or the minority of the inputs **[3]**

21/00 Details of pulse counters or frequency dividers
21/02 . Input circuits **[4]**
21/08 . Output circuits **[4]**
21/10 . . comprising logic circuits
21/12 . . with parallel read-out **[4]**
21/14 . . with series read-out of number stored **[4]**
21/16 . Circuits for carrying-over pulses between successive decades
21/17 . . with field-effect transistors **[4]**
21/18 . Circuits for visual indication of the result **[4]**
21/20 . . using glow-discharge lamps
21/38 . Starting, stopping, or resetting the counter (counters with a base other than a power of two H03K 23/48, H03K 23/66) **[4]**
21/40 . Monitoring; Error detection; Preventing or correcting improper counter operation **[4]**

23/00 Pulse counters comprising counting chains; **Frequency dividers comprising counting chains** (H03K 29/00 takes precedence)
23/40 . Gating or clocking signals applied to all stages, i.e. synchronous counters **[4]**
23/42 . . Out-of-phase gating or clocking signals applied to counter stages **[4]**
23/44 . . . using field-effect transistors **[4]**
23/46 . . . using charge transfer devices, i.e. bucket brigade or charge coupled devices **[4]**
23/48 . . with a base or radix other than a power of two (H03K 23/42 takes precedence) **[4]**
23/50 . . using bi-stable regenerative trigger circuits (H03K 23/42 to H03K 23/48 take precedence) **[4]**
23/52 . . . using field-effect transistors **[4]**
23/54 . . . Ring counters, i.e. feedback shift register counters (H03K 23/52 takes precedence) **[4]**
23/56 . . . Reversible counters (H03K 23/52 takes precedence) **[4]**
23/58 . Gating or clocking signals not applied to all stages, i.e. asynchronous counters (H03K 23/74 to H03K 23/84 take precedence) **[4]**
23/60 . . with field-effect transistors **[4]**
23/62 . . reversible **[4]**
23/64 . with a base or radix other than a power of two (H03K 23/40 to H03K 23/62 take precedence) **[4]**
23/66 . . with a variable counting base, e.g. by presetting or by adding or suppressing pulses **[4]**
23/68 . . with a base which is a non-integer **[4]**
23/70 . . with a base which is an odd number (H03K 23/66 takes precedence) **[4]**
23/72 . . Decade counters (H03K 23/66 takes precedence) **[4]**
23/74 . using relays **[4]**
23/76 . using magnetic cores or ferro-electric capacitors **[4]**
23/78 . using opto-electronic devices **[4]**
23/80 . using semiconductor devices having only two electrodes, e.g. tunnel diode, multi-layer diode **[4]**
23/82 . using gas-filled tubes **[4]**
23/84 . using thyristors or unijunction transistors **[4]**
23/86 . reversible (H03K 23/40 to H03K 23/84 take precedence) **[4]**

25/00 Pulse counters with step-by-step integration and static storage; **Analogous frequency dividers**
25/02 . comprising charge storage, e.g. capacitor without polarisation hysteresis
25/04 . . using auxiliary pulse generator triggered by the incoming pulses **[4]**
25/12 . comprising hysteresis storage

27/00 Pulse counters in which pulses are continuously circulated in a closed loop; **Analogous frequency dividers** (feedback shift register counters H03K 23/54) **[4]**

29/00 Pulse counters comprising multi-stable elements, e.g. for ternary scale, for decimal scale; **Analogous frequency dividers**
29/04 . using multi-cathode gas discharge tubes **[4]**
29/06 . using beam-type tubes, e.g. magnetrons, cathode-ray tubes **[4]**

H03L AUTOMATIC CONTROL, STARTING, SYNCHRONISATION, OR STABILISATION OF GENERATORS OF ELECTRONIC OSCILLATIONS OR PULSES (of dynamo-electric generators H02P) **[3]**

(1) This subclass covers:
– automatic control circuits for generators of electronic oscillations or pulses; **[3]**

– starting, synchronisation, or stabilisation circuits for generators where the type of generator is irrelevant or unspecified. **[3]**

(2) This subclass does not cover stabilisation or starting circuits specially adapted to only one specific type of generator, which are covered by subclasses H03B, H03K. **[3]**

(3) In this subclass, the following expression is used with the meaning indicated:
– "automatic control" covers only closed loop systems. **[3]**

1/00 **Stabilisation of generator output against variations of physical values, e.g. power supply** (automatic control H03L 5/00, H03L 7/00) **[3]**

1/02 . against variations of temperature only **[3]**

1/04 . . Constructional details for maintaining temperature constant **[3]**

3/00 **Starting of generators [3]**

5/00 **Automatic control of voltage, current, or power [3]**

5/02 . of power **[3]**

7/00 **Automatic control of frequency or phase**; **Synchronisation** (tuning of resonant circuits in general H03J; synchronising in digital communication systems, see the relevant groups in class H04) **[3]**

7/02 . using a frequency discriminator comprising a passive frequency-determining element **[3]**

7/04 . . wherein the frequency-determining element comprises distributed inductance and capacitance **[3]**

7/06 . using a reference signal applied to a frequency- or phase-locked loop **[3]**

7/07 . . using several loops, e.g. for redundant clock signal generation (for indirect frequency synthesis H03L 7/22) **[5]**

7/08 . . Details of the phase-locked loop **[3]**

7/081 . . . provided with an additional controlled phase shifter **[5]**

7/083 . . . the reference signal being additionally directly applied to the generator (direct frequency synchronisation without loop H03L 7/24) **[5]**

7/085 . . . concerning mainly the frequency- or phase-detection arrangement including the filtering or amplification of its output signal (H03L 7/10 takes precedence; frequency or phase detection comparison in general H03D 3/00, H03D 13/00) **[5]**

7/087 . . . . using at least two phase detectors or a frequency and phase detector in the loop **[5]**

7/089 . . . . the phase or frequency detector generating up-down pulses (H03L 7/087 takes precedence) **[5]**

7/091 . . . . the phase or frequency detector using a sampling device (H03L 7/087 takes precedence) **[5]**

7/093 . . . . using special filtering or amplification characteristics in the loop (H03L 7/087 to H03L 7/091 take precedence) **[5]**

7/095 . . . . using a lock detector (H03L 7/087 takes precedence) **[5]**

7/097 . . . . using a comparator for comparing the voltages obtained from two frequency to voltage converters **[5]**

7/099 . . . concerning mainly the controlled oscillator of the loop **[5]**

7/10 . . . for assuring initial synchronisation or for broadening the capture range **[3]**

7/107 . . . . using a variable transfer function for the loop, e.g. low pass filter having a variable bandwidth **[5]**

7/113 . . . . using frequency discriminator **[5]**

7/12 . . . . using a scanning signal (tuning circuits with automatic scanning over a band of frequencies H03J 7/18) **[3]**

7/14 . . . for assuring constant frequency when supply or correction voltages fail **[3]**

7/16 . . Indirect frequency synthesis, i.e. generating a desired one of a number of predetermined frequencies using a frequency- or phase-locked loop **[3]**

7/18 . . . using a frequency divider or counter in the loop (H03L 7/20, H03L 7/22 take precedence) **[3]**

7/181 . . . . a numerical count result being used for locking the loop, the counter counting during fixed time intervals **[5]**

7/183 . . . . a time difference being used for locking the loop, the counter counting between fixed numbers or the frequency divider dividing by a fixed number **[5]**

7/185 . . . . . using a mixer in the loop (H03L 7/187 to H03L 7/195 take precedence) **[5]**

7/187 . . . . . using means for coarse tuning the voltage controlled oscillator of the loop (H03L 7/191 to H03L 7/195 take precedence) **[5]**

7/189 . . . . . comprising a D/A converter for generating a coarse tuning voltage **[5]**

7/191 . . . . . using at least two different signals from the frequency divider or the counter for determining the time difference (H03L 7/193, H03L 7/195 take precedence) **[5]**

7/193 . . . . . the frequency divider/counter comprising a commutable pre-divider, e.g. a two modulus divider (pulse counters/frequency dividers H03K 21/00 to H03K 29/00) **[5]**

7/195 . . . . . in which the counter of the loop counts between two different non zero numbers, e.g. for generating an offset frequency (H03L 7/193 takes precedence; pulse counters for predetermined counting H03K 21/00 to H03K 29/00) **[5]**

7/197 . . . . a time difference being used for locking the loop, the counter counting between numbers which are variable in time or the frequency divider dividing by a factor variable in time, e.g. for obtaining fractional frequency division **[5]**

7/199 . . . . . with reset of the frequency divider or the counter, e.g. for assuring initial synchronisation **[5]**

7/20 . . . using a harmonic phase-locked loop, i.e. a loop which can be locked to one of a number of harmonically related frequencies applied to it (H03L 7/22 takes precedence) **[3]**

7/22 . . . using more than one loop **[3]**

7/23 . . . . with pulse counters or frequency dividers **[5]**

7/24 . using a reference signal directly applied to the generator **[3]**

7/26 . using energy levels of molecules, atoms, or subatomic particles as a frequency reference **[3]**

9/00 Automatic control not provided for in other groups of this subclass [8]

H03M CODING, DECODING OR CODE CONVERSION, IN GENERAL (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. G01D, G01R, G06F, G06T, G09G, G10L, G11B, G11C, H04B, H04L, H04M, H04N; ciphering or deciphering for cryptography or other purposes involving the need for secrecy G09C) **[4]**

Subclass index

1/00 Analogue/digital conversion; **Digital/analogue conversion** (conversion of analogue values to or from differential modulation H03M 3/00) **[4]**

1/02 . Reversible analogue/digital converters **[4]**

1/04 . using stochastic techniques **[4]**

1/06 . Continuously compensating for, or preventing, undesired influence of physical parameters (periodically H03M 1/10) **[4]**

1/08 . . of noise **[4]**

1/10 . Calibration or testing **[4]**

1/12 . Analogue/digital converters (H03M 1/02 to H03M 1/10 take precedence) **[4]**

1/14 . . Conversion in steps with each step involving the same or a different conversion means and delivering more than one bit **[4]**

1/16 . . . with scale factor modification, i.e. by changing the amplification between the steps **[4]**

1/18 . . Automatic control for modifying the range of signals the converter can handle, e.g. gain ranging **[4]**

1/20 . . Increasing resolution using an n bit system to obtain n + m bits, e.g. by dithering **[4]**

1/22 . . pattern-reading type **[4]**

1/24 . . . using relatively movable reader and disc or strip **[4,6]**

1/26 . . . . with weighted coding, i.e. the weight given to a digit depends on the position of the digit within the block or code word, e.g. there is a given radix and the weights are powers of this radix **[4]**

1/28 . . . . with non-weighted coding **[4]**

1/30 . . . . . incremental **[4]**

1/32 . . . using cathode-ray tubes **[4]**

1/34 . . Analogue value compared with reference values (H03M 1/48 takes precedence) **[4]**

1/36 . . . simultaneously only, i.e. parallel type **[4]**

1/38 . . . sequentially only, e.g. successive approximation type (converting more than one bit per step H03M 1/14) **[4]**

1/40 . . . . recirculation type **[4]**

1/42 . . . . Sequential comparisons in series-connected stages with no change in value of analogue signal **[4]**

1/44 . . . . Sequential comparisons in series-connected stages with change in value of analogue signal **[4]**

1/46 . . . . with digital/analogue converter for supplying reference values to converter **[4]**

1/48 . . Servo-type converters **[4]**

1/50 . . with intermediate conversion to time interval (H03M 1/64 takes precedence) **[4]**

1/52 . . . Input signal integrated with linear return to datum **[4]**

1/54 . . . Input signal sampled and held with linear return to datum **[4]**

1/56 . . . Input signal compared with linear ramp **[4]**

1/58 . . . Non-linear conversion **[4]**

1/60 . . with intermediate conversion to frequency of pulses **[4]**

1/62 . . . Non-linear conversion **[4]**

1/64 . . with intermediate conversion to phase of sinusoidal signals **[4]**

1/66 . Digital/analogue converters (H03M 1/02 to H03M 1/10 take precedence) **[4]**

1/68 . . with conversions of different sensitivity, i.e. one conversion relating to the more significant digital bits and another conversion to the less significant bits **[4]**

1/70 . . Automatic control for modifying converter range **[4]**

1/72 . . Sequential conversion in series-connected stages (H03M 1/68 takes precedence) **[4]**

1/74 . . Simultaneous conversion **[4]**

1/76 . . . using switching tree **[4]**

1/78 . . . using ladder network **[4]**

1/80 . . . using weighted impedances (H03M 1/76 takes precedence) **[4]**

1/82 . . with intermediate conversion to time interval **[4]**

1/84 . . . Non-linear conversion **[4]**

1/86 . . with intermediate conversion to frequency of pulses **[4]**

1/88 . . . Non-linear conversion **[4]**

3/00 Conversion of analogue values to or from differential modulation [4]

3/02 . Delta modulation, i.e. one-bit differential modulation **[4]**

3/04 . Differential modulation with several bits **[4]**

5/00 Conversion of the form of the representation of individual digits [4]

Note

In groups H03M 5/02 to H03M 5/22, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

5/02 . Conversion to or from representation by pulses **[4]**

5/04 . . the pulses having two levels **[4]**

5/06 . . . Code representation, e.g. transition, for a given bit cell depending only on the information in that bit cell **[4]**

5/08 . . . . Code representation by pulse width **[4]**

5/10 . . . . Code representation by pulse frequency **[4]**

5/12 . . . . Biphase level code, e.g. split phase code, Manchester code; Biphase space or mark code, e.g. double frequency code **[4]**

5/14 . . . Code representation, e.g. transition, for a given bit cell depending on the information in one or more adjacent bit cells, e.g. delay modulation code, double density code **[4]**

5/16 . . the pulses having three levels **[4]**

5/18 . . . two levels being symmetrical with respect to the third level, i.e. balanced bipolar ternary code **[4]**

5/20 . . the pulses having more than three levels **[4]**

5/22 . Conversion to or from representation by sinusoidal signals **[4]**

7/00 Conversion of a code where information is represented by a given sequence or number of digits to a code where the same information is represented by a different sequence or number of digits [4]

Note

In groups H03M 7/02 to H03M 7/30, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[4]**

7/02 . Conversion to or from weighted codes, i.e. the weight given to a digit depending on the position of the digit within the block or code word **[4]**

7/04 . . the radix thereof being two **[4]**

7/06 . . the radix thereof being a positive integer different from two **[4]**

7/08 . . . the radix being ten, i.e. pure decimal code **[4]**

7/10 . . the radix thereof being negative **[4]**

7/12 . . having two radices, e.g. binary-coded-decimal code **[4]**

7/14 . Conversion to or from non-weighted codes **[4]**

7/16 . . Conversion to or from unit-distance codes, e.g. Gray code, reflected binary code **[4]**

7/18 . . Conversion to or from residue codes **[4]**

7/20 . . Conversion to or from n-out-of-m codes **[4]**

7/22 . . . to or from one-out-of-m codes **[4]**

7/24 . . Conversion to or from floating-point codes **[4]**

7/26 . Conversion to or from stochastic codes **[4]**

7/28 . Programmable structures, i.e. where the code converter contains apparatus which is operator-changeable to modify the conversion process **[4]**

7/30 . Compression (speech analysis-synthesis for redundancy reduction G10L 19/00; for image communication H04N); Expansion; Suppression of unnecessary data, e.g. redundancy reduction **[4]**

7/32 . . Conversion to or from delta modulation, i.e. one-bit differential modulation **[4]**

7/34 . . . adaptive **[4]**

7/36 . . Conversion to or from differential modulation with several bits, i.e. the difference between successive samples being coded by more than one bit **[4]**

7/38 . . . adaptive **[4]**

7/40 . . Conversion to or from variable length codes, e.g. Shannon-Fano code, Huffman code, Morse code **[4]**

7/42 . . . using table look-up for the coding or decoding process, e.g. using read-only memory **[4]**

7/44 . . . Suppression of irrelevant zeroes **[4]**

7/46 . . Conversion to or from run-length codes, i.e. by representing the number of consecutive digits, or groups of digits, of the same kind by a code word and a digit indicative of that kind **[4]**

7/48 . . . alternating with other codes during the code conversion process, e.g. run-length coding being performed only as long as sufficiently long runs of digits of the same kind are present **[4]**

7/50 . . Conversion to or from non-linear codes, e.g. companding **[4]**

9/00 Parallel/series conversion or vice versa (digital stores in which the information is moved stepwise G11C 19/00) **[4]**

11/00 Coding in connection with keyboards or like devices, i.e. coding of the position of operated keys (keyboard switch arrangements, structural association of coders and keyboards H01H 13/70, H03K 17/94) **[4]**

11/02 . Details **[5]**

11/04 . . Coding of multifunction keys **[5]**

11/06 . . . by operating the multifunction key itself in different ways **[5]**

11/08 . . . . by operating selected combinations of multifunction keys **[5]**

11/10 . . . . by methods based on duration or pressure detection of keystrokes **[5]**

11/12 . . . . by operating a key a selected number of consecutive times whereafter a separate enter key is used which marks the end of the series **[5]**

11/14 . . . by using additional keys, e.g. shift keys, which determine the function performed by the multifunction key **[5]**

11/16 . . . . wherein the shift keys are operated after the operation of the multifunction keys **[5]**

11/18 . . . . wherein the shift keys are operated before the operation of the multifunction keys **[5]**

11/20 . Dynamic coding, i.e. by key scanning (H03M 11/26 takes precedence) **[5]**

11/22 . Static coding (H03M 11/26 takes precedence) **[5]**

11/24 . . using analogue means **[5]**

11/26 . using opto-electronic means **[5]**

13/00 **Coding, decoding or code conversion, for error detection or error correction**; **Coding theory basic assumptions**; **Coding bounds**; **Error probability evaluation methods**; **Channel models**; **Simulation or testing of codes** (error detection or error correction for analogue/digital, digital/analogue or code conversion H03M 1/00 to H03M 11/00; specially adapted for digital computers G06F 11/08, for information storage based on relative movement between record carrier and transducer G11B, e.g. G11B 20/18, for static stores G11C) **[4,7]**

13/01 . Coding theory basic assumptions; Coding bounds; Error probability evaluation methods; Channel models; Simulation or testing of codes **[7]**

13/03 . Error detection or forward error correction by redundancy in data representation, i.e. code words containing more digits than the source words **[7]**

13/05 . . using block codes, i.e. a predetermined number of check bits joined to a predetermined number of information bits **[7]**

13/07 . . . Arithmetic codes **[7]**

13/09 . . . Error detection only, e.g. using cyclic redundancy check (CRC) codes or single parity bit **[7]**

13/11 . . . using multiple parity bits **[7]**

13/13 . . . Linear codes **[7]**

13/15 . . . . Cyclic codes, i.e. cyclic shifts of codewords produce other codewords, e.g. codes defined by a generator polynomial, Bose-Chaudhuri-Hocquenghem (BCH) codes (H03M 13/17 takes precedence) **[7]**

13/17 . . . . Burst error correction, e.g. error trapping, Fire codes **[7]**

13/19 . . . . Single error correction without using particular properties of the cyclic codes, e.g. Hamming codes, extended or generalised Hamming codes **[7]**

13/21 . . . Non-linear codes, e.g. m-bit data word to n-bit code word (mBnB) conversion with error detection or error correction **[7]**

13/23 . . using convolutional codes, e.g. unit memory codes **[7]**

13/25 . Error detection or forward error correction by signal space coding, i.e. adding redundancy in the signal constellation, e.g. Trellis Coded Modulation (TCM) **[7]**

13/27 . using interleaving techniques **[7]**

13/29 . combining two or more codes or code structures, e.g. product codes, generalised product codes, concatenated codes, inner and outer codes **[7]**

13/31 . combining coding for error detection or correction and efficient use of the spectrum (without error detection or correction H03M 5/14) **[7]**

13/33 . Synchronisation based on error coding or decoding **[7]**

13/35 . Unequal or adaptive error protection, e.g. by providing a different level of protection according to significance of source information or by adapting the coding according to the change of transmission channel characteristics **[7]**

13/37 . Decoding methods or techniques, not specific to the particular type of coding provided for in groups H03M 13/03 to H03M 13/35 **[7]**

13/39 . . Sequence estimation, i.e using statistical methods for the reconstruction of the original codes **[7]**

13/41 . . . using the Viterbi algorithm or Viterbi processors **[7]**

13/43 . . Majority logic or threshold decoding **[7]**

13/45 . . Soft decoding, i.e. using symbol reliability information (H03M 13/41 takes precedence) **[7]**

13/47 . Error detection, forward error correction or error protection, not provided for in groups H03M 13/01 to H03M 13/37 **[7]**

13/49 . . Unidirectional error detection or correction **[7]**

13/51 . . Constant weight codes; n-out-of-m codes; Berger codes **[7]**

13/53 . . Codes using Fibonacci numbers series **[7]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

H04 ELECTRIC COMMUNICATION TECHNIQUE

Note

This class covers electrical communication systems with propagation paths employing beams of corpuscular radiation, acoustic waves or electromagnetic waves, e.g. radio or optical communication. **[4]**

H04B **TRANSMISSION** (transmission systems for measured values, control or similar signals G08C; speech analysis or synthesis G10L; coding, decoding or code conversion, in general H03M; broadcast communication H04H; multiplex systems H04J; secret communication H04K; transmission of digital information H04L; wireless communication networks H04W) **[4]**

Note

This subclass covers the transmission of information-carrying signals, the transmission being independent of the nature of the information, and includes monitoring and testing arrangements and the suppression and limitation of noise and interference.

Subclass index

1/00 **Details of transmission systems, not covered by a single one of groups H04B 3/00 to H04B 13/00**; **Details of transmission systems not characterised by the medium used for transmission** (tuning resonant circuits H03J) **[4]**

1/02 . Transmitters (spatial arrangements of component circuits in radio pills for living beings A61B 5/07)

1/03 . . Constructional details, e.g. casings, housings **[2]**

1/034 . . . Portable transmitters **[2]**

1/036 . . . Cooling arrangements (cooling transformers H01F 27/08; cooling discharge tubes H01J 7/24, H01J 19/74) **[2]**

1/04 . . Circuits (of television transmitters H04N 5/38)

1/06 . Receivers (control of amplification H03G; television receivers H04N 5/44, H04N 5/64)

1/08 . . Constructional details, e.g. cabinet

1/10 . . Means associated with receiver for limiting or suppressing noise or interference

1/12 . . . Neutralising, balancing, or compensation arrangements

1/14 . . . Automatic detuning arrangements

1/16 . . Circuits

1/18 . . . Input circuits, e.g. for coupling to an aerial or a transmission line (input circuits for amplifiers in general H03F; coupling networks between aerials or lines and receivers independent of the nature of the receiver H03H)

1/20 . . . for coupling gramophone pick-up, recorder output, or microphone to receiver

1/22 . . . for receivers in which no local oscillation is generated

1/24 . . . . the receiver comprising at least one semiconductor device having three or more electrodes

1/26 . . . for superheterodyne receivers (multiple frequency-changing H03D 7/16)

1/28 . . . . the receiver comprising at least one semiconductor device having three or more electrodes

1/30 . . . for homodyne or synchrodyne receivers (demodulator circuits H03D 1/22)

1/38 . Transceivers, i.e. devices in which transmitter and receiver form a structural unit and in which at least one part is used for functions of transmitting and receiving

1/40 . . Circuits

1/44 . . . Transmit/receive switching (in radar systems G01S; tubes therefor H01J 17/64; waveguide switches H01P 1/10) **[2]**

1/46 . . . . by voice-frequency signals; by pilot signals

1/48 . . . . in circuit for connecting transmitter and receiver to a common transmission path, e.g. by energy of transmitter

1/50 . . . using different frequencies for the two directions of communication

1/52 . . . . Hybrid arrangements, i.e. for transition from single-path two-way transmission to single transmission on each of two paths, or vice versa

1/54 . . . using the same frequency for both directions of communication (H04B 1/44 takes precedence)

1/56 . . . . with provision for simultaneous communication in both directions

1/58 . . . . Hybrid arrangements, i.e. for transition from single-path two-way transmission to single transmission on each of two paths, or vice versa

1/59 . Responders; Transponders (relay systems H04B 7/14)

1/60 . Supervising unattended repeaters

1/62 . for providing a predistortion of the signal in the transmitter and corresponding correction in the receiver, e.g. for improving the signal/noise ratio

1/64 . . Volume compression or expansion arrangements

1/66 . for reducing bandwidth of signals (in speech analysis-synthesis techniques G10L 19/00; in pictorial communication systems H04N); for improving efficiency of transmission (H04B 1/68 takes precedence)

1/68 . for wholly or partially suppressing the carrier or one side band **[4]**

1/69 . *Spread spectrum techniques* **[6,2011.01]**

Note

When classifying in this group, any aspect of code division multiplexing, which is considered to represent information of interest for search, may also be classified in group H04J 13/00. **[2011.01]**

1/692 . . *Hybrid techniques using combinations of two or more spread spectrum techniques* **[2011.01]**

1/707 . . *using direct sequence modulation* **[6,2011.01]**

1/7073 . . . *Synchronisation aspects* **[2011.01]**

1/7075 . . . . *with code phase acquisition* **[2011.01]**

1/7077 . . . . . *Multi-step acquisition, e.g. multi-dwell, coarse-fine or validation* **[2011.01]**

1/708 . . . . . *Parallel implementation* **[2011.01]**

1/7083 . . . . *Cell search, e.g. using a three-step approach* **[2011.01]**

1/7085 . . . . *using a code tracking loop, e.g. a delay-locked loop* **[2011.01]**

1/7087 . . . . *Carrier synchronisation aspects* **[2011.01]**

1/709 . . . *Correlator structure* **[2011.01]**

1/7093 . . . . *Matched filter type* **[2011.01]**

1/7095 . . . . *Sliding correlator type* **[2011.01]**

1/7097 . . . *Interference-related aspects* **[2011.01]**

1/71 . . . . *the interference being narrowband interference* **[2011.01]**

1/7103 . . . . *the interference being multiple access interference* **[2011.01]**

1/7105 . . . . . *Joint detection techniques, e.g. linear detectors* **[2011.01]**

1/7107 . . . . . *Subtractive interference cancellation* **[2011.01]**

1/711 . . . . *the interference being multi-path interference* **[2011.01]**

1/7113 . . . . . *Determination of path profile* **[2011.01]**

1/7115 . . . . . *Constructive combining of multi-path signals, i.e. RAKE receivers* **[2011.01]**

1/7117 . . . . . *Selection, re-selection, allocation or re-allocation of paths to fingers, e.g. timing offset control of allocated fingers* **[2011.01]**

1/712 . . . . . *Weighting of fingers for combining, e.g. amplitude control or phase rotation using an inner loop* **[2011.01]**

1/713 . . *using frequency hopping* **[6,2011.01]**

1/7136 . . . *Arrangements for generation of hop frequencies, e.g. using a bank of frequency sources, using continuous tuning or using a transform* **[2011.01]**

1/7143 . . . *Arrangements for generation of hop patterns* **[2011.01]**

1/715 . . . *Interference-related aspects* **[2011.01]**

1/7156 . . . *Arrangements for sequence synchronisation* **[2011.01]**

1/7163 . . *using impulse radio* **[2011.01]**

1/717 . . . *Pulse-related aspects* **[2011.01]**

1/7176 . . . *Data mapping, e.g. modulation* **[2011.01]**

1/7183 . . . *Synchronisation* **[2011.01]**

1/719 . . . *Interference-related aspects* **[2011.01]**

1/72 . Circuits or components for simulating aerials, e.g. dummy aerial (dissipative waveguide terminations H01P 1/26)

1/74 . for increasing reliability, e.g. using redundant or spare channels or apparatus **[3]**

1/76 . Pilot transmitters or receivers for control of transmission or for equalising **[3]**

3/00 **Line transmission systems** (combined with near-field transmission systems H04B 5/00; constructional features of cables H01B 11/00)

3/02 . Details

3/03 . . Hybrid circuits (for transceivers H04B 1/52, H04B 1/58; hybrid junctions of the waveguide type H01P 5/16) **[3]**

3/04 . . Control of transmission; Equalising (control of amplification in general H03G)

3/06 . . . by the transmitted signal

3/08 . . . . in negative-feedback path of line amplifier

3/10 . . . by pilot signal

3/11 . . . . using pilot wire (H04B 3/12 take precedence) **[3]**

3/12 . . . . in negative-feedback path of line amplifier

3/14 . . . characterised by the equalising network used

3/16 . . . characterised by the negative-impedance network used

3/18 . . . . wherein the network comprises semiconductor devices

3/20 . . Reducing echo effects or singing; Opening or closing transmitting path; Conditioning for transmission in one direction or the other

3/21 . . . using a set of bandfilters **[3]**

3/23 . . . using a replica of transmitted signal in the time domain, e.g. echo cancellers **[3]**

3/26 . . Improving frequency characteristic by the use of loading coils (loading coils per se H01F 17/08)

3/28 . . Reducing interference caused by currents induced in cable sheathing or armouring

3/30 . . Reducing interference caused by unbalance current in a normally balanced line

3/32 . . Reducing cross-talk, e.g. by compensating

3/34 . . . by systematic interconnection of lengths of cable during laying; by addition of balancing components to cable during laying

3/36 . . Repeater circuits (H04B 3/58 takes precedence; amplifiers therefor H03F)

3/38 . . . for signals in two different frequency ranges transmitted in opposite directions over the same transmission path

3/40 . . Artificial lines; Networks simulating a line of certain length

3/42 . . Circuits for by-passing of ringing signals

3/44 . . Arrangements for feeding power to a repeater along the transmission line

3/46 . . Monitoring; Testing

3/48 . . . Testing attenuation

3/50 . Systems for transmission between fixed stations via two-conductor transmission lines (H04B 3/54 takes precedence)

3/52 . Systems for transmission between fixed stations via waveguides

3/54 . Systems for transmission via power distribution lines (in alarm signalling systems G08B 25/06; remote indication of power network conditions, remote control of switching means in a power distribution network H02J 13/00)

3/56 . . Circuits for coupling, blocking, or by-passing of signals

3/58 . . Repeater circuits (amplifiers therefor H03F)
3/60 . Systems for communication between relatively movable stations, e.g. for communication with lift (H04B 3/54 takes precedence)

5/00 Near-field transmission systems, e.g. inductive loop type
5/02 . using transceiver
5/04 . Calling systems, e.g. paging system
5/06 . using a portable transmitter associated with a microphone

7/00 Radio transmission systems, i.e. using radiation field (H04B 10/00, H04B 15/00 take precedence)
7/005 . Control of transmission; Equalising **[3]**
7/01 . Reducing phase shift **[3]**
7/015 . Reducing echo effects **[3]**
7/02 . Diversity systems (for direction finding G01S 3/72; aerial arrays or systems H01Q)
7/04 . . using a plurality of spaced independent aerials
7/06 . . . at transmitting station
7/08 . . . at receiving station
7/10 . . using a single aerial system characterised by its polarisation or directive properties, e.g. polarisation diversity, direction diversity
7/12 . . Frequency-diversity systems
7/14 . Relay systems (interrogator-responder radar systems G01S 13/74) **[2]**
7/145 . . Passive relay systems **[2]**
7/15 . . Active relay systems **[2]**
7/155 . . . Ground-based stations (H04B 7/204 takes precedence) **[2,5]**
7/165 . . . . employing angle modulation **[2]**
7/17 . . . . employing pulse modulation, e.g. pulse code modulation **[2]**
7/185 . . . Space-based or airborne stations (H04B 7/204 takes precedence) **[2,5]**
7/19 . . . . Earth-synchronous stations **[2]**
7/195 . . . . Non-synchronous stations **[2]**
7/204 . . . Multiple access **[5]**
7/208 . . . . Frequency-division multiple access **[5]**
7/212 . . . . Time-division multiple access **[5]**
7/216 . . . . Code-division or spread-spectrum multiple access (spread spectrum techniques in general H04B 1/69) **[5]**
7/22 . Scatter propagation systems
7/24 . for communication between two or more posts (wireless communication networks H04W) **[2]**
7/26 . . at least one of which is mobile **[2]**

10/00 Transmission systems employing beams of corpuscular radiation, or electromagnetic waves other than radio waves, e.g. light, infra-red (optical coupling, mixing or splitting G02B; light guides G02B 6/00; switching, modulation, demodulation of light beams G02B, G02F; devices or arrangements for the control, e.g. modulation, of light beams G02F 1/00; devices or arrangements for demodulating light, transferring the modulation or changing the frequency of light G02F 2/00; optical multiplex systems H04J 14/00) **[5]**
10/02 . Details **[5]**
10/04 . . Transmitters **[5]**
10/06 . . Receivers **[5]**
10/08 . . Equipment for monitoring, testing or fault measuring **[5]**
10/10 . Transmission through free space, e.g. through the atmosphere (H04B 10/22, H04B 10/24, H04B 10/30 take precedence) **[5,7]**
10/105 . . specially adapted for satellite links **[6]**
10/12 . Transmission through light guides, e.g. optical fibres (H04B 10/22, H04B 10/24, H04B 10/30 take precedence) **[5,7]**
10/13 . . using multimodal transmission **[6]**
10/135 . . using single mode transmission **[6]**
10/14 . . Terminal stations **[5]**
10/142 . . . Coherent homodyne or heterodyne systems **[6]**
10/145 . . . . Transmitters **[6]**
10/148 . . . . Receivers **[6]**
10/152 . . . Non-coherent direct-detection systems **[6]**
10/155 . . . . Transmitters **[6]**
10/158 . . . . Receivers **[6]**
10/16 . . Repeaters **[5]**
10/17 . . . in which processing or amplification is carried out without conversion of the signal from optical form **[6]**
10/18 . . Arrangements for reducing or eliminating distortion or dispersion, e.g. equalisers **[5]**
10/20 . . Arrangements for networking, e.g. bus or star coupling **[5]**
10/207 . . . using a star-type coupler **[6]**
10/213 . . . using a T-type coupler **[6]**
10/22 . Transmission between two stations which are mobile relative to each other (H04B 10/30 takes precedence) **[5,7]**
10/24 . Bidirectional transmission (H04B 10/22, H04B 10/30 take precedence) **[5,7]**
10/26 . . using a single light source for both stations involved **[6]**
10/28 . . using a single device as a light source or a light receiver **[6]**
10/30 . Transmission systems employing beams of corpuscular radiation (arrangements for handling beams of corpuscular radiation, e.g. focusing, moderating, G21K 1/00) **[7]**

11/00 Transmission systems employing ultrasonic, sonic or infrasonic waves

13/00 Transmission systems characterised by the medium used for transmission, not provided for in groups H04B 3/00 to H04B 11/00
13/02 . Transmission systems in which the medium consists of the earth or a large mass of water thereon, e.g. earth telegraphy (line transmission systems with earth or water return H04B 3/00)

14/00 Transmission systems not characterised by the medium used for transmission (details thereof H04B 1/00) **[4]**
14/02 . characterised by the use of pulse modulation (in radio transmission relays H04B 7/17) **[4]**
14/04 . . using pulse code modulation (analogue/digital or digital/analogue conversion H03M 1/00) **[4]**
14/06 . . using differential modulation, e.g. delta modulation (conversion of analogue values to or from differential modulation H03M 3/00) **[4]**
14/08 . characterised by the use of a sub-carrier **[4]**

15/00 **Suppression or limitation of noise or interference** (by means associated with receiver H04B 1/10)

15/02 . Reducing interference from electric apparatus by means located at or near the interfering apparatus (structural association with dynamo-electric machines H02K 11/00; screening H05K 9/00)

15/04 . . the interference being caused by substantially sinusoidal oscillations, e.g. in a receiver, in a tape-recorder (reducing parasitic oscillations H03B, H03F)

15/06 . . . by local oscillators of receivers

17/00 **Monitoring**; **Testing [2]**

17/02 . of relay systems **[2]**

H04H **BROADCAST COMMUNICATION** (multiplex communication H04J; pictorial communication aspects of broadcast systems H04N)

(1) In this subclass, the following terms or expressions are used with the meaning indicated: **[2008.01]**
- "broadcast" is simultaneous distribution of identical signals to plural receiving stations. The term "broadcast" does not include distribution to receiving stations which is controlled by requests or responses from the receiving stations; **[2008.01]**
- "broadcast information" covers all kinds of information distributed by broadcast systems; **[2008.01]**
- "broadcast-related information" is information required by services provided via broadcast systems, other than broadcast information; **[2008.01]**
- "broadcast time" is a time when particular broadcast information exists and is available; **[2008.01]**
- "broadcast channel" is a channel via which broadcast information is distributed, e.g. carrier waves, time slots, cables or wireless broadcast service areas; **[2008.01]**
- "broadcast space" is either a set of broadcast channels in which particular broadcast information exists and is available or a geographical area determined by the set of broadcast channels; **[2008.01]**
- "broadcast space-time" is space-time determined by broadcast space and broadcast time in which particular broadcast information exists and is available; **[2008.01]**
- "broadcast system" is a system which consists of transmitter, transponder and receiver for broadcast; **[2008.01]**
- "broadcast-related system" is a system which is directly affected by generation, broadcast, reception or use of broadcast information; **[2008.01]**
- "broadcast service" is a service directly provided by a broadcast system, i.e. distribution service of broadcast information; **[2008.01]**
- "broadcast-related service" is a service provided by broadcast-related systems; **[2008.01]**
- "A with a direct linkage to B" means that A directly affects B or that A is directly affected by B. **[2008.01]**

(2) In this subclass, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups, which is considered to represent information of interest for search, may also be classified in each of those groups. **[2008.01]**

20/00 **Arrangements for broadcast or for distribution combined with broadcast [2008.01]**

20/02 . Arrangements for relaying broadcast information **[2008.01]**

20/04 . . from field pickup units [FPU] **[2008.01]**

20/06 . . among broadcast stations **[2008.01]**

20/08 . . among terminal devices **[2008.01]**

20/10 . Arrangements for replacing or switching information during the broadcast or during the distribution **[2008.01]**

20/12 . Arrangements for monitoring, testing or troubleshooting **[2008.01]**

20/14 . . for monitoring programmes **[2008.01]**

20/16 . Arrangements for broadcast or distribution of identical information repeatedly **[2008.01]**

20/18 . Arrangements for synchronising broadcast or distribution via plural systems **[2008.01]**

20/20 . Arrangements for broadcast or distribution of identical information via plural systems **[2008.01]**

20/22 . . Arrangements for broadcast of identical information via plural broadcast systems **[2008.01]**

20/24 . . Arrangements for distribution of identical information via broadcast system and non-broadcast system **[2008.01]**

20/26 . Arrangements for switching distribution systems **[2008.01]**

20/28 . Arrangements for simultaneous broadcast of plural pieces of information **[2008.01]**

20/30 . . by a single channel **[2008.01]**

20/31 . . . using in-band signals, e.g. subsonic or cue signal **[2008.01]**

20/33 . . by plural channels **[2008.01]**

20/34 . . . using an out-of-band subcarrier signal **[2008.01]**

20/36 . . for AM broadcasts **[2008.01]**

20/38 . Arrangements for distribution where lower stations, e.g. receivers, interact with the broadcast **[2008.01]**

20/40 . Arrangements for broadcast specially adapted for accumulation-type receivers **[2008.01]**

20/42 . Arrangements for resource management **[2008.01]**

20/44 . Arrangements characterised by circuits or components specially adapted for broadcast **[2008.01]**

20/46 . . specially adapted for broadcast systems covered by groups H04H 20/53 to H04H 20/86 **[2008.01]**

20/47 . . . specially adapted for stereophonic broadcast systems **[2008.01]**

20/48 . . . . for FM stereophonic broadcast systems **[2008.01]**

20/49 . . . . for AM stereophonic broadcast systems **[2008.01]**

20/51 . . . specially adapted for satellite broadcast systems **[2008.01]**

20/53 . Arrangements specially adapted for specific applications, e.g. for traffic information or for mobile receivers **[2008.01]**
20/55 . . for traffic information **[2008.01]**
20/57 . . for mobile receivers **[2008.01]**
20/59 . . for emergency or urgency **[2008.01]**
20/61 . . for local area broadcast, e.g. instore broadcast **[2008.01]**
20/62 . . . for transportation systems, e.g. in vehicles **[2008.01]**
20/63 . . . to plural spots in a confined site, e.g. MATV [Master Antenna Television] **[2008.01]**
20/65 . Arrangements characterised by transmission systems for broadcast **[2008.01]**
20/67 . . Common-wave systems, i.e. using separate transmitters operating on substantially the same frequency **[2008.01]**
20/69 . . Optical systems **[2008.01]**
20/71 . . Wireless systems **[2008.01]**
20/72 . . . of terrestrial networks **[2008.01]**
20/74 . . . of satellite networks **[2008.01]**
20/76 . . Wired systems **[2008.01]**
20/77 . . . using carrier waves **[2008.01]**
20/78 . . . . CATV [Community Antenna Television] systems **[2008.01]**
20/79 . . . . . using downlink of the CATV systems, e.g. audio broadcast via CATV network **[2008.01]**
20/80 . . . . having frequencies in two or more frequency bands, e.g. medium wave and VHF **[2008.01]**
20/81 . . . . combined with telephone network over which the broadcast is continuously available **[2008.01]**
20/82 . . . using signals not modulated onto a carrier **[2008.01]**
20/83 . . . . not sharing the network with any other service **[2008.01]**
20/84 . . . combined with power distribution network **[2008.01]**
20/86 . Arrangements characterised by special technical features of the broadcast information, e.g. signal form or information format **[2008.01]**
20/88 . . Stereophonic broadcast systems **[2008.01]**
20/89 . . . using three or more audio channels, e.g. triphonic or quadraphonic **[2008.01]**
20/91 . . broadcasting computer programmes **[2008.01]**
20/93 . . which locates resources of other pieces of information, e.g. URL [Uniform Resource Locator] **[2008.01]**
20/95 . . characterised by a specific format, e.g. MP3 [MPEG-1 Audio Layer 3] **[2008.01]**

40/00 Arrangements specially adapted for receiving broadcast information [2008.01]

40/09 . Arrangements for receiving desired information automatically according to timetables **[2008.01]**
40/18 . Arrangements characterised by circuits or components specially adapted for receiving **[2008.01]**
40/27 . . specially adapted for broadcast systems covered by groups H04H 20/53 to H04H 20/86 **[2008.01]**
40/36 . . . specially adapted for stereophonic broadcast receiving **[2008.01]**
40/45 . . . . for FM stereophonic broadcast receiving **[2008.01]**
40/54 . . . . . generating subcarriers **[2008.01]**
40/63 . . . . . for separation improvements or adjustments **[2008.01]**
40/72 . . . . . for noise suppression **[2008.01]**
40/81 . . . . . for stereo-monaural switching **[2008.01]**
40/90 . . . specially adapted for satellite broadcast receiving **[2008.01]**

60/00 Arrangements for broadcast applications with a direct linkage to broadcast information or to broadcast space-time; **Broadcast-related systems [2008.01]**

60/02 . Arrangements for generating broadcast information; Arrangements for generating broadcast-related information with a direct linkage to broadcast information or to broadcast space-time; Arrangements for simultaneous generation of broadcast information and broadcast-related information **[2008.01]**
60/04 . . Studio equipment; Interconnection of studios **[2008.01]**
60/05 . . . Mobile studios **[2008.01]**
60/06 . . Arrangements for scheduling broadcast services or broadcast-related services **[2008.01]**
60/07 . . characterised by processes or methods for the generation **[2008.01]**
60/09 . Arrangements for device control with a direct linkage to broadcast information or to broadcast space-time; Arrangements for control of broadcast-related services **[2008.01]**
60/11 . . Arrangements for counter-measures when a portion of broadcast information is unavailable **[2008.01]**
60/12 . . . wherein another information is substituted for the portion of broadcast information **[2008.01]**
60/13 . . Arrangements for device control affected by the broadcast information **[2008.01]**
60/14 . . Arrangements for conditional access to broadcast information or to broadcast-related services **[2008.01]**
60/15 . . . on receiving information **[2008.01]**
60/16 . . . on playing information **[2008.01]**
60/17 . . . on recording information **[2008.01]**
60/18 . . . on copying information **[2008.01]**
60/19 . . . on transmission of information **[2008.01]**
60/20 . . . on secondary editing information **[2008.01]**
60/21 . . . Billing for the use of broadcast information or broadcast-related information **[2008.01]**
60/22 . . . . per use **[2008.01]**
60/23 . . . using cryptography, e.g. encryption, authentication or key distribution **[2008.01]**
60/25 . Arrangements for updating broadcast information or broadcast-related information **[2008.01]**
60/27 . Arrangements for recording or accumulating broadcast information or broadcast-related information **[2008.01]**
60/29 . Arrangements for monitoring broadcast services or broadcast-related services **[2008.01]**
60/31 . . Arrangements for monitoring the use made of the broadcast services **[2008.01]**
60/32 . . Arrangements for monitoring conditions of receiving stations, e.g. malfunction or breakdown of receiving stations **[2008.01]**
60/33 . . Arrangements for monitoring the users' behaviour or opinions **[2008.01]**

60/35 . Arrangements for identifying or recognising characteristics with a direct linkage to broadcast information or to broadcast space-time, e.g. for identifying broadcast stations or for identifying users **[2008.01]**
60/37 . . for identifying segments of broadcast information, e.g. scenes or extracting programme ID **[2008.01]**
60/38 . . for identifying broadcast time or space **[2008.01]**
60/39 . . . for identifying broadcast space-time (use of Electronic Programme Guides H04H 60/72) **[2008.01]**
60/40 . . . for identifying broadcast time **[2008.01]**
60/41 . . . for identifying broadcast space, i.e. broadcast channels, broadcast stations or broadcast areas **[2008.01]**
60/42 . . . . for identifying broadcast areas **[2008.01]**
60/43 . . . . for identifying broadcast channels **[2008.01]**
60/44 . . . . for identifying broadcast stations **[2008.01]**
60/45 . . for identifying users **[2008.01]**
60/46 . . for recognising users' preferences **[2008.01]**
60/47 . . for recognising genres **[2008.01]**
60/48 . . for recognising items expressed in broadcast information **[2008.01]**
60/49 . . for identifying locations **[2008.01]**
60/50 . . . of broadcast or relay stations **[2008.01]**
60/51 . . . of receiving stations **[2008.01]**
60/52 . . . of users **[2008.01]**
60/53 . . . of destinations **[2008.01]**
60/54 . . . where broadcast information is generated **[2008.01]**
60/56 . Arrangements characterised by components specially adapted for monitoring, identification or recognition covered by groups H04H 60/29 or H04H 60/35 **[2008.01]**
60/58 . . of audio **[2008.01]**
60/59 . . of video **[2008.01]**
60/61 . Arrangements for services using the result of monitoring, identification or recognition covered by groups H04H 60/29 or H04H 60/35 **[2008.01]**
60/63 . . for services of sales **[2008.01]**
60/64 . . for providing detail information **[2008.01]**
60/65 . . for using the result on users' side **[2008.01]**
60/66 . . for using the result on distributors' side **[2008.01]**
60/68 . Systems specially adapted for using specific information, e.g. geographical or meteorological information **[2008.01]**
60/70 . . using geographical information, e.g. maps, charts or atlases **[2008.01]**
60/71 . . using meteorological information **[2008.01]**
60/72 . . using EPGs [Electronic Programme Guides] (focusing on identifying broadcast space-time H04H 60/39) **[2008.01]**
60/73 . . using meta-information **[2008.01]**
60/74 . . . using programme related information, e.g. title, composer or interpreter **[2008.01]**
60/76 . Arrangements characterised by transmission systems other than for broadcast, e.g. the Internet **[2008.01]**
60/78 . . characterised by source locations or destination locations **[2008.01]**
60/79 . . . characterised by transmission among broadcast stations **[2008.01]**
60/80 . . . characterised by transmission among terminal devices **[2008.01]**
60/81 . . characterised by the transmission system itself **[2008.01]**
60/82 . . . the transmission system being the Internet **[2008.01]**
60/83 . . . . accessed over telephonic networks **[2008.01]**
60/84 . . . . . which are fixed telephone networks **[2008.01]**
60/85 . . . . . which are mobile communication networks **[2008.01]**
60/86 . . . . accessed over CATV networks **[2008.01]**
60/87 . . . . accessed over computer networks **[2008.01]**
60/88 . . . . . which are wireless networks **[2008.01]**
60/89 . . . . . which are wired networks **[2008.01]**
60/90 . . . Wireless transmission systems **[2008.01]**
60/91 . . . . Mobile communication networks (for accessing the Internet H04H 60/85) **[2008.01]**
60/92 . . . . for local area **[2008.01]**
60/93 . . . Wired transmission systems **[2008.01]**
60/94 . . . . Telephonic networks (for accessing the Internet H04H 60/84) **[2008.01]**
60/95 . . . . for local area **[2008.01]**
60/96 . . . . CATV systems (for accessing the Internet H04H 60/86) **[2008.01]**
60/97 . . . . . using uplink of the CATV systems **[2008.01]**
60/98 . . . Physical distribution of media, e.g. postcards, CDs or DVDs **[2008.01]**

H04J **MULTIPLEX COMMUNICATION** (peculiar to transmission of digital information H04L 5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N 7/08; in exchanges H04Q 11/00)

Note

This subclass covers:
– circuits or apparatus for combining or dividing signals for the purpose of transmitting them simultaneously or sequentially over the same transmission path;
– monitoring arrangements therefor.

1/00 **Frequency-division multiplex systems** (H04J 14/02 takes precedence) **[5]**
1/02 . Details
1/04 . . Frequency-transposition arrangements
1/05 . . . using digital techniques **[3]**
1/06 . . Arrangements for supplying the carrier waves
1/08 . . Arrangements for combining channels
1/10 . . Intermediate station arrangements, e.g. for branching, for tapping-off
1/12 . . Arrangements for reducing cross-talk between channels

1/14 . . Arrangements providing for calling or supervisory signals
1/16 . . Monitoring arrangements
1/18 . in which all the carriers are amplitude-modulated (H04J 1/02 takes precedence) **[3]**
1/20 . in which at least one carrier is angle-modulated (H04J 1/02 takes precedence) **[3]**

3/00 **Time-division multiplex systems** (H04J 14/08 takes precedence) **[4,5]**
3/02 . Details
3/04 . . Distributors combined with modulators or demodulators
3/06 . . Synchronising arrangements
3/07 . . . using pulse stuffing for systems with different or fluctuating information rates **[3]**
3/08 . . Intermediate station arrangements, e.g. for branching, for tapping-off
3/10 . . Arrangements for reducing cross-talk between channels
3/12 . . Arrangements providing for calling or supervisory signals
3/14 . . Monitoring arrangements
3/16 . in which the time allocation to individual channels within a transmission cycle is variable, e.g. to accommodate varying complexity of signals, to vary number of channels transmitted (H04J 3/17, H04J 3/24 take precedence) **[4]**
3/17 . in which the transmission channel allotted to a first user may be taken away and re-allotted to a second user if the first user becomes inactive, e.g. TASI **[4]**
3/18 . using frequency compression and subsequent expansion of the individual signals
3/20 . using resonant transfer **[2]**
3/22 . in which the sources have different rates or codes **[4]**
3/24 . in which the allocation is indicated by an address (H04J 3/17 takes precedence) **[4]**
3/26 . . in which the information and the address are simultaneously transmitted **[4]**

4/00 **Combined time-division and frequency-division multiplex systems** (H04J 13/00 takes precedence) **[2]**

7/00 **Multiplex systems in which the amplitudes or durations of the signals in individual channels are characteristic of those channels**
7/02 . in which the polarity of the amplitude is characteristic

9/00 **Multiplex systems in which each channel is represented by a different type of modulation of the carrier**

11/00 **Orthogonal multiplex systems** (H04J 13/00 takes precedence) **[2]**

13/00 ***Code division multiplex systems*** *(for frequency hopping H04B 1/713)* **[2,2011.01]**

Note

When classifying in this group, any aspect of spread spectrum techniques not specific to frequency hopping, and which is considered to represent information of interest for search, may also be classified in group H04B 1/69. **[2011.01]**

13/10 . *Code generation* **[2011.01]**
13/12 . . *Generation of orthogonal codes* **[2011.01]**
13/14 . . *Generation of codes with a zero correlation zone* **[2011.01]**
13/16 . *Code allocation* **[2011.01]**
13/18 . . *Allocation of orthogonal codes* **[2011.01]**
13/20 . . . *having an orthogonal variable spreading factor [OVSF]* **[2011.01]**
13/22 . . *Allocation of codes with a zero correlation zone* **[2011.01]**

14/00 **Optical multiplex systems [5]**
14/02 . Wavelength-division multiplex systems **[5]**
14/04 . Mode multiplex systems **[5]**
14/06 . Polarisation multiplex systems **[5]**
14/08 . Time-division multiplex systems **[5]**

99/00 **Subject matter not provided for in other groups of this subclass [2009.01]**

H04K SECRET COMMUNICATION; JAMMING OF COMMUNICATION

Note

In this subclass, the following expression is used with the meaning indicated:
– "secret communication" includes secret line and radiation transmission systems, i.e. those in which apparatus at the transmitting station modifies the signal in such a way that the information cannot be intelligibly received without corresponding modifying apparatus at the receiving station.

1/00 **Secret communication** (ciphering or deciphering apparatus per se G09C; systems with reduced bandwidth or suppressed carrier H04B 1/66; spread spectrum techniques H04B 1/69; by using a sub-carrier H04B 14/08; by multiplexing H04J; transmission systems for secret digital information H04L 9/00; secret or subscription television systems H04N 7/16, H04N 21/00)
1/02 . by adding a second signal to make the desired signal unintelligible
1/04 . by frequency scrambling, i.e. by transposing or inverting parts of the frequency band or by inverting the whole band
1/06 . by transmitting the information or elements thereof at unnatural speeds or in jumbled order or backwards
1/08 . by varying the polarisation of transmitted waves
1/10 . by using two signals transmitted simultaneously or successively

3/00 **Jamming of communication**; **Counter-measures** (counter-measures used in radar or analogous systems G01S 7/00)

H04L **TRANSMISSION OF DIGITAL INFORMATION, E.G. TELEGRAPHIC COMMUNICATION** (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; coding, decoding or code conversion, in general H03M; arrangements common to telegraphic and telephonic communication H04M; selecting H04Q; wireless communication networks H04W) **[4]**

Note

This subclass covers transmission of signals having been supplied in digital form and includes data transmission, telegraphic communication, or methods or arrangements for monitoring.

Subclass index

1/00 **Arrangements for detecting or preventing errors in the information received** (correcting synchronisation H04L 7/00; arrangements in the transmission path H04B)

1/02 . by diversity reception (in general H04B 7/02)
1/04 . . using frequency diversity
1/06 . . using space diversity
1/08 . by repeating transmission, e.g. Verdan system
1/12 . by using return channel
1/14 . . in which the signals are sent back to the transmitter to be checked
1/16 . . in which the return channel carries supervisory signals, e.g. repetition request signals
1/18 . . . Automatic repetition systems, e.g. van Duuren system
1/20 . using signal-quality detector **[3]**
1/22 . using redundant apparatus to increase reliability **[3]**
1/24 . Testing correct operation **[3]**

5/00 **Arrangements affording multiple use of the transmission path** (multiplex communication in general H04J)

5/02 . Channels characterised by the type of signal
5/04 . . the signals being represented by different amplitudes or polarities, e.g. quadriplex
5/06 . . the signals being represented by different frequencies (combined with time-division multiplexing H04L 5/26)
5/08 . . . each combination of signals in different channels being represented by a fixed frequency
5/10 . . . with dynamo-electric generation of carriers; with mechanical filters or demodulators
5/12 . . the signals being represented by different phase modulations of a single carrier
5/14 . Two-way operation using the same type of signal, i.e. duplex (conditioning for two-way transmission in general H04B 3/20)
5/16 . . Half-duplex systems; Simplex/duplex switching; Transmission of break signals
5/18 . . Automatic changing of the traffic direction
5/20 . using different combinations of lines, e.g. phantom working
5/22 . using time-division multiplexing
5/24 . . with start-stop synchronous converters
5/26 . . combined with the use of different frequencies

7/00 **Arrangements for synchronising receiver with transmitter**

7/02 . Speed or phase control by the received code signals, the signals containing no special synchronisation information
7/027 . . extracting the synchronising or clock signal from the received signal spectrum, e.g. by using a resonant or bandpass circuit **[5]**
7/033 . . using the transitions of the received signal to control the phase of the synchronising-signal-generating means, e.g. using a phase-locked loop **[5]**
7/04 . Speed or phase control by synchronisation signals
7/06 . . the synchronisation signals differing from the information signals in amplitude, polarity, or frequency
7/08 . . the synchronisation signals recurring cyclically
7/10 . . Arrangements for initial synchronisation

9/00 **Arrangements for secret or secure communication** (spread spectrum techniques H04B 1/69)

Note

In group H04L 9/06 to H04L 9/32, in the absence of an indication to the contrary, classification is made in the last appropriate place. **[5]**

9/06 . the encryption apparatus using shift registers or memories for blockwise coding, e.g. D.E.S. systems **[5]**
9/08 . . Key distribution **[5]**
9/10 . with particular housing, physical features or manual controls **[5]**
9/12 . Transmitting and receiving encryption devices synchronised or initially set up in a particular manner **[5]**
9/14 . using a plurality of keys or algorithms **[5]**
9/16 . . the keys or algorithms being changed during operation **[5]**

9/18 . Encryption by serially and continuously modifying data stream elements, e.g. stream cipher systems **[5]**
9/20 . . Pseudorandom key sequence combined element-for-element with data sequence **[5]**
9/22 . . . with particular pseudorandom sequence generator **[5]**
9/24 . . . . sequence produced by more than one generator **[5]**
9/26 . . . . producing a nonlinear pseudorandom sequence **[5]**
9/28 . using particular encryption algorithm **[5]**
9/30 . . Public key, i.e. encryption algorithm being computationally infeasible to invert and users' encryption keys not requiring secrecy **[5]**
9/32 . including means for verifying the identity or authority of a user of the system (security arrangements for protecting computers or computer systems against unauthorised activity G06F 21/00; dispensing apparatus actuated by coded identity card or credit card G07F 7/08; specially adapted for wireless communication networks H04W 12/00) **[5]**
9/34 . Bits, or blocks of bits, of the telegraphic message being interchanged in time **[5]**
9/36 . with means for detecting characters not meant for transmission **[5]**
9/38 . Encryption being effected by mechanical apparatus, e.g. rotating cams, switches, keytape punchers **[5]**

12/00 **Data switching networks** (interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units G06F 13/00) **[5]**
12/02 . Details **[5]**
12/04 . . Switchboards **[5]**
12/06 . . Answer-back mechanisms or circuits **[5]**
12/08 . . Allotting numbers to messages; Counting characters, words or messages **[5]**
12/10 . . Current supply arrangements **[5]**
12/12 . . Arrangements for remote connection or disconnection of substations or of equipment thereof **[5]**
12/14 . . Charging arrangements **[5]**
12/16 . . Arrangements for providing special services to substations **[5]**
12/18 . . . for broadcast or conference **[5]**
12/20 . . . for converting transmission speed from the inherent speed of a substation to the inherent speed of other substations **[5]**
12/22 . . Arrangements for preventing the taking of data from a data transmission channel without authorisation (means for verifying the identity or the authority of a user of a secure or secret communication system H04L 9/32) **[5]**
12/24 . . Arrangements for maintenance or administration **[5]**
12/26 . . Monitoring arrangements; Testing arrangements **[5]**
12/28 . characterised by path configuration, e.g. LAN [Local Area Networks] or WAN [Wide Area Networks] (wireless communication networks H04W) **[5,6]**
12/40 . . Bus networks **[5,6]**
12/403 . . . with centralised control, e.g. polling **[6]**
12/407 . . . with decentralised control **[6]**
12/413 . . . . with random access, e.g. carrier-sense multiple-access with collision detection (CSMA-CD) **[6]**
12/417 . . . . with deterministic access, e.g. token passing **[6]**
12/42 . . Loop networks **[5,6]**
12/423 . . . with centralised control, e.g. polling **[6]**
12/427 . . . with decentralised control **[6]**
12/43 . . . . with synchronous transmission, e.g. time division multiplex (TDM), slotted rings **[6]**
12/433 . . . . with asynchronous transmission, e.g. token ring, register insertion **[6]**
12/437 . . . Ring fault isolation or reconfiguration **[6]**
12/44 . . Star or tree networks **[5,6]**
12/46 . . Interconnection of networks **[5,6]**
12/50 . Circuit switching systems, i.e. systems in which the path is physically permanent during the communication **[5,6]**
12/52 . . using time division techniques (in digital transmission systems H04L 5/22) **[5,6]**
12/54 . Stored and forward switching systems **[5,6]**
12/56 . . Packet switching systems **[5,6]**
12/58 . . Message switching systems (permutation- code selecting H04Q 3/02) **[5,6]**
12/60 . . . Manual relay systems, e.g. push-button switching **[5,6]**
12/62 . . . . with perforated tape storage **[5,6]**
12/64 . Hybrid switching systems **[5,6]**
12/66 . Arrangements for connecting between networks having differing types of switching systems, e.g. gateways **[5,6]**

13/00 **Details of the apparatus or circuits covered by groups H04L 15/00 or H04L 17/00**
13/02 . Details not particular to receiver or transmitter
13/04 . . Driving mechanisms; Clutches (in general F16)
13/06 . . Tape or page guiding or feeding devices
13/08 . . Intermediate storage means
13/10 . . Distributors
13/12 . . . Non-mechanical distributors, e.g. relay distributors
13/14 . . . . Electronic distributors (in general H03K 17/00)
13/16 . of transmitters, e.g. code-bars, code-discs
13/18 . of receivers

15/00 **Apparatus or local circuits for transmitting or receiving dot-and-dash codes, e.g. Morse code** (teaching apparatus therefor G09B; keyboard switches in general H01H 13/70, H03K 17/94; telegraph tapping keys H01H 21/86; coding in connection with keyboards or like devices, in general H03M 11/00)
15/03 . Keys structurally combined with sound generators **[2]**
15/04 . Apparatus or circuits at the transmitting end
15/06 . . with a restricted number of keys, e.g. separate key for each type of code element
15/08 . . . with a single key which transmits dots in one position and dashes in a second position
15/10 . . . combined with perforating apparatus
15/12 . . with keyboard co-operating with code-bars
15/14 . . . combined with perforating apparatus
15/16 . . with keyboard co-operating with code discs
15/18 . . Automatic transmitters, e.g. controlled by perforated tape
15/20 . . . with optical sensing means
15/22 . . Apparatus or circuits for sending one or a restricted number of signals, e.g. distress signals
15/24 . Apparatus or circuits at the receiving end

15/26 . . operating only on reception of predetermined code signals, e.g. distress signals, party-line call signals
15/28 . . Code reproducing apparatus
15/30 . . . Writing recorders
15/32 . . . Perforating recorders
15/34 . . Apparatus for recording received coded signals after translation, e.g. as type-characters

17/00 Apparatus or local circuits for transmitting or receiving codes wherein each character is represented by the same number of equal-length code elements, e.g. Baudot code (keyboard switches in general H01H 13/70, H03K 17/94; coding in connection with keyboards or like devices, in general H03M 11/00)
17/02 . Apparatus or circuits at the transmitting end
17/04 . . with keyboard co-operating with code-bars
17/06 . . . Contact operating means
17/08 . . . combined with perforating apparatus
17/10 . . with keyboard co-operating with code-discs
17/12 . . Automatic transmitters, e.g. controlled by perforated tape
17/14 . . . with optical sensing means
17/16 . Apparatus or circuits at the receiving end
17/18 . . Code selection mechanisms
17/20 . . using perforating recorders
17/22 . . using mechanical translation and type-bar printing
17/24 . . using mechanical translation and type-head printing, e.g. type-wheel, type-cylinder
17/26 . . using aggregate motion translation
17/28 . . using pneumatic or hydraulic translation
17/30 . . using electric or electronic translation

19/00 Apparatus or local circuits for step-by-step systems

21/00 Apparatus or local circuits for mosaic printer telegraph systems
21/02 . at the transmitting end
21/04 . at the receiving end

23/00 Apparatus or local circuits for systems other than those covered by groups H04L 15/00 to H04L 21/00
23/02 . adapted for orthogonal signalling **[2]**

25/00 Baseband systems
25/02 . Details (circuits in general for handling pulses H03K; in line transmission systems in general H04B 3/02)
25/03 . . Shaping networks in transmitter or receiver, e.g. adaptive shaping networks (impedance networks per se H03H) **[2]**
25/04 . . . Passive shaping networks **[2]**
25/05 . . Electric or magnetic storage of signals before transmitting or retransmitting for changing the transmission rate **[7]**
25/06 . . Dc level restoring means; Bias distortion correction
25/08 . . Modifications for reducing interference; Modifications for reducing effects due to line faults
25/10 . . Compensating for variations in line balance
25/12 . . Compensating for variations in line impedance
25/14 . . Channel dividing arrangements
25/17 . . Interpolating arrangements **[4]**
25/18 . . Arrangements for inductively generating telegraphic signals (induction coil interrupters H01H 51/34; dynamo-electric generators H02K)
25/20 . . Repeater circuits; Relay circuits
25/22 . . . Repeaters for converting two wires to four wires (in general H04B); Repeaters for converting single current to double current
25/24 . . . Relay circuits using discharge tubes or semiconductor devices
25/26 . . . Circuits with optical sensing means
25/28 . . . Repeaters using modulation and subsequent demodulation
25/30 . Non-synchronous systems
25/32 . . characterised by the code employed
25/34 . . . using three or more different amplitudes, e.g. cable code
25/38 . Synchronous or start-stop systems, e.g. for Baudot code
25/40 . . Transmitting circuits; Receiving circuits (repeater circuits, relay circuits H04L 25/52)
25/42 . . . using mechanical distributors
25/44 . . . using relay distributors
25/45 . . . using electronic distributors (electronic distributors in general H03K 17/00) **[2]**
25/46 . . . using tuning forks or vibrating reeds
25/48 . . . characterised by the code employed (H04L 25/49 takes precedence) **[2]**
25/49 . . . using code conversion at the transmitter; using predistortion; using insertion of idle bits for obtaining a desired frequency spectrum; using three or more amplitude levels **[2]**
25/493 . . . . by transition coding, i.e. the time-position or direction of a transition being encoded before transmission **[3]**
25/497 . . . . by correlative coding, e.g. partial response coding or echo modulation coding **[3]**
25/52 . . Repeater circuits; Relay circuits
25/54 . . . using mechanical distributors
25/56 . . . Non-electrical regenerative repeaters
25/58 . . . using relay distributors
25/60 . . . Regenerative repeaters with electromagnetic switches
25/62 . . . using tuning forks or vibrating reeds
25/64 . . . Start-stop regenerative repeaters using discharge tubes or semiconductor devices
25/66 . . . Synchronous repeaters using discharge tubes or semiconductor devices

27/00 Modulated-carrier systems
27/01 . Equalisers **[5]**
27/02 . Amplitude-modulated carrier systems, e.g. using on/off keying; Single sideband or vestigial sideband modulation (H04L 27/32 takes precedence) **[2,5]**
27/04 . . Modulator circuits (in general H03C); Transmitter circuits
27/06 . . Demodulator circuits (in general H03D); Receiver circuits
27/08 . . Amplitude regulation arrangements
27/10 . Frequency-modulated carrier systems, i.e. using frequency-shift keying (H04L 27/32 takes precedence) **[5]**
27/12 . . Modulator circuits (in general H03C); Transmitter circuits
27/14 . . Demodulator circuits (in general H03D); Receiver circuits
27/144 . . . with demodulation using spectral properties of the received signal, e.g. by using frequency selective- or frequency sensitive elements **[6]**
27/148 . . . . using filters, including PLL-type filters **[6]**
27/152 . . . . using controlled oscillators, e.g. PLL arrangements **[6]**

27/156 . . . with demodulation using temporal properties of the received signal, e.g. detecting pulse width **[6]**
27/16 . . Frequency regulation arrangements
27/18 . Phase-modulated carrier systems, i.e. using phase-shift keying (H04L 27/32 takes precedence) **[5]**
27/20 . . Modulator circuits (in general H03C); Transmitter circuits
27/22 . . Demodulator circuits (in general H03D); Receiver circuits
27/227 . . . using coherent demodulation **[6]**
27/233 . . . using non-coherent demodulation **[6]**
27/24 . . Half-wave signalling systems
27/26 . Systems using multi-frequency codes (H04L 27/32 takes precedence) **[5]**
27/28 . . with simultaneous transmission of different frequencies each representing one code element
27/30 . . wherein each code element is represented by a combination of frequencies
27/32 . Carrier systems characterised by combinations of two or more of the types covered by groups H04L 27/02, H04L 27/10, H04L 27/18, or H04L 27/26 **[5]**
27/34 . . Amplitude- and phase-modulated carrier systems, e.g. quadrature-amplitude modulated carrier systems **[5]**
27/36 . . . Modulator circuits; Transmitter circuits **[5]**
27/38 . . . Demodulator circuits; Receiver circuits **[5]**

29/00 Arrangements, apparatus, circuits or systems, not covered by a single one of groups H04L 1/00 to H04L 27/00 (interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units G06F 13/00) **[5]**
29/02 . Communication control; Communication processing (H04L 29/12, H04L 29/14 take precedence) **[5]**
29/04 . . for plural communication lines **[5]**
29/06 . . characterised by a protocol **[5]**
29/08 . . . Transmission control procedure, e.g. data link level control procedure **[5]**
29/10 . . characterised by an interface, e.g. the interface between the data link level and the physical level **[5]**
29/12 . characterised by the data terminal **[5]**
29/14 . Counter-measures to a fault **[5]**

H04M TELEPHONIC COMMUNICATION (circuits for controlling other apparatus <u>via</u> a telephone cable and not involving telephone switching apparatus G08)

(1) This subclass <u>covers</u> :
– telephonic communication systems combined with other electrical systems;
– testing arrangements specially adapted for telephonic communication systems.
(2) In this subclass, the following terms or expressions are used with the meanings indicated:
– "subscriber" is a general term for terminal equipment, e.g. telephones for public use;
– "substation" means subscriber or monitoring equipment which may connect a single subscriber to a line without choice as to subscriber;
– "satellite" is a type of exchange the operation of which depends upon control signals received from a supervisory exchange;
– "switching centres" includes exchanges and satellites.

<u>Subclass index</u>

1/00 Substation equipment, e.g. for use by subscribers (subscriber services or facilities provided at exchanges H04M 3/00; prepayment telephone coin boxes H04M 17/00; current supply arrangements H04M 19/08) **[1,7]**
1/02 . Constructional features of telephone sets
1/03 . . Constructional features of telephone transmitters or receivers, e.g. telephone hand-sets **[2]**
1/04 . . Supports for telephone transmitters or receivers
1/05 . . . specially adapted for use on head, throat or breast
1/06 . . . Hooks; Cradles
1/08 . . . . associated with switches operated by the weight of the receiver or hand-set
1/10 . . . . associated with switches operated by magnetic effect due to proximity of receiver or hand-set
1/11 . . Supports for sets, e.g. incorporating armrests
1/12 . . . Adjustable supports, e.g. extensible
1/13 . . . . pantographic
1/14 . . . with resilient means to eliminate extraneous vibrations
1/15 . . Protecting or guiding telephone cords **[5]**
1/17 . . Hygienic or sanitary devices on telephone equipment (for mouthpieces or earpieces H04R 1/12) **[2]**
1/18 . . Telephone sets specially adapted for use in ships, mines, or other places exposed to adverse environment (H04M 1/19 takes precedence)

1/19 . . Arrangements of transmitters, receivers, or complete sets to prevent eavesdropping, to attenuate local noise or to prevent undesired transmission; Mouthpieces or receivers specially adapted therefor (circuit arrangements for preventing eavesdropping H04M 1/68; telephone cabinets E04H 1/14)

1/20 . . Arrangements for preventing acoustic feedback (H04M 1/62 takes precedence)

1/21 . . Combinations with auxiliary equipment, e.g. with clocks or memoranda pads

1/215 . . . by non-intrusive coupling means, e.g. acoustic couplers **[7]**

1/22 . . Illumination; Arrangements for improving the visibility of characters on dials

1/23 . . Construction or mounting of dials or of equivalent devices; Means for facilitating the use thereof (by improving visibility H04M 1/22)

1/24 . Arrangements for testing

1/247 . Telephone sets including user guidance or feature selection means facilitating their use **[7]**

1/253 . Telephone sets using digital voice transmission **[7]**

1/26 . Devices for calling a subscriber (H04M 1/66 takes precedence) **[1,7]**

1/27 . . Devices whereby a plurality of signals may be stored simultaneously **[2]**

1/272 . . . with provision for storing only one subscriber number at a time, e.g. by keyboard or dial **[2]**

1/274 . . . with provision for storing more than one subscriber number at a time **[2]**

1/2745 . . . . using static electronic memories, i.e. memories whose operation does not require relative movement between storage means and a transducer, e.g. chips **[7]**

1/275 . . . . . implemented by means of portable electronic directories **[7]**

1/2755 . . . . . whose contents are provided by optical scanning **[7]**

1/276 . . . . using magnetic recording, e.g. on tape **[2]**

1/278 . . . . using punched cards or tapes **[2]**

1/30 . . Devices which can set up and transmit only one digit at a time

1/31 . . . by interrupting current to generate trains of pulses; by periodically opening and closing contacts to generate trains of pulses **[2]**

1/315 . . . . Clutches, spring assemblies, speed regulators, e.g. centrifugal brakes (H04M 1/32 to H04M 1/40 take precedence) **[3]**

1/32 . . . . Locking setting devices during transmission to prevent interference by user

1/34 . . . . Lost-motion or other arrangements for ensuring a pause between successive digit transmissions

1/38 . . . . Pulses transmitted by a movement variably limited by the setting of a stop

1/40 . . . . wherein the setting-operation short-circuits or open-circuits the transmitting mechanism during a variable part of a cycle

1/50 . . . by generating or selecting currents of predetermined frequencies or combinations of frequencies **[2]**

1/515 . . by generating or selecting signals other than trains of pulses of similar shape, or signals other than currents of one or more different frequencies, e.g. generation of dc signals of alternating polarity, coded pulses or impedance dialling **[2]**

1/52 . . Arrangements wherein a dial or the like is mechanically coupled to a line selector

1/53 . . Generation of additional signals, e.g. additional pulses **[2]**

1/54 . . . Arrangements wherein a dial or the like generates identifying signals, e.g. in party-line systems **[2]**

1/56 . Arrangements for indicating or recording the called number at the calling subscriber's set

1/57 . Arrangements for indicating or recording the number of the calling subscriber at the called subscriber's set (at the operator set in a manual exchange H04M 5/20) **[2]**

1/58 . Anti-side-tone circuits

1/60 . including speech amplifiers

1/62 . . Constructional arrangements

1/64 . Automatic arrangements for answering calls; Automatic arrangements for recording messages for absent subscribers; Arrangements for recording conversations (centralised dictation systems H04M 11/10) **[1,7]**

1/65 . . Recording arrangements **[2,7]**

1/652 . . . Means for playing back the recorded messages by remote control over a telephone line (H04M 1/658 takes precedence) **[7]**

1/654 . . . Telephone line monitoring circuits therefor, e.g. ring detectors **[7]**

1/656 . . . for recording conversations **[7]**

1/658 . . . Means for redirecting recorded messages to other extensions or equipment **[7]**

1/66 . with means for preventing unauthorised or fraudulent calling (verifying user identity or authority in secret or secure digital communications H04L 9/32) **[1,7]**

1/663 . . Preventing unauthorised calls to a telephone set **[7]**

1/665 . . . by checking the validity of a code **[7]**

1/667 . . Preventing unauthorised calls from a telephone set (H04M 1/677 takes precedence) **[7]**

1/67 . . . by electronic means **[7]**

1/673 . . . . the user being required to key in a code **[7]**

1/675 . . . . the user being required to insert a coded card, e.g. a smart card carrying an integrated circuit chip **[7]**

1/677 . . Preventing the dialling or sending of predetermined telephone numbers or selected types of telephone numbers, e.g. long distance numbers **[7]**

1/68 . Circuit arrangements for preventing eavesdropping

1/70 . . Lock-out or secrecy arrangements in party-line systems

1/72 . Substation extension arrangements; Cordless telephones, i.e. devices for establishing wireless links to base stations without route selecting **[1,7]**

1/723 . . using two or more extensions per line (H04M 1/725 takes precedence) **[7]**

1/725 . . Cordless telephones **[7]**

1/727 . . . Identification code transfer arrangements **[7]**

1/73 . . . Battery saving arrangements **[7]**

1/733 . . . with a plurality of base stations connected to a plurality of lines **[7]**

1/737 . . . characterised by transmission of electromagnetic waves other than radio waves, e.g. infra-red waves **[7]**

1/738 . Interface circuits for coupling substations to external telephone lines (H04M 1/78 takes precedence) **[7]**

1/74 . . with means for reducing interference; with means for reducing effects due to line faults

1/76 . . Compensating for differences in line impedance
1/78 . Circuit arrangements in which low-frequency speech signals proceed in one direction on the line, while speech signals proceeding in the other direction on the line are modulated on a high-frequency carrier signal **[2]**
1/80 . Telephone line holding circuits **[7]**
1/82 . Line monitoring circuits for call progress or status discrimination **[7]**

3/00 Automatic or semi-automatic exchanges
3/02 . Calling substations, e.g. by ringing (selective calling H04Q)
3/04 . . the calling signal being supplied from the final selector
3/06 . . the calling signal being supplied from the subscriber's line circuit
3/08 . Indicating faults in circuits or apparatus
3/10 . . Providing fault- or trouble-signals
3/12 . . Marking faulty circuits "busy"; Enabling equipment to disengage itself from faulty circuits
3/14 . . Signalling existence of persistent "off-hook" condition
3/16 . with lock-out or secrecy provision in party-line systems
3/18 . with means for reducing interference; with means for reducing effects due to line faults
3/20 . with means for interrupting existing connections; with means for breaking-in on conversations
3/22 . Arrangements for supervision, monitoring or testing
3/24 . . with provision for checking the normal operation
3/26 . . with means for applying test signals
3/28 . . . Automatic routine testing
3/30 . . . . for subscribers' lines
3/32 . . . . for lines between exchanges
3/34 . . . Testing for cross-talk
3/36 . . Statistical metering, e.g. recording occasions when traffic exceeds capacity of trunks
3/38 . Graded-service arrangements, i.e. some subscribers prevented from establishing certain connections (queuing arrangements H04Q 3/64)
3/40 . Applications of speech amplifiers
3/42 . Systems providing special services or facilities to subscribers (specially adapted for wireless communication networks H04W 4/00)
3/424 . . Arrangements for automatic redialling (at the subscriber's set H04M 1/27) **[7]**
3/428 . . Arrangements for placing incoming calls on hold **[7]**
3/432 . . Arrangements for calling a subscriber at a specific time, e.g. morning call service **[7]**
3/436 . . Arrangements for screening incoming calls **[7]**
3/44 . . Additional connecting arrangements for providing access to frequently-wanted subscribers, e.g. abbreviated dialling (at the subscriber's set H04M 1/27; automatic redialling H04M 3/424) **[1,7]**
3/46 . . Arrangements for calling a number of substations in a predetermined sequence until an answer is obtained
3/48 . . Arrangements for recalling a calling subscriber when the wanted subscriber ceases to be busy
3/487 . . Arrangements for providing information services, e.g. recorded voice services or time announcements **[7]**
3/493 . . . Interactive information services, e.g. directory enquiries **[7]**
3/50 . . Centralised arrangements for answering calls; Centralised arrangements for recording messages for absent or busy subscribers (H04M 3/487 takes precedence; centralised dictation systems H04M 11/10) **[1,7]**
3/51 . . . Centralised call answering arrangements requiring operator intervention **[7]**
3/52 . . . . Arrangements for routing dead number calls to operators
3/523 . . . . with call distribution or queuing **[7]**
3/527 . . . Centralised call answering arrangements not requiring operator intervention **[7]**
3/53 . . . Centralised arrangements for recording incoming messages **[7]**
3/533 . . . . Voice mail systems **[7]**
3/537 . . . . Arrangements for indicating the presence of a recorded message **[7]**
3/54 . . Arrangements for diverting calls for one subscriber to another predetermined subscriber
3/56 . . Arrangements for connecting several subscribers to a common circuit, i.e. affording conference facilities (video conference systems H04N 7/15)
3/58 . . Arrangements for transferring received calls from one subscriber to another; Arrangements affording interim conversations between either the calling or the called party and a third party (substation line holding circuits H04M 1/80) **[1,7]**
3/60 . Semi-automatic systems, i.e. systems in which the numerical selection of the outgoing line is under the control of an operator
3/62 . . Keyboard equipment
3/64 . . Arrangements for signalling the number or class of the calling line to the operator (between operators in inter-exchange working H04M 5/18)

5/00 Manual exchanges (substation equipment in general H04M 1/00)
5/02 . Constructional details (jacks, jack-plugs H01R 24/58)
5/04 . Arrangements for indicating calls or supervising connections for calling or clearing
5/06 . . affording automatic call distribution
5/08 . using connecting means other than cords
5/10 . using separate plug for each subscriber
5/12 . Calling substations, e.g. by ringing
5/14 . Applications of speech amplifiers
5/16 . with means for reducing interference; with means for reducing effects due to line faults
5/18 . Arrangements for signalling the class or number of called or calling line from one exchange to another
5/20 . . Arrangements for indicating the numbers of the incoming lines

7/00 Arrangements for interconnection between switching centres
7/02 . for compensating differences of ground potential
7/04 . for compensating differences of line impedance
7/06 . using auxiliary connections for control or supervision
7/08 . for phantom working
7/10 . for two-way working, i.e. calls may be set-up in either direction over the same connection
7/12 . for working between exchanges having different types of switching equipment, e.g. power-driven and step by step or decimal and non-decimal

7/14 . in systems involving main and subordinate switching centres (current supply source at subordinate switching centre charged from main exchange H04M 19/06)
7/16 . in systems employing carrier frequencies

9/00 Arrangements for interconnection not involving centralised switching
9/02 . involving a common line for all parties
9/04 . involving a separate line for each pair of parties
9/06 . involving combinations of interconnecting lines
9/08 . Two-way loud-speaking telephone systems with means for conditioning the signal, e.g. for suppressing echoes for one or both directions of traffic
9/10 . . with switching of direction of transmission by voice frequency

11/00 Telephonic communication systems specially adapted for combination with other electrical systems
11/02 . with bell or annunciator systems
11/04 . with alarm systems, e.g. fire, police or burglar alarm systems
11/06 . Simultaneous speech and data transmission, e.g. telegraphic transmission over the same conductors
11/08 . specially adapted for optional reception of entertainment or informative matter
11/10 . with dictation recording and playback systems

13/00 Party-line systems (substation equipment H04M 1/00; exchange equipment H04M 3/00, H04M 5/00; metering arrangements H04M 15/36)

15/00 Arrangements for metering, time-control or time-indication
15/02 . Severing connection after a predetermined time
15/04 . Recording calls in printed, perforated, or other permanent form
15/06 . . Recording class or number of calling party or called party
15/08 . Metering calls to called party
15/10 . Metering calls from calling party
15/12 . . Discriminative metering
15/14 . . . according to class of calling party
15/16 . . . according to connection obtained
15/18 . . . according to duration of call
15/20 . . . . Operator's time recording or indicating arrangements
15/22 . . . according to time of day
15/24 . . . preventing metering of tax-free calls to certain lines, e.g. to fire or ambulance stations
15/26 . . with a meter at the exchange controlled by an operator
15/28 . with meter at substation
15/30 . . the meter not being controlled from an exchange
15/32 . Metering arrangements for satellites or concentrators which connect one or more exchange lines with a group of local lines
15/34 . Metering arrangements for private branch exchanges
15/36 . Metering arrangements for party-lines
15/38 . Metering by apparatus other than mechanical step-by-step counter type

17/00 Prepayment telephone systems (using a coded card to authorise calls from a telephone set H04M 1/675) **[1,7]**
17/02 . Coin-freed or check-freed systems

19/00 Current supply arrangements for telephone systems (for selecting equipment H04Q 1/28)
19/02 . providing ringing current or supervisory tones, e.g. dialling tone or busy tone
19/04 . . the ringing-current being generated at the substations
19/06 . in which current supply sources at subordinate switching centres are charged from the main exchange
19/08 . with current supply sources at the substations (generating ringing current H04M 19/04) **[1,7]**

99/00 Subject matter not provided for in other groups of this subclass [8]

H04N PICTORIAL COMMUNICATION, E.G. TELEVISION [4]

(1) This subclass covers:
- transmission of pictures or their transient or permanent reproduction either locally or remotely, by methods involving both the following steps:
  step (a): the scanning of a picture, i.e. resolving the whole picture-containing area into individual picture-elements and the derivation of picture-representative electric signals related thereto, simultaneously or in sequence;
  step (b): the reproduction of the whole picture-containing area by the reproduction of individual picture-elements into which the picture is resolved by means of picture-representative electric signals derived therefrom, simultaneously or in sequence; **[4]**
- (in group H04N 1/00) systems for the transmission or the reproduction of arbitrarily composed pictures or patterns in which the local light variations composing a picture are not subject to variation with time, e.g. documents (both written and printed), maps, charts, photographs (other than cinematograph films);
- circuits specially designed for dealing with pictorial communication signals, e.g. television signals, as distinct from merely signals of a particular frequency range.

(2) This subclass does not cover:
- circuits or other parts of systems which form the subject of other subclasses, which are covered by the corresponding subclasses, e.g. H03C, H03F, H03J, H04B, H04H;
- systems in which legible alphanumeric or like character forms are analysed according to step (a) of Note (1) to derive an electric signal from which the character is recognised by comparison with stored information, which are covered by subclass G06K;
- systems for the direct photographic copying of an original picture in which an electric signal representative of the picture is derived according to the said step (a) and employed to modify the operation of the system, e.g. to control exposure, which are covered by class G03;

– systems for the reproduction according to step (b) of Note (1) of pictures comprising alphanumeric or like character forms but involving the production of the equivalent of a signal which would be derived according to the above-mentioned step (a), e.g. by cams, punched card or tape, coded control signal, or other means, which are covered by the subclass for the application, e.g. G01D, G06T, H04L;
– systems for the reproduction according to the above-mentioned step (b) of pictures comprising alphanumeric or like character forms and involving the generation according to the above-mentioned step (a) of picture-representative electric signals from a pre-arranged assembly of such characters, or records thereof, forming an integral part of the systems, which are covered by the subclass for the application, e.g. B41B, G06K, subject to those applications which are covered by this subclass;
– printing, duplication or marking processes, or materials therefor, which are covered by the relevant subclasses, e.g. B41C, B41J, B41M, G03C, G03F, G03G. **[4]**

(3) In this subclass, the following expression is used with the meaning indicated:
– "television systems" means those systems for the transmission and reproduction of arbitrarily composed pictures in which the local light variations composing a picture may change with time, e.g. natural "live" scenes, recordings of such scenes such as cinematograph films.

Note

In groups H04N 1/00 to H04N 17/00, it is desirable to add the indexing code of group H04N 101/00. **[6]**

1/00 Scanning, transmission or reproduction of documents or the like, e.g. facsimile transmission; Details thereof [3,4]

1/024 . Details of scanning heads **[3,4]**
1/028 . . for picture-information pick-up **[3,4]**
1/029 . . . Heads optically focused on only one picture element at a time **[6]**
1/03 . . . with photodetectors arranged in a substantially linear array (scanning of linear arrays H04N 1/19) **[6]**
1/031 . . . . the photodetectors having a one-to-one and optically positive correspondence with the scanned picture elements, e.g. linear contact sensors **[6]**
1/032 . . for picture-information reproduction **[3,4]**
1/034 . . . using ink, e.g. ink-jet heads **[5]**
1/036 . . . for optical reproduction **[3,4]**
1/04 . Scanning arrangements (H04N 1/387 takes precedence) **[4]**
1/047 . . Detection, control or error compensation of scanning velocity or position (H04N 1/17 takes precedence) **[6]**
1/053 . . . in main scanning direction, e.g. synchronisation of line start or picture elements in a line **[6]**
1/06 . . using cylindrical picture-bearing surfaces **[4]**
1/08 . . . Mechanisms for mounting or holding the sheet around the drum **[4]**
1/10 . . using flat picture-bearing surfaces **[4]**
1/107 . . . with manual scanning **[6]**
1/113 . . using oscillating or rotating mirrors **[6]**
1/12 . . using the sheet-feed movement as the slow scanning component (using multi-element arrays H04N 1/19) **[4,6]**
1/14 . . . using a rotating endless belt carrying the scanning heads **[4]**
1/16 . . . using a rotating helical element **[4]**
1/17 . . the scanning speed being dependent on content of picture **[3,4]**
1/19 . . using multi-element arrays **[6]**
1/191 . . . the array comprising a one-dimensional array **[6]**
1/192 . . . . Simultaneously scanning picture elements on one main scanning line **[6]**
1/193 . . . . . using electrically scanned linear arrays **[6]**
1/195 . . . the array comprising a two-dimensional array **[6]**
1/203 . . Simultaneous scanning of two or more separate pictures **[6]**
1/207 . . Simultaneous scanning of the original picture and the reproduced picture with a common scanning device **[6]**
1/21 . Intermediate information storage (H04N 1/387, H04N 1/41 take precedence) **[4]**
1/23 . Reproducing arrangements (details of scanning heads H04N 1/024; scanning arrangements therefor H04N 1/04) **[4]**
1/27 . . involving production of a magnetic intermediate picture **[4]**
1/29 . . involving production of an electrostatic intermediate picture **[4]**
1/31 . . Mechanical arrangements for picture transmission, e.g. adaptation of clutches, gearing, gear transmissions **[4]**
1/32 . Circuits or arrangements for control or supervision between transmitter and receiver
1/327 . . Initiating, continuing or ending a single-mode communication; Handshaking therefor **[6]**
1/333 . . Mode signalling or mode changing; Handshaking therefor **[6]**
1/34 . . for coin-freed systems
1/36 . . for synchronising or phasing transmitter and receiver
1/38 . Circuits or arrangements for blanking or otherwise eliminating unwanted parts of pictures (H04N 1/387 takes precedence) **[4]**
1/387 . Composing, repositioning or otherwise modifying originals **[4]**
1/393 . . Enlarging or reducing **[4]**
1/40 . Picture signal circuits (H04N 1/387 takes precedence) **[4]**
1/401 . . Compensating positionaly unequal response of the pick-up or reproducing head (H04N 1/403 takes precedence) **[6]**
1/403 . . Discrimination between the two tones in the picture signal of a two-tone original **[6]**
1/405 . . Halftoning, i.e. converting the picture signal of a continuous-tone original into a corresponding signal showing only two levels **[6]**
1/407 . . Control or modification of tonal gradation or of extreme levels, e.g. background level **[6]**
1/409 . . Edge or detail enhancement; Noise or error suppression **[6]**
1/41 . Bandwidth or redundancy reduction (by scanning H04N 1/17) **[3]**

1/411 . . for the transmission or reproduction of two-tone pictures, e.g. black and white pictures **[4]**
1/413 . . . Systems or arrangements allowing the picture to be reproduced without loss or modification of picture-information **[4]**
1/415 . . . . in which the picture-elements are subdivided or grouped into fixed one-dimensional or two-dimensional blocks **[4]**
1/417 . . . . using predictive or differential encoding **[4]**
1/419 . . . . in which encoding of the length of a succession of picture-elements of the same value along a scanning line is the only encoding step **[4]**
1/42 . Systems for two-way working
1/44 . Secrecy systems
1/46 . Colour picture communication systems
1/48 . . Picture signal generators (for halftone screening H04N 1/52) **[6]**
1/50 . . Picture reproducers (for halftone screening H04N 1/52) **[6]**
1/52 . . Circuits or arrangements for halftone screening **[6]**
1/54 . . Conversion of colour picture signals to a plurality of signals some of which represent particular mixed colours, e.g. for textile printing **[6]**
1/56 . . Processing of colour picture signals (H04N 1/52 takes precedence) **[6]**
1/58 . . . Edge or detail enhancement; Noise or error suppression, e.g. colour misregistration correction (H04N 1/62 takes precedence) **[6]**
1/60 . . . Colour correction or control **[6]**
1/62 . . . . Retouching, i.e. modification of isolated colours only or in isolated picture areas only **[6]**
1/64 . . Systems for the transmission or the storage of the colour picture signal; Details therefor, e.g. coding or decoding means therefor **[6]**

3/00 Scanning details of television systems; **Combination thereof with generation of supply voltages [4]**

3/02 . by optical-mechanical means only (H04N 3/36 takes precedence) **[2]**
3/04 . . having a moving aperture
3/06 . . having a moving lens or other refractor
3/08 . . having a moving reflector
3/09 . . . for electromagnetic radiation in the invisible region, e.g. infra-red **[4]**
3/10 . by means not exclusively optical-mechanical (H04N 3/36 takes precedence; devices or arrangements for the electro-, magneto- or acousto-optical modulation or deflection of light beams G02F) **[2]**
3/12 . . by switched stationary formation of lamps, photocells, or light relays
3/14 . . by means of electrically scanned solid-state devices (for picture generation H04N 5/335)
3/15 (transferred to H04N 5/335)
3/16 . . by deflecting electron beam in cathode-ray tube
3/18 . . . Generation of supply voltages, in combination with electron beam deflecting **[4]**
3/185 . . . . Maintaining dc voltage constant **[4]**
3/19 . . . . Arrangements or assemblies in supply circuits for the purpose of withstanding high voltages **[3]**
3/20 . . . Prevention of damage to cathode-ray tubes in event of failure of scanning
3/22 . . . Circuits for controlling dimensions, shape or centering of picture on screen
3/223 . . . . Controlling dimensions (by maintaining the cathode-ray tube high voltage constant H04N 3/185) **[4]**
3/227 . . . . Centering **[4]**
3/23 . . . . Distortion correction, e.g. for pincushion distortion correction, S-correction **[4]**
3/233 . . . . . using active elements **[4]**
3/237 . . . . . using passive elements **[4]**
3/24 . . . Blanking circuits
3/26 . . . Modifications of scanning arrangements to improve focusing
3/27 . . . Circuits special to multi-standard receivers **[3,4]**
3/28 . . producing multiple scanning, i.e. using more than one spot at the same time
3/30 . . otherwise than with constant velocity or otherwise than in pattern formed by unidirectional, straight, substantially horizontal or vertical lines
3/32 . . . Velocity varied in dependence upon picture information
3/34 . . . Elemental scanning area oscillated rapidly in direction transverse to main scanning direction
3/36 . Scanning of motion picture films, e.g. for telecine **[2]**
3/38 . . with continuously moving film **[4]**
3/40 . . with intermittently moving film **[4]**

5/00 Details of television systems *(scanning details or combination thereof with generation of supply voltages H04N 3/00; specially adapted for colour television H04N 9/00; servers specially adapted for the distribution of content H04N 21/20; client devices specially adapted for the reception of or interaction with content H04N 21/40)* **[4,2011.01]**

5/04 . Synchronising (for television systems using pulse code modulation H04N 7/24) **[4]**
5/05 . . Synchronising circuits with arrangements for extending range of synchronisation, e.g. by using switching between several time constants **[2]**
5/06 . . Generation of synchronising signals
5/067 . . . Arrangements or circuits at the transmitter end **[4]**
5/073 . . . . for mutually locking plural sources of synchronising signals, e.g. studios or relay stations **[4]**
5/08 . . Separation of synchronising signals from picture signals
5/10 . . . Separation of line synchronising signal from frame synchronising signal
5/12 . . Devices in which the synchronising signals are only operative if a phase difference occurs between synchronising and synchronised scanning devices, e.g. flywheel synchronising **[2]**
5/14 . Picture signal circuitry for video frequency region (H04N 5/222 takes precedence) **[2]**
5/16 . . Circuitry for reinsertion of dc and slowly varying components of signal; Circuitry for preservation of black or white level
5/18 . . . by means of “clamp” circuit operated by switching circuit
5/20 . . Circuitry for controlling amplitude response
5/202 . . . Gamma control **[4]**
5/205 . . . for correcting amplitude versus frequency characteristic **[4]**
5/208 . . . . for compensating for attenuation of high frequency components, e.g. crispening, aperture distortion correction **[4]**

5/21 . . Circuitry for suppressing or minimising disturbance, e.g. moire, halo (suppression of noise in television recording H04N 5/911)
5/213 . . . Circuitry for suppressing or minimising impulsive noise (H04N 5/217 takes precedence) **[4]**
5/217 . . . *in picture signal generation (noise reduction or noise suppression involving solid-state image sensors H04N 5/357)* **[4,2011.01]**
5/222 . Studio circuitry; Studio devices; Studio equipment **[4]**
5/225 . . Television cameras **[4]**
5/228 . . . Circuit details for pick-up tubes **[4]**
5/232 . . . Devices for controlling television cameras, e.g. remote control (H04N 5/235 takes precedence) **[4]**
5/235 . . . Circuitry for compensating for variation in the brightness of the object **[4]**
5/238 . . . . by influencing optical part of the camera **[4]**
5/243 . . . . by influencing the picture signal **[4]**
5/247 . . . Arrangement of television cameras **[4]**
5/253 . . Picture signal generating by scanning motion picture films or slide opaques, e.g. for telecine (scanning details therefor H04N 3/36) **[4]**
5/257 . . Picture signal generators using flying-spot scanners (H04N 5/253 takes precedence) **[4]**
5/262 . . Studio circuits, e.g. for mixing, switching-over, change of character of image, other special effects **[4]**
5/265 . . . Mixing **[4]**
5/268 . . . Signal distribution or switching (for broadcasting H04H 20/00) **[4]**
5/272 . . . Means for inserting a foreground image in a background image, i.e. inlay, outlay **[4]**
5/275 . . . . Generation of keying signals **[4]**
5/278 . . . Subtitling **[4]**
5/28 . . Mobile studios
5/30 . Transforming light or analogous information into electric information (H04N 5/222 takes precedence; scanning details H04N 3/00) **[2,4,7]**
5/32 . . Transforming X-rays
5/321 . . . with video transmission of fluoroscopic images **[5]**
5/325 . . . . Image enhancement, e.g. by subtraction techniques using polyenergetic X-rays **[5]**
5/33 . . Transforming infra-red radiation **[2]**
5/335 . . *using solid-state image sensors [SSIS] (H04N 5/32, H04N 5/33 take precedence)* **[4,2011.01]**

Note

In this group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2011.01]**

5/341 . . . *Extracting pixel data from an image sensor by controlling scanning circuits, e.g. by modifying the number of pixels having been sampled or to be sampled* **[2011.01]**
5/343 . . . . *by switching between different modes of operation using different resolutions or aspect ratios, e.g. between still and video mode or between interlaced and non-interlaced mode* **[2011.01]**
5/345 . . . . *by partially reading an SSIS array* **[2011.01]**
5/347 . . . . *by combining or binning pixels in SSIS* **[2011.01]**
5/349 . . . . *for increasing resolution by shifting the sensor relative to the scene* **[2011.01]**
5/351 . . . *Control of the SSIS depending on the scene, e.g. brightness or motion in the scene* **[2011.01]**
5/353 . . . . *Control of the integration time* **[2011.01]**
5/355 . . . . *Control of the dynamic range* **[2011.01]**
5/357 . . . *Noise processing, e.g. detecting, correcting, reducing or removing noise* **[2011.01]**
5/359 . . . . *applied to excess charges produced by the exposure, e.g. smear, blooming, ghost image, crosstalk or leakage between pixels* **[2011.01]**
5/361 . . . . *applied to dark current* **[2011.01]**
5/363 . . . . *applied to reset noise, e.g. KTC noise* **[2011.01]**
5/365 . . . . *applied to fixed-pattern noise, e.g. non-uniformity of response* **[2011.01]**
5/367 . . . . . *applied to defects, e.g. non-responsive pixels* **[2011.01]**
5/369 . . . *SSIS architecture; Circuitry associated therewith* **[2011.01]**
5/372 . . . . *Charge-coupled device [CCD] sensors; Time delay and integration [TDI] registers or shift registers specially adapted for SSIS* **[2011.01]**
5/3722 . . . . . *using frame interline transfer [FIT]* **[2011.01]**
5/3725 . . . . . *using frame transfer [FT]* **[2011.01]**
5/3728 . . . . . *using interline transfer [IT]* **[2011.01]**
5/374 . . . . *Addressed sensors, e.g. MOS or CMOS sensors* **[2011.01]**
5/3745 . . . . . *having additional components embedded within a pixel or connected to a group of pixels within a sensor matrix, e.g. memories, A/D converters, pixel amplifiers, shared circuits or shared components* **[2011.01]**
5/376 . . . . *Addressing circuits* **[2011.01]**
5/378 . . . . *Readout circuits, e.g. correlated double sampling [CDS] circuits, output amplifiers or A/D converters* **[2011.01]**
5/38 . Transmitter circuitry (H04N 5/14 takes precedence) **[4]**
5/40 . . Modulation circuits
5/42 . . for transmitting at will black-and-white or colour signals
5/44 . *Receiver circuitry (H04N 5/14 takes precedence)* **[4,2011.01]**
5/445 . . *for displaying additional information (H04N 5/50 takes precedence)* **[4,2011.01]**
5/45 . . . *Picture in picture* **[4,2011.01]**
5/455 . . Demodulation-circuits **[4]**
5/46 . . for receiving on more than one standard at will (deflecting circuits of multi-standard receivers H04N 3/27) **[4]**
5/50 . . Tuning indicators; Automatic tuning control **[4]**
5/52 . . Automatic gain control **[4]**
5/53 . . . Keyed automatic gain control **[4]**
5/54 . . . for positively-modulated picture signals (H04N 5/53 takes precedence) **[4]**
5/56 . . . for negatively-modulated picture signals (H04N 5/53 takes precedence) **[4]**
5/57 . . Control of contrast or brightness **[4]**
5/58 . . . in dependence upon ambient light **[4]**

5/59 . . . in dependence upon beam current of cathode ray tube **[4]**
5/60 . . for the sound signals
5/62 . . . Intercarrier circuits, i.e. heterodyning sound and vision carriers
5/63 . Generation or supply of power specially adapted for television receivers (generation of supply voltages in combination with electron beam deflecting H04N 3/18) **[4]**
5/64 . Constructional details of receivers, e.g. cabinets, dust covers (furniture aspects A47B, e.g. A47B 81/06) **[2]**
5/645 . . Mounting of picture tube on chassis or in housing
5/65 . . Holding-devices for protective discs or for picture masks
5/655 . . Construction or mounting of chassis, e.g. for varying the elevation of the tube
5/66 . Transforming electric information into light information (scanning details H04N 3/00)
5/68 . . Circuit details for cathode-ray display tubes
5/70 . . Circuit details for electroluminescent devices
5/72 . Modifying the appearance of television pictures by optical filters or diffusing screens
5/74 . Projection arrangements for image reproduction, e.g. using eidophor
5/76 . Television signal recording **[3,4]**
5/761 . . Systems for programming the time at which predetermined television channels will be selected for recording **[7]**
5/7613 . . . by using data entered by the user and a reference timing clock incorporated in the recorder **[7]**
5/7617 . . . by using data entered by the user and reference data transmitted by the broadcasting station **[7]**
5/765 . . Interface circuits between an apparatus for recording and another apparatus (associated working of recording or reproducing apparatus with a television camera or receiver in which the television signal is not significantly involved G11B 31/00) **[6]**
5/77 . . . between a recording apparatus and a television camera **[6]**
5/775 . . . between a recording apparatus and a television receiver **[6]**
5/78 . . using magnetic recording (H04N 5/91 takes precedence) **[3]**
5/781 . . . on discs or drums **[3]**
5/782 . . . on tape **[3]**
5/7822 . . . . with stationary magnetic heads **[6]**
5/7824 . . . . with rotating magnetic heads **[6]**
5/7826 . . . . . involving helical scanning of the magnetic tape **[6]**
5/7828 . . . . . involving transversal scanning of the magnetic tape **[6]**
5/783 . . . . Adaptations for reproducing at a rate different from the recording rate **[3]**
5/784 . . . on a sheet **[6]**
5/80 . . using electrostatic recording (H04N 5/91 takes precedence) **[3]**
5/82 . . . using deformable thermoplastic recording medium
5/83 . . . . on discs or drums **[3]**
5/84 . . using optical recording (H04N 5/80, H04N 5/89, H04N 5/91 take precedence) **[3,4]**
5/85 . . . on discs or drums **[3]**
5/87 . . . Producing a motion picture film from a television signal **[3,4]**
5/89 . . using holographic recording (H04N 5/91 take precedence) **[3]**
5/90 . . . on discs or drums **[3]**
5/903 . . using variable electrical capacitive recording (H04N 5/91 takes precedence) **[4]**
5/907 . . using static stores, e.g. storage tubes, semiconductor memories (H04N 5/91 takes precedence; based on relative movement between record carrier and transducer H04N 5/78 to H04N 5/903) **[4]**
5/91 . . Television signal processing therefor (of colour signals H04N 9/79) **[3]**
5/911 . . . for the suppression of noise **[6]**
5/913 . . . for scrambling **[6]**
5/915 . . . for field- or frame-skip recording or reproducing **[6]**
5/917 . . . for bandwidth reduction (using pulse code modulation H04N 7/24) **[6]**
5/919 . . . . by dividing samples or signal segments, e.g. television lines, among a plurality of recording channels **[6]**
5/92 . . . Transformation of the television signal for recording, e.g. modulation, frequency changing; Inverse transformation for playback **[3]**
5/921 . . . . by recording or reproducing the baseband signal **[6]**
5/922 . . . . by modulation of the signal on a carrier wave, e.g. amplitude or frequency modulation **[6]**
5/923 . . . . using preemphasis of the signal before modulation and deemphasis of the signal after demodulation **[6]**
5/924 . . . . using duty cycle modulation **[6]**
5/926 . . . . by pulse code modulation (H04N 5/919 takes precedence) **[6]**
5/928 . . . . the sound signal being pulse code modulated and recorded in time division multiplex with the modulated video signal **[6]**
5/93 . . . Regeneration of the television signal or of selected parts thereof **[3]**
5/931 . . . . for restoring the level of the reproduced signal **[6]**
5/932 . . . . Regeneration of analogue synchronisation signals **[6]**
5/935 . . . . Regeneration of digital synchronisation signals **[6]**
5/937 . . . . by assembling picture element blocks in an intermediate store **[6]**
5/94 . . . . Signal drop-out compensation **[3]**
5/945 . . . . . for signals recorded by pulse code modulation **[6]**
5/95 . . . . Time-base error compensation **[3]**
5/953 . . . . . by using an analogue memory, e.g. a CCD-shift register, the delay of which is controlled by a voltage controlled oscillator **[6]**
5/956 . . . . . by using a digital memory with independent write-in and read-out clock generators **[6]**

7/00 ***Television systems*** *(details H04N 3/00, H04N 5/00, specially adapted for colour television H04N 11/00; stereoscopic television systems H04N 13/00; selective content distribution H04N 21/00)* **[4,2011.01]**
7/01 . Conversion of standards **[4]**
7/015 . High-definition television systems **[6]**

7/025 . Systems for transmission of digital non-picture data, e.g. of text during the active part of a television frame **[6]**
7/03 . . Subscription systems therefor **[6]**
7/035 . . Circuits for the digital non-picture data signal, e.g. for slicing of the data signal, for regeneration of the data-clock signal, for error detection or correction of the data signal **[6]**
7/04 . Systems for the transmission of one television signal, i.e. both picture and sound, by a single carrier **[4]**
7/045 . . the carrier being frequency modulated **[6]**
7/06 . Systems for the simultaneous transmission of one television signal, i.e. both picture and sound, by more than one carrier **[4]**
7/08 . Systems for the simultaneous or sequential transmission of more than one television signal, e.g. additional information signals, the signals occupying wholly or partially the same frequency band **[4,6]**
7/081 . . the additional information signals being transmitted by means of a subcarrier **[6]**
7/083 . . with signal insertion during the vertical and the horizontal blanking interval **[6]**
7/084 . . with signal insertion during the horizontal blanking interval **[6]**
7/085 . . . the inserted signal being digital **[6]**
7/087 . . with signal insertion during the vertical blanking interval **[4]**
7/088 . . . the inserted signal being digital **[6]**
7/10 . Adaptations for transmission by electrical cable (H04N 7/12 takes precedence) **[4]**
7/12 . Systems in which the television signal is transmitted via one channel or a plurality of parallel channels, the bandwidth of each channel being less than the bandwidth of the television signal (H04N 7/24 takes precedence; high-definition television systems H04N 7/015) **[4]**
7/14 . Systems for two-way working (H04N 7/173 takes precedence) **[4]**
7/15 . . Conference systems (telephonic conference arrangements H04M 3/56) **[5]**
7/16 . *Analogue secrecy systems; Analogue subscription systems* **[1,2011.01]**
7/167 . . *Systems rendering the television signal unintelligible and subsequently intelligible* **[4,2011.01]**
7/169 . . . *Systems operating in the time domain of the television signal* **[6,2011.01]**
7/171 . . . *Systems operating in the amplitude domain of the television signal* **[6,2011.01]**
7/173 . . *with two-way working, e.g. subscriber sending a programme selection signal* **[4,2011.01]**
7/18 . Closed-circuit television systems, i.e. systems in which the signal is not broadcast
7/20 . Adaptations for transmission via a GHz frequency band, e.g. via satellite **[4]**
7/22 . Adaptations for optical transmission **[4]**
7/24 . *Systems for the transmission of television signals using pulse code modulation (H04N 21/00 takes precedence)* **[6,2011.01]**
7/26 . . using bandwidth reduction (information reduction by code conversion in general H03M 7/30) **[6]**
7/28 . . . using vector coding **[6]**
7/30 . . . involving transform coding (H04N 7/50 takes precedence; digital computers for performing complex mathematical operations, e.g. domain transformation, G06F 17/14) **[6]**
7/32 . . . involving predictive coding (H04N 7/48, H04N 7/50 take precedence) **[6]**
7/34 . . . . using spatial prediction **[6]**
7/36 . . . . using temporal prediction **[6]**
7/38 . . . . involving delta modulation **[6]**
7/40 . . . . . adaptive **[6]**
7/42 . . . . involving differential modulation **[6]**
7/44 . . . . . adaptive **[6]**
7/46 . . . . using subsampling at the coder and sample restitution by interpolation at the coder or decoder **[6]**
7/48 . . . involving pulse code modulation and predictive coding **[6]**
7/50 . . . involving transform and predictive coding **[6]**
7/52 . . *Systems for transmission of a pulse code modulated with one or more other pulse code modulated signals, e.g. an audio signal or a synchronizing signal (assembling of a multiplex stream by combining a video stream with other content or additional data, remultiplexing of multiplex streams, insertion of stuffing bits into the multiplex stream, assembling of a packetised elementary stream at server side H04N 21/236; disassembling of a multiplex stream, remultiplexing of multiplex streams, extraction or processing of Service Information, disassembling of packetised elementary stream at client side H04N 21/434)* **[6,2011.01]**
7/54 . . . the signals being synchronous **[6]**
7/56 . . . . Synchronising systems therefor **[6]**
7/58 *(transferred to H04N 21/2365, H04N 21/434)*
7/60 *(transferred to H04N 21/236, H04N 21/434)*
7/62 *(transferred to H04N 21/242, H04N 21/431, H04N 21/434, H04N 21/8547)*
7/64 . . Systems for detection or correction of transmission errors (coding, decoding or code conversion for error detection or error correction in general H03M 13/00) **[6]**
7/66 . . . using redundant codes **[6]**
7/68 . . . using error concealment **[6]**

9/00 Details of colour television systems [4]
9/04 . Picture signal generators **[4]**
9/07 . . with one pick-up device only **[2,4]**
9/077 . . . whereby the colour signals are characterised by their phase **[4]**
9/083 . . . whereby the colour signals are characterised by their frequency **[4]**
9/09 . . with more than one pick-up device **[4]**
9/093 . . . Systems for avoiding or correcting misregistration of video signals **[4]**
9/097 . . . Optical arrangements associated therewith, e.g. for beam-splitting, for colour correction **[4]**
9/10 . . using optical-mechanical scanning means only (H04N 9/11 takes precedence) **[2,4]**
9/11 . . Scanning of colour motion picture films, e.g. for telecine **[2,4]**
9/12 . Picture reproducers (H04N 9/11 takes precedence) **[2,4]**
9/14 . . using optical-mechanical scanning means only **[2,4]**
9/16 . . using cathode ray tubes (H04N 9/11 takes precedence) **[2,4]**
9/18 . . . using separate electron beams for the primary colour signals (H04N 9/27 takes precedence) **[2,4]**
9/20 . . . . with more than one beam in a tube **[4]**

9/22 . . . using the same beam for more than one primary colour information (H04N 9/27 takes precedence) **[2,4]**
9/24 . . . . using means, integral with, or external to, the tube, for producing signal indicating instantaneous beam position **[4]**
9/26 . . . . using electron-optical colour selection means, e.g. line grid, deflection means in or near the gun or near the phosphor screen **[4]**
9/27 . . . with variable depth of penetration of electron beam into the luminescent layer, e.g. penetrons **[2,4]**
9/28 . . . Arrangements for convergence or focusing **[4]**
9/285 . . . . using quadrupole lenses **[4]**
9/29 . . . using demagnetisation or compensation of external magnetic fields **[2,4]**
9/30 . . using solid-state colour display devices **[4]**
9/31 . . Projection devices for colour picture display **[2,4]**
9/43 . Conversion of monochrome picture signals to colour picture signals for colour picture display **[4]**
9/44 . Colour synchronisation **[4]**
9/45 . . Generation or recovery of colour sub-carriers **[4]**
9/455 . . Generation of colour burst signals; Insertion of colour burst signals in colour picture signals or separation of colour burst signals from colour picture signals (H04N 9/45 takes precedence) **[4]**
9/465 . . Synchronisation of the PAL-switch **[4]**
9/47 . . for sequential signals **[2,4]**
9/475 . . for mutually locking different synchronisation sources **[4]**
9/64 . Circuits for processing colour signals (H04N 9/77 takes precedence) **[4]**
9/65 . . for synchronous modulators **[4]**
9/66 . . for synchronous demodulators **[4]**
9/67 . . for matrixing **[4]**
9/68 . . for controlling the amplitude of colour signals, e.g. automatic chroma control circuits (H04N 9/71, H04N 9/73 take precedence) **[4]**
9/69 . . . for modifying the colour signals by gamma correction **[4]**
9/70 . . for colour killing **[4]**
9/71 . . . combined with colour gain control **[4]**
9/72 . . for reinsertion of dc and slowly varying components of colour signals **[4]**
9/73 . . colour balance circuits, e.g. white balance circuits, colour temperature control **[4]**
9/74 . . for obtaining special effects (H04N 9/65 to H04N 9/73 take precedence) **[4]**
9/75 . . . Chroma key **[4]**
9/76 . . . for mixing of colour signals (H04N 9/75 takes precedence) **[4]**
9/77 . Circuits for processing the brightness signal and the chrominance signal relative to each other, e.g. adjusting the phase of the brightness signal relative to the colour signal, correcting differential gain or differential phase (circuits for matrixing H04N 9/67) **[4]**
9/78 . . for separating the brightness signal or the chrominance signal from the colour television signal, e.g. using comb filter **[4]**
9/79 . Processing of colour television signals in connection with recording **[4]**
9/793 . . for controlling the level of the chrominance signal, e.g. by means of automatic chroma control circuits **[6]**
9/797 . . for recording the signal in a plurality of channels, the bandwidth of each channel being less than the bandwidth of the signal (H04N 9/804, H04N 9/81, H04N 9/82 take precedence) **[6]**
9/80 . . Transformation of the television signal for recording, e.g. modulation, frequency changing; Inverse transformation for playback **[4]**
9/802 . . . involving processing of the sound signal (H04N 9/806, H04N 9/835 take precedence) **[6]**
9/804 . . . involving pulse code modulation of the colour picture signal components **[6]**
9/806 . . . . with processing of the sound signal **[6]**
9/808 . . . involving pulse code modulation of the composite colour video-signal **[6]**
9/81 . . . the individual colour picture signal components being recorded sequentially only **[4]**
9/815 . . . . the luminance signal and the sequential colour component signals being recorded in separate recording channels **[6]**
9/82 . . . the individual colour picture signal components being recorded simultaneously only **[4]**
9/825 . . . . the luminance and chrominance signals being recorded in separate channels **[6]**
9/83 . . . . the recorded chrominance signal occupying a frequency band under the frequency band of the recorded brightness signal **[4]**
9/835 . . . . . involving processing of the sound signal **[6]**
9/84 . . . . . the recorded signal showing a feature, which is different in adjacent track parts, e.g. different phase or frequency **[4]**
9/85 . . . . the recorded brightness signal occupying a frequency band totally overlapping the frequency band of the recorded chrominance signal, e.g. frequency interleaving **[4]**
9/86 . . . the individual colour picture signal components being recorded sequentially and simultaneously, e.g. corresponding to SECAM-system **[4]**
9/87 . . Regeneration of colour television signals (H04N 9/80 takes precedence) **[4]**
9/873 . . . for restoring the colour component sequence of the reproduced signal **[6]**
9/877 . . . by assembling picture element blocks in an intermediate memory **[6]**
9/88 . . . Signal drop-out compensation **[4]**
9/882 . . . . the signal being a composite colour television signal **[6]**
9/885 . . . . . using a digital intermediate memory **[6]**
9/888 . . . . for signals recorded by pulse code modulation **[6]**
9/89 . . . Time-base error compensation **[4]**
9/893 . . . . using an analogue memory, e.g. a CCD-shift register, the delay of which is controlled by a voltage controlled oscillator **[6]**
9/896 . . . . using a digital memory with independent write-in and read-out clock generators **[6]**
9/898 . . . using frequency multiplication of the reproduced colour signal with another auxiliary reproduced signal, e.g. a pilot signal carrier **[6]**

11/00 **Colour television systems** (details H04N 9/00; stereoscopic H04N 15/00) **[4]**
11/02 . with bandwidth reduction (H04N 11/04 takes precedence) **[4]**
11/04 . using pulse code modulation **[4]**

11/06 . Transmission systems characterised by the manner in which the individual colour picture signal components are combined **[4]**

11/08 . . using sequential signals only (dot sequential systems H04N 11/12) **[4]**

11/10 . . . in which colour signals are inserted in the blanking interval of brightness signal **[4]**

11/12 . . using simultaneous signals only **[4]**

11/14 . . . in which one signal, modulated in phase and amplitude, conveys colour information and a second signal conveys brightness information, e.g. NTSC-system **[4]**

11/16 . . . . the chrominance signal alternating in phase, e.g. PAL-system **[4]**

11/18 . . using simultaneous and sequential signals, e.g. SECAM-system **[4]**

11/20 . . Conversion of the manner in which the individual colour picture signal components are combined, e.g. conversion of colour television standards **[4]**

11/22 . . . in which simultaneous signals are converted into sequential signals or vice versa **[4]**

11/24 . High-definition television systems **[6]**

13/00 Stereoscopic television systems; **Details thereof** (specially adapted for colour television H04N 15/00) **[4]**

13/02 . Picture signal generators **[4]**

13/04 . Picture reproducers **[4]**

15/00 Stereoscopic colour television systems; **Details thereof [4]**

17/00 Diagnosis, testing or measuring for television systems or their details [4]

17/02 . for colour television signals **[4]**

17/04 . for receivers **[4]**

17/06 . for recorders **[4]**

21/00 Selective content distribution, e.g. interactive television, VOD [Video On Demand] *(broadcast communication H04H; arrangements, apparatus, circuits or systems for communication control or processing being characterised by a protocol H04L 29/06; real-time bi-directional transmission of motion video data H04N 7/14)* **[2011.01]**

(1) *This group covers :*
- *interactive video distribution processes, systems, or elements thereof, which are characterised by point-to-multipoint system configurations, and which are mainly used for motion video data unidirectional distribution or delivery resulting from interactions between systems operators, e.g. access or service providers, or users e.g. subscribers, and system elements.* **[2011.01]**
- *such systems include dedicated communication systems, such as television distribution systems, which primarily distribute or deliver motion video data in the manner indicated, which may, in addition, provide a framework for further, diverse data communications or services in either unidirectional or bi-directional form. However, video will occupy most of the downlink bandwidth in the distribution process.* **[2011.01]**
- *typically, system operators interface with transmitter-side elements or users' interface with receiver-side elements in order to facilitate, through interaction with such elements, the dynamic control of data processing or data flow at various points in the system. This interaction is typically occasional or intermittent in nature.* **[2011.01]**
- *processes, systems or elements thereof specially adapted to the generation, distribution and processing of data, which is either associated with video content, e.g. metadata, ratings, or related to the user or his environment and which has been actively or passively gathered. This data is either used to facilitate interaction or to alter or target the content.* **[2011.01]**

(2) *In this main group, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.* **[2011.01]**

21/20 . Servers specifically adapted for the distribution of content, e.g. VOD servers; Operations thereof **[2011.01]**

21/21 . . Server components or server architectures **[2011.01]**

21/214 . . . Specialised server platform, e.g. server located in an airplane, hotel or hospital **[2011.01]**

21/218 . . . Source of audio or video content, e.g. local disk arrays **[2011.01]**

21/2183 . . . . Cache memory **[2011.01]**

21/2187 . . . . Live feed **[2011.01]**

21/222 . . . Secondary servers, e.g. proxy server or cable television Head-end **[2011.01]**

21/2225 . . . . Local VOD servers **[2011.01]**

21/226 . . . Internal components of the server **[2011.01]**

21/23 . . Processing of content or additional data; Elementary server operations; Server middleware **[2011.01]**

21/231 . . . Content storage operation, e.g. caching movies for short term storage, replicating data over plural servers or prioritizing data for deletion **[2011.01]**

21/2312 . . . . Data placement on disk arrays **[2011.01]**

21/2315 . . . . . using interleaving **[2011.01]**

21/2318 . . . . . using striping **[2011.01]**

21/232 . . . Content retrieval operation within server, e.g. reading video streams from disk arrays **[2011.01]**

21/233 . . . Processing of audio elementary streams **[2011.01]**

21/234 . . . Processing of video elementary streams, e.g. splicing of video streams or manipulating MPEG-4 scene graphs (video encoding or transcoding processes per se H04N 7/26) **[2011.01]**

21/2343 . . . . involving reformatting operations of video signals for distribution or compliance with end-user requests or end-user device requirements **[2011.01]**

21/2347 . . . . involving video stream encryption (arrangements for secret or secure communication H04L 9/00; analogue secrecy systems H04N 7/16) **[2011.01]**

21/235 . . . Processing of additional data, e.g. scrambling of additional data or processing content descriptors **[2011.01]**

21/236 . . . *Assembling of a multiplex stream, e.g. transport stream, by combining a video stream with other content or additional data, e.g. inserting a URL [Uniform Resource Locator] into a video stream, multiplexing software data into a video stream; Remultiplexing of multiplex streams; Insertion of stuffing bits into the multiplex stream, e.g. to obtain a constant bit-rate; Assembling of a packetised elementary stream* **[2011.01]**

21/2362 . . . . *Generation or processing of SI [Service Information]* **[2011.01]**

21/2365 . . . . *Multiplexing of several video streams* **[2011.01]**

21/2368 . . . . *Multiplexing of audio and video streams* **[2011.01]**

21/237 . . . *Communication with additional data server* **[2011.01]**

21/238 . . . *Interfacing the downstream path of the transmission network, e.g. adapting the transmission rate of a video stream to network bandwidth; Processing of multiplex streams* **[2011.01]**

21/2381 . . . . *Adapting the multiplex stream to a specific network, e.g. an IP [Internet Protocol] network* **[2011.01]**

21/2383 . . . . *Channel coding of digital bit-stream, e.g. modulation* **[2011.01]**

21/2385 . . . . *Channel allocation (H04N 21/266 takes precedence); Bandwidth allocation (H04N 21/24 takes precedence)* **[2011.01]**

21/2387 . . . . *Stream processing in response to a playback request from an end-user, e.g. for trick-play* **[2011.01]**

21/2389 . . . . *Multiplex stream processing, e.g. multiplex stream encrypting* **[2011.01]**

21/239 . . . *Interfacing the upstream path of the transmission network, e.g. prioritizing client requests* **[2011.01]**

21/24 . . . *Monitoring of processes or resources, e.g. monitoring of server load, available bandwidth or upstream requests* **[2011.01]**

21/241 . . . *OS [Operating System] processes, e.g. server setup (arrangements for programme control G06F 9/00)* **[2011.01]**

21/242 . . . *Synchronization processes, e.g. processing of PCR [Program Clock References]* **[2011.01]**

21/25 . . *Management operations performed by the server for facilitating the content distribution or administrating data related to end-users or client devices, e.g. end-user or client device authentication or learning user preferences for recommending movies* **[2011.01]**

21/254 . . . *Management at additional data server, e.g. shopping server or rights management server* **[2011.01]**

21/2543 . . . . *Billing* **[2011.01]**

21/2547 . . . . . *Third party billing, e.g. billing of advertiser* **[2011.01]**

21/258 . . . *Client or end-user data management, e.g. managing client capabilities, user preferences or demographics or processing of multiple end-users preferences to derive collaborative data* **[2011.01]**

21/262 . . . *Content or additional data distribution scheduling, e.g. sending additional data at off-peak times, updating software modules, calculating the carousel transmission frequency, delaying a video stream transmission or generating play-lists* **[2011.01]**

21/266 . . . *Channel or content management, e.g. generation and management of keys and entitlement messages in a conditional access system or merging a VOD unicast channel into a multicast channel* **[2011.01]**

21/2662 . . . . *Controlling the complexity of the video stream, e.g. by scaling the resolution or bitrate of the video stream based on the client capabilities* **[2011.01]**

21/2665 . . . . *Gathering content from different sources, e.g. Internet and satellite* **[2011.01]**

21/2668 . . . . *Creating a channel for a dedicated end-user group, e.g. by inserting targeted commercials into a video stream based on end-user profiles* **[2011.01]**

21/27 . . *Server based end-user applications* **[2011.01]**

21/274 . . . *Storing end-user specific content or additional data in response to end-user request* **[2011.01]**

21/2743 . . . . *Video hosting of uploaded data from client* **[2011.01]**

21/2747 . . . . *Remote storage of video programs received via the downstream path, e.g. from the server* **[2011.01]**

21/278 . . . *Content descriptor database or directory service for end-user access* **[2011.01]**

21/40 . *Client devices specifically adapted for the reception of, or interaction with, content, e.g. STB [set-top-box]; Operations thereof* **[2011.01]**

21/41 . . *Structure of client; Structure of client peripherals* **[2011.01]**

21/414 . . . *Specialised client platforms, e.g. receiver in car or embedded in a mobile appliance* **[2011.01]**

21/4143 . . . . *PC [Personal Computer]* **[2011.01]**

21/4147 . . . . *PVR [Personal Video Recorder] (H04N 5/76 takes precedence)* **[2011.01]**

21/418 . . . *External card to be used in combination with the client device, e.g. for conditional access* **[2011.01]**

21/4185 . . . . *for payment* **[2011.01]**

21/422 . . . *Input-only peripherals, e.g. GPS [Global Positioning System] (input arrangements or combined input and output arrangements for interaction between user and computer G06F 3/01)* **[2011.01]**

21/4223 . . . . *Cameras (H04N 5/225 takes precedence)* **[2011.01]**

21/4227 . . . . *Remote input by a user located remotely from the client device, e.g. at work* **[2011.01]**

21/426 . . . *Internal components of the client (H04N 5/44 takes precedence)* **[2011.01]**

21/43 . . *Processing of content or additional data, e.g. demultiplexing additional data from a digital video stream; Elementary client operations, e.g. monitoring of home network or synchronizing decoder's clock; Client middleware* **[2011.01]**

21/431 . . . *Generation of visual interfaces; Content or additional data rendering (receiver circuitry for displaying additional information H04N 5/445)* **[2011.01]**

21/432 . . . *Content retrieval operation from a local storage medium, e.g. hard-disk* **[2011.01]**

21/433 . . . *Content storage operation, e.g. storage operation in response to a pause request or caching operations* **[2011.01]**

21/4335 . . . . *Housekeeping operations, e.g. prioritizing content for deletion because of storage space restrictions* **[2011.01]**

21/434 . . . *Disassembling of a multiplex stream, e.g. demultiplexing audio and video streams or extraction of additional data from a video stream; Remultiplexing of multiplex streams; Extraction or processing of SI; Disassembling of packetised elementary stream* **[2011.01]**

21/435 . . . *Processing of additional data, e.g. decrypting of additional data or reconstructing software from modules extracted from the transport stream* **[2011.01]**

21/436 . . . *Interfacing a local distribution network, e.g. communicating with another STB or inside the home* **[2011.01]**

21/4363 . . . . *Adapting the video stream to a specific local network, e.g. a IEEE 1394 or Bluetooth network* **[2011.01]**

21/4367 . . . . *Establishing a secure communication between the client and a peripheral device or smart card (arrangements for secret or secure communication H04L 9/00; security arrangements for protecting computers or computer systems against unauthorised activity G06F 21/00)* **[2011.01]**

21/437 . . . *Interfacing the upstream path of the transmission network, e.g. for transmitting client requests to a VOD server* **[2011.01]**

21/438 . . . *Interfacing the downstream path of the transmission network originating from a server, e.g. retrieving MPEG packets from an IP network* **[2011.01]**

21/4385 . . . . *Multiplex stream processing, e.g. multiplex stream decrypting* **[2011.01]**

21/439 . . . *Processing of audio elementary streams* **[2011.01]**

21/44 . . . *Processing of video elementary streams, e.g. splicing a video clip retrieved from local storage with an incoming video stream or rendering scenes according to MPEG-4 scene graphs* **[2011.01]**

21/4402 . . . . *involving reformatting operations of video signals for household redistribution, storage or real-time display* **[2011.01]**

21/4405 . . . . *involving video stream decryption (arrangements for secret or secure communication H04L 9/00)* **[2011.01]**

21/4408 . . . . *involving video stream encryption, e.g. re-encrypting a decrypted video stream for redistribution in a home network (arrangements for secret or secure communication H04L 9/00)* **[2011.01]**

21/441 . . . *Acquiring end-user identification* **[2011.01]**

21/4415 . . . . *using biometric characteristics of the user, e.g. by voice recognition or fingerprint scanning* **[2011.01]**

21/442 . . . *Monitoring of processes or resources, e.g. detecting the failure of a recording device, monitoring the downstream bandwidth, the number of times a movie has been viewed or the storage space available from the internal hard disk* **[2011.01]**

21/4425 . . . . *Monitoring of client processing errors or hardware failure (monitoring in electrical digital data processing G06F 11/00)* **[2011.01]**

21/443 . . . *OS processes, e.g. booting a STB, implementing a Java virtual machine in a STB or power management in a STB (arrangements for program loading or initiating G06F 9/445)* **[2011.01]**

21/45 . . *Management operations performed by the client for facilitating the reception of or the interaction with the content or administrating data related to the end-user or to the client device itself, e.g. learning user preferences for recommending movies or resolving scheduling conflicts* **[2011.01]**

21/454 . . . *Content filtering, e.g. blocking advertisements* **[2011.01]**

21/4545 . . . . *Input to filtering algorithms, e.g. filtering a region of the image* **[2011.01]**

21/458 . . . *Scheduling content for creating a personalised stream, e.g. by combining a locally stored advertisement with an incoming stream; Updating operations, e.g. for OS modules* **[2011.01]**

21/462 . . . *Content or additional data management e.g. creating a master electronic program guide from data received from the Internet and a Head-end or controlling the complexity of a video stream by scaling the resolution or bit-rate based on the client capabilities* **[2011.01]**

21/4623 . . . . *Processing of entitlement messages, e.g. ECM [Entitlement Control Message] or EMM [Entitlement Management Message]* **[2011.01]**

21/4627 . . . . *Rights management* **[2011.01]**

21/466 . . . *Learning process for intelligent management, e.g. learning user preferences for recommending movies* **[2011.01]**

21/47 . . *End-user applications (interaction techniques for graphical user interfaces G06F 3/048; receiver circuitry for displaying additional information H04N 5/445)* **[2011.01]**

21/472 . . . *End-user interface for requesting content, additional data or services; End-user interface for interacting with content, e.g. for content reservation or setting reminders, for requesting event notification or for manipulating displayed content* **[2011.01]**

21/4722 . . . . *for requesting additional data associated with the content* **[2011.01]**

21/4725 . . . . . *using interactive regions of the image, e.g. hot spots* **[2011.01]**

21/4728 . . . . *for selecting a ROI [Region Of Interest], e.g. for requesting a higher resolution version of a selected region* **[2011.01]**

21/475 . . . *End-user interface for inputting end-user data, e.g. PIN [Personal Identification Number] or preference data* **[2011.01]**

21/478 . . . *Supplemental services, e.g. displaying phone caller identification or shopping application* **[2011.01]**

21/4782 . . . . *Web browsing* **[2011.01]**

21/4784 . . . . *receiving rewards* **[2011.01]**

21/4786 . . . . *e-mailing* **[2011.01]**

21/4788 . . . . *communicating with other users, e.g. chatting* **[2011.01]**

21/482 . . . *End-user interface for program selection* **[2011.01]**

21/485 . . . *End-user interface for client configuration* **[2011.01]**
21/488 . . . *Data services, e.g. news ticker* **[2011.01]**
21/60 . *Network structure or processes for video distribution between server and client or between remote clients (data switching networks H04L 12/00; wireless communication networks H04W); Control signaling between clients, server and network components; Transmission of management data between server and client; Communication details between server and client* **[2011.01]**
21/61 . . *Network physical structure; Signal processing (H04B takes precedence)* **[2011.01]**
21/63 . . *Control signaling between client, server and network components; Network processes for video distribution between server and clients, e.g. transmitting basic layer and enhancement layers over different transmission paths, setting up a peer-to-peer communication via Internet between remote STB's; Communication protocols; Addressing* **[2011.01]**
21/633 . . . *Control signals issued by server directed to the network components or client* **[2011.01]**
21/6332 . . . . *directed to client* **[2011.01]**
21/6334 . . . . . *for authorization, e.g. by transmitting a key (arrangements for secret or secure communication H04L 9/00)* **[2011.01]**
21/6336 . . . . . *directed to decoder* **[2011.01]**
21/6338 . . . . *directed to network* **[2011.01]**
21/637 . . . *Control signals issued by the client directed to the server or network components* **[2011.01]**
21/6371 . . . . *directed to network* **[2011.01]**
21/6373 . . . . *for rate control* **[2011.01]**
21/6375 . . . . *for requesting retransmission* **[2011.01]**
21/6377 . . . . *directed to server* **[2011.01]**
21/6379 . . . . . *directed to encoder* **[2011.01]**
21/64 . . . *Addressing* **[2011.01]**
21/6402 . . . . *Address allocation for clients* **[2011.01]**
21/6405 . . . . *Multicasting* **[2011.01]**
21/6408 . . . . *Unicasting* **[2011.01]**
21/643 . . . *Communication protocols* **[2011.01]**
21/6433 . . . . *DSM-CC [Digital Storage Media - Command and Control Protocol]* **[2011.01]**
21/6437 . . . . *RTP [Real-time Transport Protocol]* **[2011.01]**
21/647 . . . *Control signaling between network components and server or clients; Network processes for video distribution between server and clients, e.g. controlling the quality of the video stream, by dropping packets, protecting content from unauthorised alteration within the network, monitoring of network load or bridging between two different networks, e.g. between IP and wireless* **[2011.01]**
21/65 . . *Transmission of management data between client and server* **[2011.01]**
21/654 . . . *Transmission by server directed to the client* **[2011.01]**
21/6543 . . . . *for forcing some client operations, e.g. recording* **[2011.01]**
21/6547 . . . . *comprising parameters, e.g. for client setup* **[2011.01]**
21/658 . . . *Transmission by the client directed to the server* **[2011.01]**
21/6583 . . . . *Acknowledgement* **[2011.01]**
21/6587 . . . . *Control parameters, e.g. trick play commands or viewpoint selection* **[2011.01]**
21/80 . *Generation or processing of content or additional data by content creator independently of the distribution process; Content per se* **[2011.01]**
21/81 . . *Monomedia components thereof* **[2011.01]**
21/83 . . *Generation or processing of protective or descriptive data associated with content; Content structuring* **[2011.01]**
21/835 . . . *Generation of protective data, e.g. certificates* **[2011.01]**
21/8352 . . . . *involving content or source identification data, e.g. UMID [Unique Material Identifier]* **[2011.01]**
21/8355 . . . . *involving usage data, e.g. number of copies or viewings allowed* **[2011.01]**
21/8358 . . . . *involving watermark* **[2011.01]**
21/84 . . . *Generation or processing of descriptive data, e.g. content descriptors* **[2011.01]**
21/8405 . . . . *represented by keywords* **[2011.01]**
21/845 . . . *Structuring of content, e.g. decomposing content into time segments* **[2011.01]**
21/85 . . *Assembly of content; Generation of multimedia applications* **[2011.01]**
21/854 . . . *Content authoring* **[2011.01]**
21/8541 . . . . *involving branching, e.g. to different story endings* **[2011.01]**
21/8543 . . . . *using a description language, e.g. MHEG [Multimedia and Hypermedia information coding Expert Group] or XML [eXtensible Markup Language]* **[2011.01]**
21/8545 . . . . *for generating interactive applications* **[2011.01]**
21/8547 . . . . *involving timestamps for synchronizing content* **[2011.01]**
21/8549 . . . . *Creating video summaries, e.g. movie trailer* **[2011.01]**
21/858 . . . *Linking data to content, e.g. by linking an URL to a video object or by creating a hotspot* **[2011.01]**

Indexing scheme associated with groups H04N 1/00 to H04N 17/00, relating to still video cameras. [6]

101/00 Still video cameras [6]

H04Q **SELECTING** (switches, relays, selectors H01H; wireless communication networks H04W) **[1,2009.01]**

(1) This subclass covers :
– methods, circuits, or apparatus for establishing selectively a connection between a desired number of stations (normally two), or between a main station and a desired number of substations (normally one) for the purpose of transferring information via this connection after it has been established;

– selective calling arrangements over connections already established. **[2009.01]**

(2) In this subclass, the following terms or expressions are used with the meanings indicated:
– "subscriber" is a general term for terminal equipment, e.g. telephone for public use;
– "substation" means a subscriber or monitoring equipment which may connect a single subscriber to a line without choice as to subscriber;
– "satellite" is a kind of exchange the operation of which depends upon control signals received from a supervisory exchange;
– "switching centres" includes exchanges and satellites.

Subclass index

1/00 Details of selecting apparatus or arrangements
1/02 . Constructional details
1/04 . . Frames or mounting racks for selector switches; Accessories therefor, e.g. frame cover
1/06 . . Cable ducts or mountings specially adapted for exchange installations
1/08 . . Frames or mounting racks for relays; Accessories therefor
1/10 . . Exchange station construction
1/12 . . Arrangements of multiple bars with or without pivotable frames
1/14 . . Distribution frames
1/16 . . Wiring arrangements for selector switches or relays in frames
1/18 . Electrical details
1/20 . . Testing circuits or apparatus; Circuits or apparatus for detecting, indicating, or signalling faults or troubles
1/22 . . . Automatic arrangements
1/24 . . . . for connection devices
1/26 . . . . for signalling trouble in unoccupied sub-exchanges
1/28 . . Current-supply circuits or arrangements for selection equipment at exchanges
1/30 . . Signalling arrangements; Manipulation of signalling currents (multiplex systems providing for calling or supervisory signals H04J 1/14, H04J 3/12)
1/32 . . . using trains of dc pulses (H04Q 1/39 takes precedence) **[3]**
1/34 . . . . Impulse regenerators with mechanical or other non-electrical marking arrangements
1/36 . . . . Pulse-correcting arrangements, e.g. for reducing effects due to interference
1/38 . . . using combinations of direct currents of different amplitudes or polarities over line conductors or combination of line conductors
1/39 . . . using coded pulse groups **[3]**
1/40 . . . whereby duration of pulse or interval between two pulses is variable
1/42 . . . . involving the position of a pulse in a cycle
1/44 . . . using ac (H04Q 1/50 takes precedence) **[3]**
1/442 . . . . with out-of-voice band signalling frequencies **[3]**
1/444 . . . . with voice-band signalling frequencies **[3]**
1/446 . . . . . using one signalling frequency (H04Q 1/46 takes precedence) **[3]**
1/448 . . . . . with conversion of a single frequency signal into a digital signal **[3]**
1/45 . . . . . using multi-frequency signalling (H04Q 1/46 takes precedence) **[3]**
1/453 . . . . . in which m-out-of-n signalling frequencies are transmitted **[3]**
1/457 . . . . . with conversion of multi-frequency signals into digital signals **[3]**
1/46 . . . . . comprising means for distinguishing between a signalling current of predetermined frequency and a complex current containing that frequency, e.g. speech current **[3]**
1/48 . . . Induced-current signalling arrangements
1/50 . . . Conversion between different kinds of signals
1/54 . . Amplifier switched-on automatically in dependence on automatically selected lines
1/56 . . Balancing circuitry switched-on automatically in dependence on automatically selected lines

3/00 Selecting arrangements (H04Q 5/00 to H04Q 11/00 take precedence)
3/02 . Circuit arrangements for selectors responsive to a permutation code
3/04 . Circuit arrangements for receivers of routing digits
3/06 . . for group or trunk group selectors
3/08 . . for local or long-distance selectors
3/10 . . for PBX selectors, i.e. private branch exchange selectors
3/12 . . for line selectors providing transfer of routing digits
3/14 . . for two-way operation selectors
3/16 . . for marking-switches
3/18 . Circuit arrangements for first stage of hunting switching
3/20 . . for preselectors
3/22 . . . comprising common calling and disconnecting circuit
3/24 . . for line finders
3/26 . . . comprising common calling and disconnecting circuit
3/28 . . . comprising main groups and subgroups
3/30 . . Selector finders, i.e. allotters
3/32 . Circuit arrangements for second or subsequent stages of hunting switching **[2]**
3/34 . . for the second preselection stage
3/36 . . for the second line-finder stage
3/38 . . for stages after the group-selector stage
3/40 . . for stages after the line selector, e.g. for extension selector
3/42 . Circuit arrangements for indirect selecting controlled by common circuits, e.g. register controller, marker
3/44 . . using revertive control
3/46 . . using signals other than revertive impulses
3/47 . . using translators

3/48 . . using markers
3/49 . . . for end-to-end marking
3/495 . . . for routing connecting paths
3/52 . . using static devices in switching stages, e.g. electronic switching arrangements **[2]**
3/54 . . in which the logic circuitry controlling the exchange is centralised
3/545 . . . using a stored programme **[4]**
3/55 . . . using wired logic circuitry **[4]**
3/555 . . . . being comprised by electro-magnetic devices **[4]**
3/56 . . in which the control signals are multiplexed **[2]**
3/58 . Arrangements providing connection between main exchange and sub-exchange or satellite
3/60 . . for connecting to satellites or concentrators which connect one or more exchange lines with a group of local lines
3/62 . . for connecting to private branch exchanges
3/64 . Distributing or queuing
3/66 . . Traffic distributors
3/68 . . Grouping or interlacing selector groups or stages
3/70 . Identification of class of calling subscriber
3/72 . Finding out and indicating number of calling subscriber
3/74 . . Identification of subscriber calling from a party-line
3/76 . Translation from the called subscriber's number to the outgoing or incoming control information **[4]**
3/78 . Temporary storage of information of calling or called subscriber (intermediate storage means for telegraphic communication H04L 13/08) **[4]**

5/00 Selecting arrangements wherein two or more subscriber stations are connected by the same line to the exchange

5/02 . with direct connection for all subscribers, i.e. party-line system (H04Q 5/24 takes precedence)
5/04 . . Signalling by currents in one or other or both line wires or additional wires
5/06 . . Signalling by amplitude or polarity of dc
5/08 . . Signalling by continuous ac
5/10 . . . using single frequencies for different subscribers
5/12 . . . using combinations of frequencies
5/14 . . Signalling by pulses
5/16 . . . by predetermined number of pulses
5/18 . with indirect connection, i.e. through subordinate switching centre
5/20 . . the subordinate centre permitting interconnection of subscribers connected thereto
5/22 . . the subordinate centre not permitting interconnection of subscribers connected thereto
5/24 . for two-party-line systems

9/00 Arrangements in telecontrol or telemetry systems for selectively calling a substation from a main station, in which substation desired apparatus is selected for applying a control signal thereto or for obtaining measured values therefrom

9/02 . Automatically-operated arrangements
9/04 . Arrangements for synchronous operation
9/06 . Calling by using amplitude or polarity of dc
9/08 . Calling by using continuous ac
9/10 . . using single different frequencies
9/12 . . using combinations of frequencies
9/14 . Calling by using pulses
9/16 . . by predetermined number of pulses

11/00 Selecting arrangements for multiplex systems (multiplex systems H04J)

11/02 . for frequency-division multiplexing
11/04 . for time-division multiplexing
11/06 . . Time-space-time switching **[5]**
11/08 . . Time only switching **[5]**

H04R LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL TRANSDUCERS; **DEAF-AID SETS**; **PUBLIC ADDRESS SYSTEMS** (generating mechanical vibrations in general B06B; transducers for measuring particular variables G01; transducers in clocks G04; producing sounds with frequency not determined by supply frequency G10K; transducers in recording or reproducing heads G11B; transducers in motors H02) **[6]**

(1) This subclass covers:
- loudspeakers, microphones, gramophone pick-ups or like transducers producing acoustic waves or variations of electric current or voltage;
- arrangements actuated by variations of electric current or voltage for cutting grooves in records;
- circuits for the above-mentioned arrangements;
- monitoring or testing the above-mentioned equipment.

(2) Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems". **[7]**

Subclass index

1/00 **Details of transducers** (diaphragms H04R 7/00; characterised by the nature of the transducer, see the relevant group of main groups H04R 9/00 to H04R 23/00; mounting radio sets or communication systems in helmets A42B 3/30; mountings specially adapted for telephone equipment H04M 1/02)

1/02 . Casings; Cabinets; Mountings therein (H04R 1/28 takes precedence)

1/04 . . Structural association of microphone with electric circuitry therefor (in deaf-aid sets H04R 25/00)

1/06 . Arranging circuit leads; Relieving strain on circuit leads

1/08 . Mouthpieces; Attachments therefor

1/10 . Earpieces; Attachments therefor

1/12 . Sanitary or hygienic devices for mouthpieces or earpieces, e.g. for protecting against infection

1/14 . Throat mountings for microphones

1/16 . Mounting or connecting stylus to transducer with or without damping means

1/18 . . Holders for styli; Mounting holders on transducers

1/20 . Arrangements for obtaining desired frequency or directional characteristics (for stereophonic purposes H04R 5/00; speech enhancement by processing of the speech signal G10L 21/02)

1/22 . . for obtaining desired frequency characteristic only (circuits for combining transducers having different responses H04R 3/00)

1/24 . . . Structural combinations of separate transducers or of parts of the same transducer and responsive respectively to two or more frequency ranges

1/26 . . . Spatial arrangement of separate transducers responsive to two or more frequency ranges

1/28 . . . Transducer mountings or enclosures designed for specific frequency response; Transducer enclosures modified by provision of mechanical or acoustic impedances, e.g. resonator, damping means

1/30 . . . Combinations of transducers with horns, e.g. with mechanical matching means (horns in general G10K)

1/32 . . for obtaining desired directional characteristic only

1/34 . . . by using a single transducer with sound reflecting, diffracting, directing or guiding means

1/36 . . . . by using a single aperture of dimensions not greater than the shortest operating wavelength

1/38 . . . . in which sound waves act upon both sides of a diaphragm and incorporating acoustic phase-shifting means, e.g. pressure-gradient microphone

1/40 . . . by combining a number of identical transducers

1/42 . Combinations of transducers with fluid-pressure or other non-electrical amplifying means

1/44 . Special adaptations for subaqueous use, e.g. for hydrophone

1/46 . Special adaptations for use as contact microphones, e.g. on musical instrument, on stethoscope (throat mountings H04R 1/14)

3/00 **Circuits for transducers** (for stereophonic arrangements H04R 5/04; arrangements for producing a reverberation or echo sound G10K 15/08; amplifiers H03F)

3/02 . for preventing acoustic reaction

3/04 . for correcting frequency response

3/06 . . of electrostatic transducers

3/08 . . of electromagnetic transducers

3/10 . . of variable-resistance microphones

3/12 . for distributing signals to two or more loudspeakers

3/14 . . Cross-over networks

5/00 **Stereophonic arrangements** (stereophonic pick-ups H04R 9/16, H04R 11/12, H04R 17/08, H04R 19/10)

Note

In this group, the following expression is used with the meaning indicated:
– "stereophonic arrangements" covers quadraphonic or similar arrangements. **[3]**

5/02 . Spatial or constructional arrangements of loudspeakers

5/027 . Spatial or constructional arrangements of microphones, e.g. in dummy heads **[3]**

5/033 . Headphones for stereophonic communication **[3]**

5/04 . Circuit arrangements (combinations of amplifiers H03F 3/68; stereophonic systems H04S)

7/00 **Diaphragms for electromechanical transducers** (in general F16J 3/00); **Cones** (for musical instruments G10)

7/02 . characterised by the construction

7/04 . . Plane diaphragms

7/06 . . . comprising a plurality of sections or layers

7/08 . . . . comprising superposed layers separated by air or other fluid

7/10 . . . . comprising superposed layers in contact

7/12 . . Non-planar diaphragms or cones

7/14 . . . corrugated, pleated, or ribbed

7/16 . Mounting or tensioning of diaphragms or cones

7/18 . . at the periphery

7/20 . . . Securing diaphragm or cone resiliently to support by flexible material, springs, cords, or strands

7/22 . . . Clamping rim of diaphragm or cone against seating

7/24 . . Tensioning by means acting directly on free portion of diaphragm or cone

7/26 . Damping by means acting directly on free portion of diaphragm or cone (air damping H04R 1/28)

9/00 **Transducers of moving-coil, moving-strip, or moving-wire type**

9/02 . Details

9/04 . . Construction, mounting, or centering of coil

9/06 . Loudspeakers

9/08 . Microphones

9/10 . Telephone receivers

9/12 . Gramophone pick-ups using a stylus; Recorders using a stylus

9/14 . . comprising two or more styli or transducers (H04R 9/16 takes precedence)
9/16 . . signals being recorded or played-back by vibration of a stylus in two orthogonal directions simultaneously
9/18 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

11/00 **Transducers of moving-armature or moving-core type** (acoustic diaphragm of magnetisable material directly co-acting with electromagnet H04R 13/00)
11/02 . Loudspeakers
11/04 . Microphones
11/06 . Telephone receivers
11/08 . Gramophone pick-ups using a stylus; Recorders using a stylus
11/10 . . comprising two or more styli or transducers (H04R 11/12 takes precedence)
11/12 . . signals being recorded or played-back by vibration of a stylus in two orthogonal directions simultaneously
11/14 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

13/00 **Transducers having an acoustic diaphragm of magnetisable material directly co-acting with electromagnet**
13/02 . Telephone receivers

15/00 **Magnetostrictive transducers** (magnetostrictive elements in general H01L 41/00)
15/02 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

17/00 **Piezo-electric transducers**; **Electrostrictive transducers** (piezo-electric or electrostrictive elements in general H01L 41/00; details of piezo-electric or electrostrictive motors, generators or positioners H02N 2/00)
17/02 . Microphones
17/04 . Gramophone pick-ups using a stylus; Recorders using a stylus
17/06 . . comprising two or more styli or transducers (H04R 17/08 takes precedence)
17/08 . . signals being recorded or played-back by vibration of a stylus in two orthogonal directions simultaneously
17/10 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

19/00 **Electrostatic transducers**
19/01 . characterised by the use of electrets **[3]**
19/02 . Loudspeakers (H04R 19/01 takes precedence) **[3]**
19/04 . Microphones (H04R 19/01 takes precedence) **[3]**
19/06 . Gramophone pick-ups using a stylus; Recorders using a stylus (H04R 19/01 takes precedence) **[3]**
19/08 . . comprising two or more styli or transducers (H04R 19/10 takes precedence)
19/10 . . signals being recorded or played-back by vibration of a stylus in two orthogonal directions simultaneously

21/00 **Variable-resistance transducers** (gaseous-resistance transducers H04R 23/00; magneto-resistive transducers H04R 23/00)
21/02 . Microphones
21/04 . Gramophone pick-ups using a stylus; Recorders using a stylus

23/00 **Transducers other than those covered by groups H04R 9/00 to H04R 21/00**
23/02 . Transducers using more than one principle simultaneously

25/00 **Deaf-aid sets** (constructions of transducers per se H04R 9/00 to H04R 23/00; structural combination with spectacle frames G02C 11/06; processing of speech signals G10L 21/00)
25/02 . adapted to be supported entirely by ear
25/04 . comprising pocket amplifiers

27/00 **Public address systems** (circuits for preventing acoustic reaction H04R 3/02; circuits for distributing signals to loudspeakers H04R 3/12; amplifiers H03F)
27/02 . Amplifying systems for the deaf
27/04 . Electric megaphones

29/00 **Monitoring arrangements**; **Testing arrangements**

31/00 **Apparatus or processes specially adapted for the manufacture of transducers or diaphragms therefor** (processes or apparatus specially adapted for the manufacture of micro-structural devices or systems, e.g. in combination with electrical devices, B81C)

H04S **STEREOPHONIC SYSTEMS** (information storage on discs or tapes G11B; broadcast systems for the distribution of stereophonic information H04H 20/88; multiplex systems in general H04J) **[3]**

Note

In this subclass, the following expression is used with the meaning indicated:
– "stereophonic systems" covers quadraphonic or similar systems. **[3]**

1/00 **Two-channel systems** (H04S 5/00, H04S 7/00 take precedence) **[3]**

3/00 **Systems employing more than two channels, e.g. quadraphonic** (H04S 5/00, H04S 7/00 take precedence) **[3]**
3/02 . of the matrix type, i.e. in which input signals are combined algebraically, e.g. after having been phase shifted with respect to each other **[3]**

5/00 **Pseudo-stereo systems, e.g. in which additional channel signals are derived from monophonic signals by means of phase shifting, time delay or reverberation** (arrangements for producing a reverberation or echo sound G10K 15/08) **[3]**

5/02 **.** of the pseudo four-channel type, e.g. in which rear channel signals are derived from two-channel stereo signals **[3]**

7/00 **Indicating arrangements**; **Control arrangements, e.g. balance control [3]**

H04W WIRELESS COMMUNICATION NETWORKS [2009.01]

(1) This subclass covers:
- communication networks for selectively establishing one or a plurality of wireless communication links between a desired number of users or between users and network equipment, for the purpose of transferring information via these wireless communication links; **[2009.01]**
- networks deploying an infrastructure for mobility management of wireless users connected thereto, e.g. cellular networks, WLAN [Wireless Local Area Network], wireless access networks, e.g. WLL [Wireless Local Loop] or self-organising wireless communication networks, e.g. ad hoc networks; **[2009.01]**
- planning or deployment specially adapted for the above-mentioned wireless networks; **[2009.01]**
- services or facilities specially adapted for the above-mentioned wireless networks; **[2009.01]**
- arrangements or techniques specially adapted for the operation of the above-mentioned wireless networks. **[2009.01]**

(2) This subclass does not cover :
- communication systems using wireless extensions, i.e. wireless links without selective communication, e.g. cordless telephones, which are covered by group H04M 1/72; **[2009.01]**
- broadcast communication, which is covered by subclass H04H. **[2009.01]**

(3) In this subclass, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. **[2009.01]**

4/00 **Services or facilities specially adapted for wireless communication networks [2009.01]**

4/02 **.** Services making use of the location of users or terminals **[2009.01]**

4/04 **. .** in a dedicated environment, e.g. buildings or vehicles **[2009.01]**

4/06 **.** Selective distribution of broadcast; Services to user groups; One-way selective calling services **[2009.01]**

4/08 **. .** User group management **[2009.01]**

4/10 **. .** Push-to-Talk or Push-on-Call services **[2009.01]**

4/12 **.** Messaging, e.g. SMS [Short Messaging Service]; Mailboxes; Announcements, e.g. informing users on the status or progress of a communication request **[2009.01]**

4/14 **. .** Short messaging services, e.g. SMS or USSD [Unstructured Supplementary Service Data] **[2009.01]**

4/16 **.** Communication-related supplementary services, e.g. call-transfer or call-hold **[2009.01]**

4/18 **.** Information format or content conversion, e.g. adaptation by the network of the transmitted or received information for the purpose of wireless delivery to users or terminals **[2009.01]**

4/20 **.** Auxiliary data signalling, i.e. transmitting data via a non-traffic channel **[2009.01]**

4/22 **.** Emergency connection handling **[2009.01]**

4/24 **.** Accounting or billing **[2009.01]**

4/26 **. .** Usage measurement **[2009.01]**

8/00 **Network data management [2009.01]**

8/02 **.** Processing of mobility data, e.g. registration information at HLR [Home Location Register] or VLR [Visitor Location Register]; Transfer of mobility data, e.g. between HLR, VLR or external networks **[2009.01]**

8/04 **. .** Registration at HLR or HSS [Home Subscriber Server] **[2009.01]**

8/06 **. .** Registration at serving network Location Register, VLR or user mobility server **[2009.01]**

8/08 **. .** Mobility data transfer **[2009.01]**

8/10 **. . .** between location register and external networks **[2009.01]**

8/12 **. . .** between location registers or mobility servers **[2009.01]**

8/14 **. . .** between corresponding nodes **[2009.01]**

8/16 **. . .** selectively restricting mobility tracking **[2009.01]**

8/18 **.** Processing of user or subscriber data, e.g. subscribed services, user preferences or user profiles; Transfer of user or subscriber data **[2009.01]**

8/20 **. .** Transfer of user or subscriber data **[2009.01]**

8/22 **.** Processing or transfer of terminal data, e.g. status or physical capabilities **[2009.01]**

8/24 **. .** Transfer of terminal data **[2009.01]**

8/26 **.** Network addressing or numbering for mobility support **[2009.01]**

8/28 **. .** Number portability **[2009.01]**

8/30 **.** Network data restoration **[2009.01]**

12/00 **Security arrangements, e.g. access security or fraud detection**; **Authentication, e.g. verifying user identity or authorisation**; **Protecting privacy or anonymity [2009.01]**

12/02 **.** Protecting privacy or anonymity **[2009.01]**

12/04 **.** Key management **[2009.01]**

12/06 **.** Authentication **[2009.01]**

12/08 **.** Access security **[2009.01]**

12/10 **.** Integrity **[2009.01]**

12/12 **.** Fraud detection **[2009.01]**

16/00 Network planning, e.g. coverage or traffic planning tools; **Network deployment, e.g. resource partitioning or cell structures [2009.01]**

16/02 . Resource partitioning among network components, e.g. reuse partitioning **[2009.01]**
16/04 . . Traffic adaptive resource partitioning **[2009.01]**
16/06 . . Hybrid resource partitioning, e.g. channel borrowing **[2009.01]**
16/08 . . . Load shedding arrangements **[2009.01]**
16/10 . . Dynamic resource partitioning **[2009.01]**
16/12 . . Fixed resource partitioning **[2009.01]**
16/14 . Spectrum sharing arrangements **[2009.01]**
16/16 . . for PBS [Private Base Station] arrangements **[2009.01]**
16/18 . Network planning tools **[2009.01]**
16/20 . . for indoor coverage or short range network deployment **[2009.01]**
16/22 . Traffic simulation tools or models **[2009.01]**
16/24 . Cell structures **[2009.01]**
16/26 . . Cell enhancers, e.g. for tunnels or building shadow **[2009.01]**
16/28 . . using beam steering **[2009.01]**
16/30 . . Special cell shapes, e.g. doughnuts or ring cells **[2009.01]**
16/32 . . Hierarchical cell structures **[2009.01]**

24/00 Supervisory, monitoring or testing arrangements [2009.01]

24/02 . Arrangements for optimising operational condition **[2009.01]**
24/04 . Arrangements for maintaining operational condition **[2009.01]**
24/06 . Testing using simulated traffic **[2009.01]**
24/08 . Testing using real traffic **[2009.01]**
24/10 . Scheduling measurement reports **[2009.01]**

28/00 Network traffic or resource management [2009.01]

28/02 . Traffic management, e.g. flow control or congestion control **[2009.01]**
28/04 . . Error control **[2009.01]**
28/06 . . Optimising, e.g. header compression, information sizing **[2009.01]**
28/08 . . Load balancing or load distribution **[2009.01]**
28/10 . . Flow control **[2009.01]**
28/12 . . . using signalling between network elements **[2009.01]**
28/14 . . . using intermediate storage **[2009.01]**
28/16 . Central resource management; Negotiation of resources, e.g. negotiating bandwidth or QoS [Quality of Service] **[2009.01]**
28/18 . . Negotiating wireless communication parameters **[2009.01]**
28/20 . . . Negotiating bandwidth **[2009.01]**
28/22 . . . Negotiating communication rate **[2009.01]**
28/24 . . Negotiating SLA [Service Level Agreement]; Negotiating QoS [Quality of Service] **[2009.01]**
28/26 . . Resource reservation **[2009.01]**

36/00 Handoff or reselecting arrangements [2009.01]

36/02 . Buffering or recovering information during reselection **[2009.01]**
36/04 . Reselecting a cell layer in multi-layered cells **[2009.01]**
36/06 . Reselecting a communication resource in the serving access point **[2009.01]**
36/08 . Reselecting an access point **[2009.01]**
36/10 . Reselecting an access point controller **[2009.01]**
36/12 . Reselecting a serving backbone network switching or routing node **[2009.01]**
36/14 . Reselecting a network or an air interface **[2009.01]**
36/16 . Performing reselection for specific purposes **[2009.01]**
36/18 . . for allowing seamless reselection, e.g. soft reselection **[2009.01]**
36/20 . . for optimising the interference level **[2009.01]**
36/22 . . for handling the traffic **[2009.01]**
36/24 . Reselection being triggered by specific parameters **[2009.01]**
36/26 . . by agreed or negotiated communication parameters **[2009.01]**
36/28 . . . involving a plurality of connections, e.g. multi-call or multi-bearer connections **[2009.01]**
36/30 . . by measured or perceived connection quality data **[2009.01]**
36/32 . . by location or mobility data, e.g. speed data **[2009.01]**
36/34 . Reselection control **[2009.01]**
36/36 . . by user or terminal equipment **[2009.01]**
36/38 . . by fixed network equipment **[2009.01]**

40/00 Communication routing or communication path finding [2009.01]

40/02 . Communication route or path selection, e.g. power-based or shortest path routing **[2009.01]**
40/04 . . based on wireless node resources **[2009.01]**
40/06 . . . based on characteristics of available antennas **[2009.01]**
40/08 . . . based on transmission power **[2009.01]**
40/10 . . . based on available power or energy **[2009.01]**
40/12 . . based on transmission quality or channel quality **[2009.01]**
40/14 . . . based on stability **[2009.01]**
40/16 . . . based on interference **[2009.01]**
40/18 . . based on predicted events **[2009.01]**
40/20 . . based on geographic position or location **[2009.01]**
40/22 . . using selective relaying for reaching a BTS [Base Transceiver Station] or an access point **[2009.01]**
40/24 . Connectivity information management, e.g. connectivity discovery or connectivity update **[2009.01]**
40/26 . . for hybrid routing by combining proactive and reactive routing **[2009.01]**
40/28 . . for reactive routing **[2009.01]**
40/30 . . for proactive routing **[2009.01]**
40/32 . . for defining a routing cluster membership **[2009.01]**
40/34 . Modification of an existing route **[2009.01]**
40/36 . . due to handover **[2009.01]**
40/38 . . adapting due to varying relative distances between nodes **[2009.01]**

48/00 Access restriction; **Network selection**; **Access point selection [2009.01]**

48/02 . Access restriction performed under specific conditions **[2009.01]**
48/04 . . based on user or terminal location or mobility data, e.g. moving direction or speed **[2009.01]**
48/06 . . based on traffic conditions **[2009.01]**
48/08 . Access restriction or access information delivery, e.g. discovery data delivery **[2009.01]**
48/10 . . using broadcasted information **[2009.01]**
48/12 . . using downlink control channel **[2009.01]**
48/14 . . using user query **[2009.01]**

48/16 . Discovering; Processing access restriction or access information **[2009.01]**
48/18 . Selecting a network or a communication service **[2009.01]**
48/20 . Selecting an access point **[2009.01]**

52/00 Power management, e.g. TPC [Transmission Power Control], power saving or power classes [2009.01]
52/02 . Power saving arrangements **[2009.01]**
52/04 . TPC [Transmission power control] **[2009.01]**
52/06 . . TPC algorithms **[2009.01]**
52/08 . . . Closed loop power control **[2009.01]**
52/10 . . . Open loop power control **[2009.01]**
52/12 . . . Outer and inner loops **[2009.01]**
52/14 . . . Separate analysis of uplink or downlink **[2009.01]**
52/16 . . . Deriving transmission power values from another channel **[2009.01]**
52/18 . . TPC being performed according to specific parameters **[2009.01]**
52/20 . . . using error rate **[2009.01]**
52/22 . . . taking into account previous information or commands **[2009.01]**
52/24 . . . using SIR [Signal to Interference Ratio] or other wireless path parameters **[2009.01]**
52/26 . . . using transmission rate or quality of service QoS [Quality of Service] **[2009.01]**
52/28 . . . using user profile, e.g. mobile speed, priority or network state, e.g. standby, idle or non-transmission **[2009.01]**
52/30 . . using constraints in the total amount of available transmission power **[2009.01]**
52/32 . . . TPC of broadcast or control channels **[2009.01]**
52/34 . . . TPC management, i.e. sharing limited amount of power among users or channels or data types, e.g. cell loading **[2009.01]**
52/36 . . . with a discrete range or set of values, e.g. step size, ramping or offsets **[2009.01]**
52/38 . . TPC being performed in particular situations **[2009.01]**
52/40 . . . during macro-diversity or soft handoff **[2009.01]**
52/42 . . . in systems with time, space, frequency or polarisation diversity **[2009.01]**
52/44 . . . in connection with interruption of transmission **[2009.01]**
52/46 . . . in multi-hop networks, e.g. wireless relay networks **[2009.01]**
52/48 . . . during retransmission after error or non-acknowledgment **[2009.01]**
52/50 . . . at the moment of starting communication in a multiple access environment **[2009.01]**
52/52 . . using AGC [Automatic Gain Control] circuits or amplifiers **[2009.01]**
52/54 . . Signalisation aspects of the TPC commands, e.g. frame structure **[2009.01]**
52/56 . . . Detection of errors of TPC bits **[2009.01]**
52/58 . . . Format of the TPC bits **[2009.01]**
52/60 . . . using different transmission rates for TPC commands **[2009.01]**

56/00 Synchronisation arrangements [2009.01]

60/00 Registration, e.g. affiliation to network; De-registration, e.g. terminating affiliation [2009.01]
60/02 . by periodical registration **[2009.01]**
60/04 . using triggered events **[2009.01]**
60/06 . De-registration or detaching **[2009.01]**

64/00 Locating users or terminals for network management purposes, e.g. mobility management [2009.01]

68/00 Notification of users, e.g. alerting for incoming communication or change of service [2009.01]
68/02 . Arrangements for increasing efficiency of notification or paging channel **[2009.01]**
68/04 . multi-step notification using statistical or historical mobility data **[2009.01]**
68/06 . using multi-step notification by changing the notification area **[2009.01]**
68/08 . using multi-step notification by increasing the notification area **[2009.01]**
68/10 . using simulcast notification **[2009.01]**
68/12 . Inter-network notification **[2009.01]**

72/00 Local resource management, e.g. selection or allocation of wireless resources or wireless traffic scheduling [2009.01]
72/02 . Selection of wireless resources by user or terminal **[2009.01]**
72/04 . Wireless resource allocation **[2009.01]**
72/06 . . based on ranking criteria of the wireless resources **[2009.01]**
72/08 . . based on quality criteria **[2009.01]**
72/10 . . based on priority criteria **[2009.01]**
72/12 . Wireless traffic scheduling **[2009.01]**
72/14 . . using a grant channel **[2009.01]**

74/00 Wireless channel access, e.g. scheduled or random access [2009.01]
74/02 . Hybrid access techniques **[2009.01]**
74/04 . Scheduled access **[2009.01]**
74/06 . . using polling **[2009.01]**
74/08 . Non-scheduled access, e.g. random access, ALOHA or CSMA [Carrier Sense Multiple Access] **[2009.01]**

76/00 Connection management, e.g. connection set-up, manipulation or release [2009.01]
76/02 . Connection set-up **[2009.01]**
76/04 . Connection manipulation **[2009.01]**
76/06 . Connection release **[2009.01]**

80/00 Wireless network protocols or protocol adaptations to wireless operation, e.g. WAP [Wireless Application Protocol] [2009.01]
80/02 . Data link layer protocols **[2009.01]**
80/04 . Network layer protocols, e.g. mobile IP [Internet Protocol] **[2009.01]**
80/06 . Transport layer protocols, e.g. TCP [Transport Control Protocol] over wireless **[2009.01]**
80/08 . Upper layer protocols **[2009.01]**
80/10 . . adapted for session management, e.g. SIP [Session Initiation Protocol] **[2009.01]**
80/12 . . Application layer protocols, e.g. WAP **[2009.01]**

84/00 Network topologies [2009.01]
84/02 . Hierarchically pre-organised networks, e.g. paging networks, cellular networks, WLAN [Wireless Local Area Network] or WLL [Wireless Local Loop] **[2009.01]**
84/04 . . Large scale networks; Deep hierarchical networks **[2009.01]**
84/06 . . . Airborne or Satellite Networks **[2009.01]**
84/08 . . . Trunked mobile radio systems **[2009.01]**

84/10 . . Small scale networks; Flat hierarchical networks **[2009.01]**
84/12 . . . WLAN [Wireless Local Area Networks] **[2009.01]**
84/14 . . . WLL [Wireless Local Loop]; RLL [Radio Local Loop] **[2009.01]**
84/16 . . . WPBX [Wireless Private Branch Exchange] **[2009.01]**
84/18 . Self-organising networks, e.g. ad hoc networks or sensor networks **[2009.01]**
84/20 . . Master-slave arrangements **[2009.01]**
84/22 . . with access to wired networks **[2009.01]**

88/00 Devices specially adapted for wireless communication networks, e.g. terminals, base stations or access point devices [2009.01]

88/02 . Terminal devices **[2009.01]**
88/04 . . adapted for relaying to or from another terminal or user **[2009.01]**
88/06 . . adapted for operation in multiple networks, e.g. multi-mode terminals **[2009.01]**
88/08 . Access point devices **[2009.01]**
88/10 . . adapted for operation in multiple networks, e.g. multi-mode access points **[2009.01]**
88/12 . Access point controller devices **[2009.01]**
88/14 . Backbone network devices **[2009.01]**
88/16 . Gateway arrangements **[2009.01]**
88/18 . Service support; Network management devices **[2009.01]**

92/00 Interfaces specially adapted for wireless communication networks [2009.01]

92/02 . Inter-networking arrangements **[2009.01]**
92/04 . Interfaces between hierarchically different network devices **[2009.01]**
92/06 . . between gateways and public network devices **[2009.01]**
92/08 . . between user and terminal device **[2009.01]**
92/10 . . between terminal device and access point, i.e. wireless air interface **[2009.01]**
92/12 . . between access points and access point controllers **[2009.01]**
92/14 . . between access point controllers and backbone network device **[2009.01]**
92/16 . Interfaces between hierarchically similar devices **[2009.01]**
92/18 . . between terminal devices **[2009.01]**
92/20 . . between access points **[2009.01]**
92/22 . . between access point controllers **[2009.01]**
92/24 . . between backbone network devices **[2009.01]**

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05B ELECTRIC HEATING; **ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR** (apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27)

Note

Attention is drawn to Note III following the Contents of Section of section H. **[3]**

Subclass index

Heating

1/00 Details of electric heating devices

1/02 . Automatic switching arrangements specially adapted to heating apparatus (control of temperature in general G05D 23/00; thermally-actuated switches H01H 37/00)

3/00 Ohmic-resistance heating

3/02 . Details

3/03 . . Electrodes (electrothermic treatment of ores C22B 4/00) **[2]**

3/04 . . Waterproof or air-tight seals for heaters

3/06 . . Heater elements structurally combined with coupling elements or with holders

3/08 . . . having electric connections specially adapted for high temperatures

3/10 . Heating elements characterised by the composition or nature of the materials or by the arrangement of the conductor (compositions per se, see the relevant subclasses)

3/12 . . characterised by the composition or nature of the conductive material

3/14 . . . the material being non-metallic

3/16 . . the conductor being mounted on an insulating base

3/18 . . the conductor being embedded in an insulating material

3/20 . Heating elements having extended surface area substantially in a two-dimensional plane, e.g. plate-heater (H05B 3/62, H05B 3/68, H05B 3/78, H05B 3/84 take precedence) **[5]**

3/22 . . non-flexible

3/24 . . . heating conductor being self-supporting

3/26 . . . heating conductor mounted on insulating base

3/28 . . . heating conductor embedded in insulating material

3/30 . . . . on or between metallic plates

3/32 . . . heating conductor mounted on insulators on a metallic frame

3/34 . . flexible, e.g. heating nets or webs

3/36 . . . heating conductor embedded in insulating material

3/38 . . . . Powder conductors

3/40 . Heating elements having the shape of rods or tubes (H05B 3/62, H05B 3/68, H05B 3/78 take precedence)

3/42 . . non-flexible

3/44 . . . heating conductor arranged within rods or tubes of insulating material

3/46 . . . heating conductor mounted on insulating base

3/48 . . . heating conductor embedded in insulating material

3/50 . . . . heating conductor arranged in metal tubes, the radiating surface having heat-conducting fins

3/52 . . . . Apparatus or processes for filling or compressing insulating material in tubes

3/54 . . flexible

3/56 . . . Heating cables

3/58 . . . Heating hoses; Heating collars

3/60 . Heating arrangements wherein the heating current flows through granular, powdered or fluid material, e.g. for salt-bath furnace, electrolytic heating (H05B 3/38 takes precedence)

3/62 . Heating elements specially adapted for furnaces (H05B 3/60 takes precedence; arrangements of such elements in furnaces F27, e.g. F27D 11/00)

3/64 . . using ribbon, rod, or wire heater

3/66 . . Supports or mountings for heaters on or in the wall or roof

3/68 . Heating arrangements specially adapted for cooking plates or analogous hot-plates

Note

Group H05B 3/76 takes precedence over groups H05B 3/70 to H05B 3/74. **[2]**

3/70 . . Plates of cast metal

3/72 . . Plates of sheet metal

3/74 . . Non-metallic plates

3/76 . . Plates with spirally-wound heating tubes

3/78 . Heating arrangements specially adapted for immersion heating

3/80 . . Portable immersion heaters
3/82 . . Fixedly-mounted immersion heaters
3/84 . Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields **[5]**
3/86 . . the heating conductors being embedded in the transparent or reflecting material **[5]**

6/00 **Heating by electric, magnetic, or electromagnetic fields** (for therapeutic purposes A61N 5/00; joining of preformed parts by heating of plastics or substances in a plastic state B29C 65/02) **[3]**
6/02 . Induction heating **[3]**
6/04 . . Sources of current **[3]**
6/06 . . Control, e.g. of temperature, of power **[3]**
6/08 . . . using compensating or balancing arrangements **[3]**
6/10 . . Induction heating apparatus, other than furnaces, for specific applications **[3]**
6/12 . . . Cooking devices **[3]**
6/14 . . . Tools, e.g. nozzles, rollers, calenders **[3]**
6/16 . . Furnaces having endless cores (H05B 6/34 takes precedence) **[3]**
6/18 . . . having melting basin **[3]**
6/20 . . . having melting channel only **[3]**
6/22 . . Furnaces without an endless core (H05B 6/34 takes precedence) **[3]**
6/24 . . . Crucible furnaces (H05B 6/30 takes precedence) **[3]**
6/26 . . . . using vacuum or particular gas atmosphere **[3]**
6/28 . . . . Protective systems **[3]**
6/30 . . . Arrangements for remelting or zone melting **[3]**
6/32 . . . Arrangements for simultaneous levitation and heating **[3]**
6/34 . . Arrangements for circulation of melts **[3]**
6/36 . . Coil arrangements **[3]**
6/38 . . . specially adapted for fitting into hollow spaces of workpieces **[3]**
6/40 . . . Establishing desired heat distribution, e.g. to heat particular parts of workpieces **[3]**
6/42 . . . Cooling of coils **[3]**
6/44 . . . having more than one coil or coil segment **[3]**
6/46 . Dielectric heating (H05B 6/64 take precedence) **[3]**
6/48 . . Circuits **[3]**
6/50 . . . for monitoring or control **[3]**
6/52 . . Feed lines **[3]**
6/54 . . Electrodes **[3]**
6/56 . . . Rolling electrodes **[3]**
6/58 . . . "sewing machine" type **[3]**
6/60 . . Arrangements for continuous movement of material **[3]**
6/62 . . Apparatus for specific applications **[3]**
6/64 . Heating using microwaves **[3]**
6/66 . . Circuits **[3]**
6/68 . . . for monitoring or control **[3]**
6/70 . . Feed lines **[3]**
6/72 . . Radiators or aerials **[3]**
6/74 . . Mode transformers or mode stirrers **[3]**
6/76 . . Prevention of microwave leakage, e.g. door sealings **[3]**
6/78 . . Arrangements for continuous movement of material **[3]**
6/80 . . Apparatus for specific applications (stoves or ranges F24C 7/02) **[3]**

7/00 **Heating by electric discharge** (electron beam or ion beam tubes for localised treatment of objects H01J 37/30; plasma torches H05H 1/26)
7/02 . Details
7/06 . . Electrodes
7/07 . . . designed to melt in use **[2]**
7/08 . . . non-consumable **[2]**
7/085 . . . . mainly consisting of carbon **[2]**
7/09 . . . . . Self-baking electrodes **[2]**
7/10 . . Mountings, supports, terminals, or arrangements for feeding or guiding electrodes **[2]**
7/101 . . . Mountings, supports, or terminals at head of electrode, i.e. at the end remote from the arc **[2]**
7/102 . . . . specially adapted for consumable electrodes **[2]**
7/103 . . . Mountings, supports, or terminals with jaws (H05B 7/101 takes precedence) **[2]**
7/105 . . . . comprising more than two jaws equally spaced along circumference, e.g. ring holders **[2]**
7/107 . . . specially adapted for self-baking electrodes **[2]**
7/109 . . . Feeding arrangements (H05B 7/107 takes precedence; where the electrode movement is a part of a closed loop for automatic control of power H05B 7/148) **[2]**
7/11 . . Arrangements for conducting current to the electrode terminals (non-insulated conductors or conductive bodies in general H01B 5/00; insulated conductors or cables in general H01B 7/00) **[2]**
7/12 . . Arrangements for cooling, sealing, or protecting electrodes **[2]**
7/14 . . Arrangements or methods for connecting successive electrode sections **[2]**
7/144 . . Power supplies specially adapted for heating by electric discharge; Automatic control of power, e.g. by positioning of electrodes (circuit arrangements for supplying electric power in general H02J) **[2]**
7/148 . . . Automatic control of power (electrode feeding arrangements H05B 7/109; automatic feeding or moving of electrodes for spot or seam welding or cutting B23K 9/12; disposition of electrodes in or on furnaces F27D 11/10; control of position in general G05D 3/00; regulating electric characteristics of arcs in general G05F 1/02; regulating electric power in general G05F 1/66) **[2]**
7/152 . . . . by electromechanical means for positioning of electrodes **[2]**
7/156 . . . . by hydraulic or pneumatic means for positioning of electrodes **[2]**
7/16 . Heating by glow discharge
7/18 . Heating by arc discharge
7/20 . . Direct heating by arc discharge, i.e. where at least one end of the arc directly acts on the material to be heated, including additional resistance heating by arc current flowing through the material to be heated **[2]**
7/22 . . Indirect heating by arc discharge **[2]**

11/00 **Heating by combined application of processes covered by two or more of groups H05B 3/00 to H05B 7/00** (H05B 7/20 takes precedence)

Lighting

31/00 **Electric arc lamps** (regulating electric characteristics of arcs G05F 1/02; with non-consumable electrodes H01J 61/00)
31/02 . Details
31/04 . . Housings
31/06 . . Electrodes
31/08 . . . Carbon electrodes
31/10 . . . . Cored carbon electrodes
31/12 . . . . Beck-effect electrodes
31/14 . . . Metal electrodes
31/16 . . . Apparatus or processes specially adapted for manufacturing electrodes
31/18 . . Mountings for electrodes; Electrode feeding devices
31/20 . . . Mechanical arrangements for feeding electrodes
31/22 . . . Electromagnetic arrangements for feeding electrodes
31/24 . . Cooling arrangements
31/26 . . Influencing the shape of arc discharge by gas blowing devices
31/28 . . Influencing the shape of arc discharge by magnetic means
31/30 . . Starting; Igniting
31/32 . . Switching-off
31/34 . . Indicating consumption of electrodes
31/36 . having two electrodes in line
31/38 . . specially adapted for ac
31/40 . having two electrodes at an angle
31/42 . . specially adapted for ac
31/44 . having two parallel electrodes
31/46 . . specially adapted for ac
31/48 . having more than two electrodes
31/50 . . specially adapted for ac
31/52 . . . electrodes energised from different phases of the supply

33/00 **Electroluminescent light sources** (discharge lamps H01J 61/00 to H01J 65/00; semi-conductor devices with at least one particular jump barrier or surface barrier specially adapted for light emission H01L 27/15, H01L 33/00; organic light emitting devices H01L 27/32, H01L 51/50; lasers H01S 3/00, H01S 5/00; compositions per se, see the relevant subclasses) **[1,8]**
33/02 . Details
33/04 . . Sealing arrangements
33/06 . . Electrode terminals
33/08 . . Circuit arrangements not adapted to a particular application
33/10 . Apparatus or processes specially adapted to the manufacture of electroluminescent light sources
33/12 . Light sources with substantially two-dimensional radiating surfaces
33/14 . . characterised by the chemical or physical composition or the arrangement of the electroluminescent material
33/18 . . characterised by the nature or concentration of the activator
33/20 . . characterised by the chemical or physical composition or the arrangement of the material in which the electroluminescent material is embedded
33/22 . . characterised by the chemical or physical composition or the arrangement of auxiliary dielectric or reflective layers
33/24 . . . of metallic reflective layers (H05B 33/26 takes precedence)
33/26 . . characterised by the composition or arrangement of the conductive material used as an electrode
33/28 . . . of translucent electrodes

35/00 **Electric light sources using a combination of different types of light generation**

37/00 **Circuit arrangements for electric light sources in general**
37/02 . Controlling
37/03 . Detecting lamp failure
37/04 . . Circuits providing for substitution of the light source in case of its failure

39/00 **Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application**
39/02 . Switching-on, e.g. with predetermined rate of increase of lighting current
39/04 . Controlling
39/06 . . Switching arrangements, e.g. from series operation to parallel operation
39/08 . . by shifting phase of trigger voltage applied to gas-filled controlling tubes
39/09 . in which the lamp is fed by pulses
39/10 . Circuits providing for substitution of the light source in case of its failure

41/00 **Circuit arrangements or apparatus for igniting or operating discharge lamps**
41/02 . Details
41/04 . . Starting switches
41/06 . . . thermal only
41/08 . . . . heated by glow discharge
41/10 . . . magnetic only
41/12 . . . combined thermal and magnetic
41/14 . Circuit arrangements
41/16 . . in which the lamp is fed by dc or by low-frequency ac, e.g. by 50 cycles/sec ac (H05B 41/26 takes precedence)
41/18 . . . having a starting switch
41/19 . . . . for lamps having an auxiliary starting electrode
41/20 . . . having no starting switch
41/22 . . . . for lamps having an auxiliary starting electrode
41/23 . . . . for lamps not having an auxiliary starting electrode
41/231 . . . . . for high-pressure lamps
41/232 . . . . . for low-pressure lamps
41/233 . . . . . using resonance circuitry
41/234 . . . . . to eliminate stroboscopic effects, e.g. feeding two lamps with different phases
41/24 . . in which the lamp is fed by high-frequency ac (H05B 41/26 takes precedence)
41/26 . . in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc
41/28 . . . using static converters
41/282 . . . . with semiconductor devices (H05B 41/288, H05B 41/295 take precedence) **[7]**
41/285 . . . . . Arrangements for protecting lamps or circuits against abnormal operating conditions **[7]**

41/288 . . . . with semiconductor devices and specially adapted for lamps without preheating electrodes, e.g. for high-intensity discharge lamps, high-pressure mercury or sodium lamps or low-pressure sodium lamps **[7]**
41/292 . . . . . Arrangements for protecting lamps or circuits against abnormal operating conditions **[7]**
41/295 . . . . with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps **[7]**
41/298 . . . . . Arrangements for protecting lamps or circuits against abnormal operating conditions **[7]**
41/30 . . in which the lamp is fed by pulses, e.g. flash lamp
41/32 . . . for single flash operation
41/34 . . . to provide a sequence of flashes
41/36 . . Controlling
41/38 . . . Controlling the intensity of light
41/39 . . . . continuously
41/391 . . . . . using saturable magnetic devices
41/392 . . . . . using semiconductor devices, e.g. thyristor
41/40 . . . . discontinuously
41/42 . . . . . in two steps only
41/44 . . . for providing special optical effects, e.g. progressive motion of light
41/46 . . Circuits providing for substitution in case of failure of the lamp

43/00 Circuit arrangements for light sources, not otherwise provided for (H05B 37/00 takes precedence)
43/02 . for light sources using a charge of combustible material

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H05C ELECTRIC CIRCUITS OR APPARATUS SPECIALLY DESIGNED FOR USE IN EQUIPMENT FOR KILLING, STUNNING, ENCLOSING OR GUIDING LIVING BEINGS (stationary means for catching or killing insects by electric means A01M 1/22; apparatus for the destruction of noxious animals, other than insects, by electricity A01M 19/00; electric traps for animals A01M 23/38; slaughtering or stunning by electric current A22B 3/06)

1/00 Circuits or apparatus for generating electric shock effects
1/02 . providing continuous feeding of dc or ac voltage
1/04 . providing pulse voltages
1/06 . . operating only when touched

3/00 Other circuits or apparatus

H05F STATIC ELECTRICITY; NATURALLY-OCCURRING ELECTRICITY

(1) This subclass covers methods or arrangements for preventing the formation of electrostatic charges on bodies or for carrying-off these charges after their formation.
(2) This subclass does not cover specific applications of the above-mentioned methods or arrangements. Such arrangements are covered by the relevant subclasses, e.g. arrangements in large containers B65D 90/46.

1/00 Preventing the formation of electrostatic charges
1/02 . by surface treatment

3/00 Carrying-off electrostatic charges (from living beings A61N 1/14)
3/02 . by means of earthing connections
3/04 . by means of spark gaps or other discharge devices (devices providing for corona discharge H01T 19/00) **[2]**
3/06 . by means of ionising radiation

7/00 Use of naturally-occurring electricity

H05G X-RAY TECHNIQUE (apparatus for radiation diagnosis A61B 6/00; X-ray therapy A61N; testing by X-rays G01N; apparatus for X-ray photography G03B; filters, conversion screens, microscopes G21K; X-ray tubes H01J 35/00; TV systems having X-ray input H04N 5/321)

1/00 X-ray apparatus involving X-ray tubes; Circuits therefor
1/02 . Constructional details
1/04 . . Mounting the X-ray tube within a closed housing
1/06 . . . X-ray tube and at least part of the power supply apparatus being mounted within the same housing
1/08 . Electrical details
1/10 . . Power supply arrangements for feeding the X-ray tube
1/12 . . . with dc or rectified single-phase ac
1/14 . . . with single-phase low-frequency ac
1/16 . . . . Reducing the peak-inverse voltage
1/18 . . . with polyphase ac of low frequency
1/20 . . . with high-frequency ac; with pulse trains
1/22 . . . with single pulses
1/24 . . . . Obtaining pulses by using energy storage devices (pulse generators H03K)

1/26 . . Measuring, controlling, protecting (measuring electric values G01R; measuring X-ray intensity G01T)
1/28 . . . Measuring or recording actual exposure time; Counting number of exposures; Measuring required exposure time
1/30 . . . Controlling
1/32 . . . . Supply voltage of the X-ray apparatus or tube (regulating supply without reference to operating characteristics of the apparatus G05F)
1/34 . . . . Anode current, heater current, heater voltage of X-ray tube (regulating supply without reference to operating characteristics of the apparatus G05F)
1/36 . . . . Temperature of anode; Brightness of image
1/38 . . . . Exposure time
1/40 . . . . . using adjustable time switch
1/42 . . . . . using arrangements for switching when a predetermined dose of radiation has been applied, e.g. in which the switching instant is determined by measuring the electrical energy supplied to the tube
1/44 . . . . . in which the switching instant is determined by measuring the amount of radiation directly
1/46 . . . . Combined control of different quantities, e.g. exposure time as well as voltage or current
1/48 . . . . Compensating the voltage drop occurring at the instant of switching-on of the apparatus (regulating supply without reference to operating characteristics of the apparatus G05F)
1/50 . . . . Passing the tube current only during a restricted portion of the voltage waveform
1/52 . . . . Target size or shape; Direction of electron beam, e.g. in tubes with one anode and more than one cathode
1/54 . . . Protecting (overload protection combined with control H05G 1/46)
1/56 . . Switching-on; Switching-off
1/58 . . Switching arrangements for changing-over from one mode of operation to another, e.g. from radioscopy to radiography, from radioscopy to irradiation
1/60 . . Circuit arrangements for obtaining a series of X-ray photographs or for X-ray cinematography
1/61 . . . for obtaining stereoscopic photographs **[5]**
1/62 . . Circuit arrangements for obtaining X-ray photography at predetermined instants in the movement of an object, e.g. X-ray stroboscopy
1/64 . . Circuit arrangements for X-ray apparatus incorporating electronic image converters, e.g. image intensifiers **[5]**
1/66 . . Circuit arrangements for X-ray tubes with target movable relatively to the anode
1/68 . . Circuit arrangements for Lilienfeld tubes; Circuit arrangements for gas-filled X-ray tubes
1/70 . . Circuit arrangements for X-ray tubes with more than one anode; Circuit arrangements for apparatus comprising more than one X-ray tube

2/00 Apparatus or processes specially adapted for producing X-rays, not involving X-ray tubes, e.g. involving generation of a plasma (X-ray lasers H01S 4/00; plasma technique in general H05H) **[5]**

H05H PLASMA TECHNIQUE (ion-beam tubes H01J 27/00; magnetohydrodynamic generators H02K 44/08; producing X-rays involving plasma generation H05G 2/00); **PRODUCTION OF ACCELERATED ELECTRICALLY- CHARGED PARTICLES OR OF NEUTRONS** (obtaining neutrons from radioactive sources G21, e.g. G21B, G21C, G21G); **PRODUCTION OR ACCELERATION OF NEUTRAL MOLECULAR OR ATOMIC BEAMS** (atomic clocks G04F 5/14; devices using stimulated emission H01S; frequency regulation by comparison with a reference frequency determined by energy levels of molecules, atoms, or subatomic particles H03L 7/26)

(1) This subclass covers:
(a) generating or handling plasma;
(b) devices not covered by subclass H01J and in which electrons, ion beams, or neutral particles are accelerated to high energies;
(c) devices for producing neutral particle beams; **[3]**
(d) targets for (a), (b), or (c). **[3]**
(2) Attention is drawn to subclass G21K. **[3]**

Subclass index

1/00 **Generating plasma**; **Handling plasma** (application of plasma technique in thermonuclear fusion reactors G21B 1/00)
1/02 . Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma (electron optics H01J)
1/03 . . using electrostatic fields **[3]**
1/04 . . using magnetic fields substantially generated by the discharge in the plasma
1/06 . . . Longitudinal pinch devices
1/08 . . . Theta pinch devices
1/10 . . using applied magnetic fields only
1/11 . . . using cusp configuration (H05H 1/14 takes precedence) **[3]**
1/12 . . . wherein the containment vessel forms a closed loop, e.g. stellarator
1/14 . . . wherein the containment vessel is straight and has magnetic mirrors
1/16 . . using applied electric and magnetic fields
1/18 . . . wherein the fields oscillate at a very high frequency, e.g. in the microwave range
1/20 . . Ohmic heating
1/22 . . for injection heating
1/24 . Generating plasma **[2]**
1/26 . . Plasma torches **[2]**
1/28 . . . Cooling arrangements **[3]**
1/30 . . . using applied electromagnetic fields, e.g. high-frequency or microwave energy (H05H 1/28 takes precedence) **[3]**
1/32 . . . using an arc (H05H 1/28 takes precedence) **[3]**
1/34 . . . . Details, e.g. electrodes, nozzles **[3]**
1/36 . . . . . Circuit arrangements (H05H 1/38, H05H 1/40 take precedence) **[3]**
1/38 . . . . . Guiding or centering of electrodes **[3]**
1/40 . . . . . using applied magnetic fields, e.g. for focusing or rotating the arc **[3]**
1/42 . . . . with provisions for introducing materials into the plasma, e.g. powder, liquid (electrostatic spraying, spraying apparatus with means for charging the spray electrically B05B 5/00) **[3]**
1/44 . . . . using more than one torch **[3]**
1/46 . . using applied electromagnetic fields, e.g. high frequency or microwave energy (H05H 1/26 takes precedence) **[3]**
1/48 . . using an arc (H05H 1/26 takes precedence) **[3]**
1/50 . . . and using applied magnetic fields, e.g. for focusing or rotating the arc **[3]**
1/52 . . using exploding wires or spark gaps (H05H 1/26 takes precedence; spark gaps in general H01T) **[3]**
1/54 . Plasma accelerators **[3]**

3/00 **Production or acceleration of neutral particle beams, e.g. molecular or atomic beams [3]**
3/02 . Molecular or atomic-beam generation, e.g. resonant beam generation (gas masers H01S 1/06) **[3]**
3/04 . Acceleration by electromagnetic wave pressure **[3]**
3/06 . Generating neutron beams (targets for producing nuclear reactions H05H 6/00; neutron sources G21G 4/02) **[5]**

5/00 **Direct voltage accelerators**; **Accelerators using single pulses** (H05H 3/06 takes precedence) **[5]**
5/02 . Details (targets for producing nuclear reactions H05H 6/00) **[3]**
5/03 . . Accelerating tubes (vessels or containers of electric discharge tubes with improved potential distribution over surface of vessel H01J 5/06; shields of X-ray tubes associated with vessels or containers H01J 35/16) **[4]**
5/04 . energised by electrostatic generators, e.g. by van de Graaff generator **[4]**
5/06 . Tandem accelerators; Multi-stage accelerators
5/08 . Particle accelerators using step-up transformers, e.g. resonance transformers **[4]**

6/00 **Targets for producing nuclear reactions** (supports for targets or objects to be irradiated G21K 5/08) **[3]**

7/00 **Details of devices of the types covered by groups H05H 9/00 to H05H 13/00** (targets for producing nuclear reactions H05H 6/00) **[3]**
7/02 . Circuits or systems for supplying or feeding radio-frequency energy (radio-frequency generators H03B)
7/04 . Magnet systems; Energisation thereof
7/06 . Two-beam arrangements; Multi-beam arrangements
7/08 . Arrangements for injecting particles into orbits
7/10 . Arrangements for ejecting particles from orbits
7/12 . Arrangements for varying final energy of beam
7/14 . Vacuum chambers (H05H 5/03 takes precedence) **[4]**
7/16 . . of the waveguide type **[4]**
7/18 . . Cavities; Resonators **[4]**
7/20 . . . with superconductive walls **[4]**
7/22 . Details of linear accelerators, e.g. drift tubes (H05H 7/02 to H05H 7/20 take precedence) **[4]**

9/00 **Linear accelerators** (H05H 11/00 takes precedence)
9/02 . Travelling-wave linear accelerators
9/04 . Standing-wave linear accelerators

11/00 **Magnetic induction accelerators, e.g. betatrons**
11/02 . Air-cored betatrons
11/04 . Biased betatrons

13/00 **Magnetic resonance accelerators**; **Cyclotrons**
13/02 . Synchrocyclotrons, i.e. frequency-modulated cyclotrons
13/04 . Synchrotrons
13/06 . Air-cored magnetic resonance accelerators
13/08 . Alternating-gradient magnetic resonance accelerators
13/10 . Accelerators comprising one or more linear accelerating sections and bending magnets or the like to return the charged particles in a trajectory parallel to the first accelerating section, e.g. microtrons **[4]**

15/00 **Methods or devices for acceleration of charged particles not otherwise provided for [4]**

H05K **PRINTED CIRCUITS**; **CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS**; **MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS** (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film circuits H01L 27/01, H01L 27/13; non-printed means for electric connections to or between printed circuits H01R; casings for, or constructional details of, particular types of apparatus, see the relevant subclasses; processes involving only a single technical art, e.g. heating, spraying, for which provision exists elsewhere, see the relevant classes)

(1) This subclass covers:
- combinations of a radio or television receiver with apparatus having a different main function;
- printed circuits structurally associated with non-printed electric components.

(2) In this subclass, the following expression is used with the meaning indicated:
- "printed circuits" covers all kinds of mechanical constructions of circuits that consist of an insulating base or support carrying the conductor and are combined structurally with the conductor throughout their length, especially in a two-dimensional plane, the conductors of which are secured to the base in a non-dismountable manner, and also covers the processes or apparatus for manufacturing such constructions, e.g. forming the circuit by mechanical or chemical treatment of a conductive foil, paste, or film on an insulating support.

Subclass index

1/00 **Printed circuits** (assemblies of a plurality of individual semiconductor or solid state devices H01L 25/00; devices consisting of a plurality of solid state components formed in or on a common substrate, e.g. integrated circuits, thin-film or thick-film circuits, H01L 27/00)

1/02 . Details

1/03 . . Use of materials for the substrate **[3]**

1/05 . . . Insulated metal substrate **[3]**

1/09 . . Use of materials for the metallic pattern **[3]**

1/11 . . Printed elements for providing electric connections to or between printed circuits **[3]**

1/14 . . Structural association of two or more printed circuits (providing electric connection to or between printed circuits H05K 1/11, H01R 12/00)

1/16 . incorporating printed electric components, e.g. printed resistor, capacitor, inductor

1/18 . Printed circuits structurally associated with non-printed electric components (H05K 1/16 takes precedence)

3/00 **Apparatus or processes for manufacturing printed circuits** (photomechanical production of textured or patterned surfaces, materials or originals therefor, apparatus specially adapted therefor, in general G03F; involving the manufacture of semiconductor devices H01L) **[3]**

3/02 . in which the conductive material is applied to the surface of the insulating support and is thereafter removed from such areas of the surface which are not intended for current conducting or shielding

3/04 . . the conductive material being removed mechanically, e.g. by punching

3/06 . . the conductive material being removed chemically or electrolytically, e.g. by photo-etch process

3/07 . . . being removed electrolytically **[3]**

3/08 . . the conductive material being removed by electric discharge, e.g. by spark erosion

3/10 . in which conductive material is applied to the insulating support in such a manner as to form the desired conductive pattern

3/12 . . using printing techniques to apply the conductive material

3/14 . . using spraying techniques to apply the conductive material

3/16 . . . by cathodic sputtering

3/18 . . using precipitation techniques to apply the conductive material

3/20 . . by affixing prefabricated conductor pattern

3/22 . Secondary treatment of printed circuits

3/24 . . Reinforcing of the conductive pattern

3/26 . . Cleaning or polishing of the conductive pattern

3/28 . . Applying non-metallic protective coatings

3/30 . Assembling printed circuits with electric components, e.g. with resistor

3/32 . . electrically connecting electric components or wires to printed circuits

3/34 . . . by soldering

3/36 . Assembling printed circuits with other printed circuits

3/38 . Improvement of the adhesion between the insulating substrate and the metal **[3]**

3/40 . Forming printed elements for providing electric connections to or between printed circuits **[3]**

3/42 . . Plated through-holes **[3]**

3/44 . Manufacturing insulated metal core circuits **[3]**

3/46 . Manufacturing multi-layer circuits **[3]**

5/00 **Casings, cabinets or drawers for electric apparatus** (in general A47B; radio receiver cabinets H04B 1/08; television receiver cabinets H04N 5/64)

5/02 . Details

5/03 . . Covers
5/04 . Metal casings
5/06 . Hermetically-sealed casings

7/00 Constructional details common to different types of electric apparatus (casings, cabinets, drawers H05K 5/00)

7/02 . Arrangements of circuit components or wiring on supporting structure
7/04 . . on conductive chassis
7/06 . . on insulating boards
7/08 . . . on perforated boards
7/10 . . Plug-in assemblages of components
7/12 . . Resilient or clamping means for holding component to structure (holding two-part couplings together H01R 13/00)
7/14 . Mounting supporting structure in casing or on frame or rack
7/16 . . on hinges or pivots
7/18 . Construction of rack or frame
7/20 . Modifications to facilitate cooling, ventilating, or heating

9/00 Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an aerial H01Q 17/00)

10/00 Arrangements for improving the operating reliability of electronic equipment, e.g. by providing a similar stand-by unit

Note

Attention is drawn to the following appropriate places:
[6]

G05B	9/03	Electric redundant control systems
G06F	11/16	Error detection or correction of data by redundancy in digital computer hardware
G08B	29/16	Security signalling or alarm systems
H02H	3/05	Redundant emergency protective circuit arrangements
H02J	3/38	Arrangements for parallelly feeding a single network
H02J	9/04	Circuit arrangements with stand-by power supply
H03K	19/003	Modifications for increasing the reliability of logic circuits or inverting circuits
H03K	19/007	Fail-safe logic circuits or inverting circuits
H03L	7/07	Redundant clock signal generation in generators of electronic oscillations or pulses
H04B	1/74	Transmission systems using redundant channels or apparatus
H04L	1/22	Redundant apparatus for increasing reliability of arrangements used for the transmission of digital information.

11/00 Combinations of a radio or television receiver with apparatus having a different main function

11/02 . with vehicles

13/00 Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components

13/02 . Feeding of components (in general B65G)
13/04 . Mounting of components
13/06 . Wiring by machine
13/08 . Monitoring manufacture of assemblages

H99 SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

H99Z SUBJECT MATTER NOT OTHERWISE PROVIDED FOR IN THIS SECTION [8]

Note

This subclass covers subject matter that: **[8]**
(a) is not provided for, but is most closely related to, the subject matter covered by the subclasses of this section, and **[8]**
(b) is not explicitly covered by any subclass of another section. **[8]**

99/00 Subject matter not otherwise provided for in this section [8]