SECTION H — ELECTRICITY

H01 BASIC ELECTRIC ELEMENTS

Note(s) [7]

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".

H01B CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING OR DIELECTRIC PROPERTIES (selection for magnetic properties H01F 1/00; waveguides H01P)

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) **[1, 4, 2006.01]**

Note(s) [3]

Groups H01B 1/14-H01B 1/24 take precedence over groups H01B 1/02-H01B 1/06.

1/02 • mainly consisting of metals or alloys **[1, 2006.01]**
1/04 • mainly consisting of carbon-silicon compounds, carbon, or silicon **[1, 2006.01]**
1/06 • mainly consisting of other non-metallic substances **[1, 2006.01]**
1/08 • • oxides **[1, 2006.01]**
1/10 • • sulfides **[1, 2006.01]**
1/12 • • organic substances **[3, 2006.01]**
1/14 • Conductive material dispersed in non-conductive inorganic material **[3, 2006.01]**
1/16 • • the conductive material comprising metals or alloys **[3, 2006.01]**
1/18 • • the conductive material comprising carbon-silicon compounds, carbon, or silicon **[3, 2006.01]**
1/20 • Conductive material dispersed in non-conductive organic material **[3, 2006.01]**
1/22 • • the conductive material comprising metals or alloys **[3, 2006.01]**
1/24 • • the conductive material comprising carbon-silicon compounds, carbon, or silicon **[3, 2006.01]**

3/00 Insulators or insulating bodies characterised by the insulating materials; Selection of materials for their insulating or dielectric properties [1, 2006.01]

3/02 • mainly consisting of inorganic substances **[1, 2006.01]**
3/04 • • mica **[1, 2006.01]**
3/06 • • asbestos **[1, 2006.01]**
3/08 • • quartz; glass; glass wool; slag wool; vitreous enamels **[1, 2006.01]**
3/10 • • metallic oxides (ceramics H01B 3/12) **[1, 2006.01]**
3/12 • • ceramics **[1, 2006.01]**
3/14 • • cements **[1, 2006.01]**
3/16 • • gases **[1, 2006.01]**
3/18 • mainly consisting of organic substances **[1, 2006.01]**
3/20 • • liquids, e.g. oils (silicone oils H01B 3/46) **[1, 2006.01]**
3/22 • • • hydrocarbons **[1, 2006.01]**
3/24 • • • containing halogen in the molecules, e.g. halogenated oils **[1, 2006.01]**
3/26 • • asphalts; bitumens; pitches **[1, 2006.01]**
3/28 • • natural or synthetic rubbers **[1, 2006.01]**
3/30 • • plastics; resins; waxes **[1, 2006.01]**

Note(s) [2006.01]

Group H01B 3/47 takes precedence over groups H01B 3/32-H01B 3/46.

3/32 • • • natural resins **[1, 2006.01]**
3/34 • • • waxes (silicone waxes H01B 3/46) **[1, 2006.01]**
3/36 • • • condensation products of phenols with aldehydes or ketones **[1, 2006.01]**

3/38 • • • condensation products of aldehydes with amines or amides **[1, 2006.01]**
3/40 • • • epoxy resins **[1, 2006.01]**
3/42 • • • polyesters; polyethers; polyacetals **[1, 2006.01]**
3/44 • • • vinyl resins; acrylic resins (silicones H01B 3/46) **[1, 2006.01]**
3/46 • • • silicones **[1, 2006.01]**
3/47 • • • fibre-reinforced plastics, e.g. glass-reinforced plastics **[2006.01]**
3/48 • • fibrous materials (fibre-reinforced plastics H01B 3/47) **[1, 2006.01]**
3/50 • • • fabric **[1, 2006.01]**
3/52 • • • wood; paper; pressboard (insulating paper per se D21H 27/12) **[1, 2006.01]**
3/54 • • • hard paper; hard fabrics **[1, 2006.01]**
3/56 • • gases **[1, 2006.01]**

Note(s)

Group H01B 12/00 takes precedence over groups H01B 5/00-H01B 11/00.

5/00 Non-insulated conductors or conductive bodies characterised by their form [1, 2006.01]

5/02 • Single bars, rods, wires or strips; Bus-bars **[1, 7, 2006.01]**
5/04 • • wound or coiled **[1, 2006.01]**
5/06 • Single tubes **[1, 2006.01]**
5/08 • Several wires or the like stranded in the form of a rope **[1, 2006.01]**
5/10 • • stranded around a space, insulating material, or dissimilar conducting material **[1, 2006.01]**
5/12 • Braided wires or the like **[1, 2006.01]**
5/14 • comprising conductive layers or films on insulating-supports **[1, 2006.01]**
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) **[1, 3, 2006.01]**

7/00 Insulated conductors or cables characterised by their form [1, 2006.01]

7/02 • Disposition of insulation **[1, 2006.01]**
7/04 • Flexible cables, conductors, or cords, e.g. trailing cables **[1, 2006.01]**
7/06 • Extensible conductors or cables, e.g. self-coiling cords **[1, 2006.01]**
7/08 • Flat or ribbon cables **[1, 2006.01]**
7/10 • Contact cables, i.e. having conductors which may be brought into contact by distortion of the cable **[1, 2006.01]**
7/12 • Floating cables **[1, 2006.01]**
7/14 • Submarine cables **[1, 2006.01]**
7/16 • Rigid-tube cables **[1, 2006.01]**
7/17 • Protection against damage caused by external factors, e.g. sheaths or armouring **[7, 2006.01]**
7/18 • • by wear, mechanical force or pressure **[1, 7, 2006.01]**
7/20 • • • Metal tubes, e.g. lead sheaths **[1, 7, 2006.01]**
7/22 • • • Metal wires or tapes, e.g. made of steel **[1, 7, 2006.01]**
7/24 • • • Devices affording localised protection against mechanical force or pressure **[1, 7, 2006.01]**
7/26 • • • Reduction of losses in sheaths or armouring **[1, 7, 2006.01]**
7/28 • • by moisture, corrosion, chemical attack or weather **[1, 7, 2006.01]**
7/282 • • • Preventing penetration of fluid into conductor or cable **[7, 2006.01]**
7/285 • • • • by completely or partially filling interstices in the cable **[7, 2006.01]**
7/288 • • • • • using hygroscopic material or material swelling in the presence of liquid **[7, 2006.01]**
7/29 • • by extremes of temperature or by flame (H01B 7/42 takes precedence) **[7, 2006.01]**
7/295 • • • using material resistant to flame **[7, 2006.01]**
7/30 • with arrangements for reducing conductor losses when carrying ac, e.g. due to skin effect **[1, 2006.01]**
7/32 • with arrangements for indicating defects, e.g. breaks or leaks **[1, 2006.01]**
7/36 • with distinguishing or length marks **[1, 2006.01]**
7/38 • with arrangements for facilitating removal of insulation **[7, 2006.01]**
7/40 • with arrangements for facilitating mounting or securing **[7, 2006.01]**
7/42 • with arrangements for heat dissipation or conduction **[7, 2006.01]**

9/00 Power cables [1, 2006.01]

9/02 • with screens or conductive layers, e.g. for avoiding large potential gradients **[1, 2006.01]**
9/04 • Concentric cables **[1, 2006.01]**
9/06 • Gas-pressure cables; Oil-pressure cables; Cables for use in conduits under fluid pressure **[1, 2006.01]**

11/00 Communication cables or conductors [1, 2006.01]

11/02 • Cables with twisted pairs or quads **[1, 2006.01]**
11/04 • • with pairs or quads mutually positioned to reduce cross-talk **[1, 2006.01]**
11/06 • • with means for reducing effects of electromagnetic or electrostatic disturbances, e.g. screens **[1, 2006.01]**
11/08 • • • Screens specially adapted for reducing cross-talk **[1, 2006.01]**
11/10 • • • Screens specially adapted for reducing interference from external sources **[1, 2006.01]**
11/12 • • Arrangements for exhibiting specific transmission characteristics **[1, 2006.01]**
11/14 • • • Continuously inductively loaded cables, e.g. Krarup cables **[1, 2006.01]**
11/16 • • • Cables, e.g. submarine cables, with coils or other devices incorporated during cable manufacture **[1, 2006.01]**
11/18 • Coaxial cables; Analogous cables having more than one inner conductor within a common outer conductor **[1, 2006.01]**
11/20 • • Cables having a multiplicity of coaxial lines **[1, 3, 2006.01]**
11/22 • Cables including at least one electrical conductor together with optical fibres **[4, 2006.01]**

12/00 Superconductive or hyperconductive conductors, cables or transmission lines (superconductors characterised by the ceramic-forming technique or the ceramic composition C04B 35/00) **[2, 4, 2006.01]**

12/02 • characterised by their form **[4, 2006.01]**

Note(s) [4]

Group H01B 12/12 takes precedence over groups H01B 12/04-H01B 12/10.

12/04 • • Single wire **[4, 2006.01]**
12/06 • • Films or wires on bases or cores **[4, 2006.01]**
12/08 • • Stranded or braided wires **[4, 2006.01]**

12/10 • • Multi-filaments embedded in normal conductors **[4, 2006.01]**
12/12 • • Hollow conductors **[4, 2006.01]**
12/14 • characterised by the disposition of thermal insulation **[4, 2006.01]**
12/16 • characterised by cooling **[4, 2006.01]**

13/00 Apparatus or processes specially adapted for manufacturing conductors or cables [1, 2006.01]
13/004 • for manufacturing rigid-tube cables **[7, 2006.01]**
13/008 • for manufacturing extensible conductors or cables **[7, 2006.01]**
13/012 • for manufacturing wire harnesses **[7, 2006.01]**
13/016 • for manufacturing co-axial cables (applying discontinuous insulation H01B 13/20) **[7, 2006.01]**
13/02 • Stranding-up **[1, 2006.01]**
13/04 • • Mutually-positioning pairs or quads to reduce cross-talk **[1, 2006.01]**
13/06 • Insulating conductors or cables (H01B 13/32 takes precedence) **[1, 4, 2006.01]**
13/08 • • by winding **[1, 2006.01]**
13/10 • • by longitudinal lapping **[1, 2006.01]**
13/12 • • by applying loose fibres **[1, 2006.01]**
13/14 • • by extrusion **[1, 2006.01]**
13/16 • • by passing through, or dipping in, a liquid bath; by spraying **[1, 2006.01]**
13/18 • • Applying discontinuous insulation, e.g. discs, beads **[1, 2006.01]**
13/20 • • • for concentric or coaxial cables **[1, 2006.01]**
13/22 • Sheathing; Armouring; Screening; Applying other protective layers (H01B 13/32 takes precedence) **[1, 4, 2006.01]**
13/24 • • by extrusion **[1, 2006.01]**
13/26 • • by winding, braiding or longitudinal lapping **[1, 2006.01]**
13/28 • Applying continuous inductive loading, e.g. Krarup loading **[1, 2006.01]**
13/30 • Drying; Impregnating (H01B 13/32 takes precedence) **[1, 4, 2006.01]**
13/32 • Filling or coating with impervious material **[4, 2006.01]**
13/34 • for marking conductors or cables **[7, 2006.01]**

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) **[1, 2006.01]**

17/00 Insulators or insulating bodies characterised by their form [1, 2006.01]
17/02 • Suspension insulators; Strain insulators **[1, 2006.01]**
17/04 • • Chains; Multiple chains **[1, 2006.01]**
17/06 • • Fastening of insulator to support, to conductor, or to adjoining insulator **[1, 2006.01]**
17/08 • • • by cap-and-bolt **[1, 2006.01]**
17/10 • • • by intermediate link **[1, 2006.01]**
17/12 • • Special features of strain insulators **[1, 2006.01]**
17/14 • Supporting insulators (pin insulators H01B 17/20; apertured insulators H01B 17/24) **[1, 2006.01]**
17/16 • • Fastening of insulators to support, to conductor, or to adjoining insulator **[1, 2006.01]**
17/18 • • for very heavy conductors, e.g. bus-bars, rails **[1, 2006.01]**
17/20 • Pin insulators **[1, 2006.01]**
17/22 • • Fastening of conductors to insulator **[1, 2006.01]**
17/24 • Insulators apertured for fixing by nail, screw, wire, or bar, e.g. diabolo, bobbin **[1, 2006.01]**
17/26 • Lead-in insulators; Lead-through insulators **[1, 2006.01]**
17/28 • • Capacitor type **[1, 2006.01]**
17/30 • • Sealing **[1, 2006.01]**
17/32 • Single insulators consisting of two or more dissimilar insulating bodies **[1, 2006.01]**
17/34 • Insulators containing liquid, e.g. oil **[1, 2006.01]**
17/36 • Insulators having evacuated or gas-filled spaces **[1, 2006.01]**
17/38 • Fittings, e.g. caps; Fastenings therefor **[1, 2006.01]**
17/40 • • Cementless fittings **[1, 2006.01]**
17/42 • Means for obtaining improved distribution of voltage (capacitor-type lead-through insulators H01B 17/28); Protection against arc discharges **[1, 2006.01]**
17/44 • • Structural association of insulators with corona rings **[1, 2006.01]**
17/46 • • Means for providing an external arc-discharge path **[1, 2006.01]**
17/48 • • over chains or other serially-arranged insulators **[1, 2006.01]**
17/50 • with surfaces specially treated for preserving insulating properties, e.g. for protection against moisture, dirt, or the like **[1, 2006.01]**
17/52 • having cleaning devices (H01B 17/54 takes precedence) **[1, 2006.01]**
17/54 • having heating or cooling devices **[1, 2006.01]**
17/56 • Insulating bodies **[1, 2006.01]**
17/58 • • Tubes, sleeves, beads or bobbins through which the conductor passes **[1, 2006.01]**
17/60 • • Composite insulating bodies **[1, 2006.01]**
17/62 • • Insulating-layers or insulating-films on metal bodies **[1, 2006.01]**
17/64 • • with conductive admixtures inserts or layers **[1, 2006.01]**
17/66 • • Joining insulating bodies together, e.g. by bonding **[1, 2006.01]**

19/00 Apparatus or processes specially adapted for manufacturing insulators or insulating bodies [1, 2006.01]
19/02 • Drying; Impregnating **[1, 2006.01]**
19/04 • Treating the surfaces, e.g. applying coatings **[1, 2006.01]**

H01C RESISTORS

Note(s) [2]

1. In this subclass, the following term is used with the meaning indicated:
   • "adjustable" means mechanically adjustable.
2. Variable resistors, the value of which is changed non-mechanically, e.g. by voltage or temperature, are classified in group H01C 7/00.

Subclass index

1/00 Details [1, 2006.01]

1/01 • Mounting; Supporting **[2, 2006.01]**

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, 2006.01]**

1/014 • • the resistor being suspended between, and being supported by, two supporting sections (H01C 1/016 takes precedence) **[2, 2006.01]**

1/016 • • with compensation for resistor expansion or contraction **[2, 2006.01]**

1/02 • Housing; Enclosing; Embedding; Filling the housing or enclosure **[1, 2, 2006.01]**

1/022 • • the housing or enclosure being openable or separable from the resistive element **[2, 2006.01]**

1/024 • • the housing or enclosure being hermetically sealed (H01C 1/028, H01C 1/032, H01C 1/034 take precedence) **[2, 2006.01]**

1/026 • • • with gaseous or vacuum spacing between the resistive element and the housing or casing **[2, 2006.01]**

1/028 • • the resistive element being embedded in insulation with outer enclosing sheath **[2, 2006.01]**

1/03 • • • with powdered insulation **[2, 2006.01]**

1/032 • • plural layers surrounding the resistive element (H01C 1/028 takes precedence) **[2, 2006.01]**

1/034 • • the housing or enclosure being formed as coating or mould without outer sheath (H01C 1/032 takes precedence) **[2, 2006.01]**

1/036 • • • on wound resistive element **[2, 2006.01]**

1/04 • Arrangements of distinguishing marks, e.g. colour coding **[1, 2006.01]**

1/06 • Electrostatic or electromagnetic shielding arrangements **[1, 2006.01]**

1/08 • Cooling, heating, or ventilating arrangements **[1, 2006.01]**

1/082 • • using forced fluid flow **[2, 2006.01]**

1/084 • • using self-cooling, e.g. fins, heat sinks **[2, 2006.01]**

1/12 • Arrangements of current collectors **[1, 2006.01]**

1/125 • • of fluid contacts **[2, 2006.01]**

1/14 • Terminals or tapping points specially adapted for resistors; Arrangements of terminals or tapping points on resistors **[1, 2006.01]**

1/142 • • the terminals or tapping points being coated on the resistive element **[2, 2006.01]**

1/144 • • the terminals or tapping points being welded or soldered **[2, 2006.01]**

1/146 • • the resistive element surrounding the terminal **[2, 2006.01]**

1/148 • • the terminals embracing or surrounding the resistive element (H01C 1/142 takes precedence) **[2, 2006.01]**

1/16 • Resistor networks not otherwise provided for **[1, 2006.01]**

3/00 Non-adjustable metal resistors made of wire or ribbon, e.g. coiled, woven, or formed as grids [1, 2006.01]

3/02 • arranged or constructed for reducing self-induction, capacitance, or variation with frequency **[1, 2006.01]**

3/04 • Iron-filament ballast resistors; Other resistors having variable temperature coefficient **[1, 2006.01]**

3/06 • Flexible or folding resistors, whereby such a resistor can be looped or collapsed upon itself **[2, 2006.01]**

3/08 • Dimension or characteristic of resistive element changing gradually or in discrete steps from one terminal to another **[2, 2006.01]**

3/10 • the resistive element having zig-zag or sinusoidal configuration **[2, 2006.01]**

3/12 • • lying in one plane **[2, 2006.01]**

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-H01C 3/12 take precedence) **[2, 2006.01]**

3/16 • • including two or more distinct wound elements, or two or more winding patterns **[2, 2006.01]**

3/18 • • wound on a flat or ribbon base (H01C 3/16 takes precedence) **[2, 2006.01]**

3/20 • • wound on cylindrical or prismatic base (H01C 3/16 takes precedence) **[2, 2006.01]**

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; magnetic field controlled resistors H01L 43/08; bulk negative resistance effect devices H01L 47/00) **[1, 2, 2006.01]**

7/02 • having positive temperature coefficient **[1, 2006.01]**

7/04 • having negative temperature coefficient **[1, 2006.01]**

7/06 • including means to minimise changes in resistance with changes in temperature **[1, 2006.01]**

7/10 • voltage responsive, i.e. varistors **[1, 6, 2006.01]**

7/102 • • Varistor boundary, e.g. surface layers (H01C 7/12 takes precedence) **[6, 2006.01]**

7/105 • • Varistor cores (H01C 7/12 takes precedence) **[6, 2006.01]**

7/108 • • • Metal oxide **[6, 2006.01]**

7/112 • • • • ZnO type **[6, 2006.01]**

7/115 • • • • Titanium dioxide- or titanate type **[6, 2006.01]**

7/118 • • • Carbide, e.g. SiC type **[6, 2006.01]**

7/12 • • Overvoltage protection resistors; Arresters **[1, 3, 2006.01]**

7/13 • current-responsive **[2, 2006.01]**

Note(s) [2]

Groups H01C 7/02-H01C 7/13 take precedence over groups H01C 7/18-H01C 7/22.

7/18 • comprising a plurality of layers stacked between terminals **[2, 2006.01]**

7/20 • the resistive layer or coating being tapered **[2, 2006.01]**

7/22 • Elongated resistive element being bent or curved, e.g. sinusoidal, helical **[2, 2006.01]**

8/00 Non-adjustable resistors consisting of loose powdered or granular conducting, or powdered or granular semi-conducting material [2, 2006.01]

8/02 • Coherers or like imperfect resistors for detecting electromagnetic waves **[2, 2006.01]**

8/04 • Overvoltage protection resistors; Arresters **[2, 3, 2006.01]**

10/00 Adjustable resistors [2, 2006.01]

10/02 • Liquid resistors **[2, 2006.01]**

10/04 • with specified mathematical relationship between movement of resistor actuating means and value of resistance, other than direct proportional relationship **[2, 2006.01]**

10/06 • adjustable by short-circuiting different amounts of the resistive element **[2, 2006.01]**

10/08 • • with intervening conducting structure between the resistive element and the short-circuiting means, e.g. taps **[2, 2006.01]**

10/10 • adjustable by mechanical pressure or force **[2, 2006.01]**

10/12 • • by changing surface pressure between resistive masses or resistive and conductive masses, e.g. pile type **[2, 2006.01]**

10/14 • adjustable by auxiliary driving means **[2, 2006.01]**

10/16 • including plural resistive elements **[2, 2006.01]**

10/18 • • including coarse and fine resistive elements **[2, 2006.01]**

10/20 • • Contact structure or movable resistive elements being ganged **[2, 2006.01]**

10/22 • resistive-element dimensions changing gradually in one direction, e.g. tapered resistive element (H01C 10/04 takes precedence) **[2, 2006.01]**

10/23 • resistive-element dimensions changing in a series of discrete, progressive steps **[2, 2006.01]**

10/24 • the contact moving along turns of a helical resistive element, or vice versa **[2, 2006.01]**

10/26 • resistive element moving (H01C 10/16, H01C 10/24 take precedence) **[2, 2006.01]**

Note(s) [2]

Groups H01C 10/02-H01C 10/26 take precedence over groups H01C 10/28-H01C 10/50.

10/28 • the contact rocking or rolling along resistive element or taps **[2, 2006.01]**

10/30 • the contact sliding along resistive element **[2, 2006.01]**

10/32 • • the contact moving in an arcuate path **[2, 2006.01]**

10/34 • • • the contact or the associated conducting structure riding on collector formed as a ring or portion thereof **[2, 2006.01]**

10/36 • • • structurally combined with switching arrangements **[2, 2006.01]**

10/38 • • the contact moving along a straight path **[2, 2006.01]**

10/40 • • • screw-operated **[2, 2006.01]**

10/42 • • • • the contact bridging and sliding along resistive element and parallel conducting bar or collector **[2, 2006.01]**

10/44 • • • the contact bridging and sliding along resistive element and parallel conducting bar or collector (H01C 10/42 takes precedence) **[2, 2006.01]**

10/46 • Arrangements of fixed resistors with intervening connectors, e.g. taps (H01C 10/28, H01C 10/30 take precedence) **[2, 2006.01]**

10/48 • • including contact movable in an arcuate path **[2, 2006.01]**

10/50 • structurally combined with switching arrangement (H01C 10/36 takes precedence) **[2, 2006.01]**

11/00 Non-adjustable liquid resistors [1, 2, 2006.01]

13/00 Resistors not provided for elsewhere [1, 2006.01]

13/02 • Structural combinations of resistors **[2, 2006.01]**

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) **[1, 2, 2006.01]**

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, 2006.01]**

17/04 • adapted for winding the resistive element **[2, 2006.01]**

17/06 • adapted for coating resistive material on a base **[2, 2006.01]**

17/065 • • by thick-film techniques, e.g. serigraphy **[6, 2006.01]**

17/07 • • by resistor foil bonding, e.g. cladding **[6, 2006.01]**

17/075 • • by thin-film techniques **[6, 2006.01]**

17/08 • • • by vapour deposition **[2, 2006.01]**

17/10 • • • by flame spraying **[2, 2006.01]**

17/12 • • • by sputtering **[2, 2006.01]**

17/14 • • • by chemical deposition **[2, 2006.01]**

17/16 • • • • using electric current **[2, 2006.01]**

17/18 • • • • without using electric current **[2, 2006.01]**

17/20 • • by pyrolytic processes **[2, 2006.01]**

17/22 • adapted for trimming **[2, 2006.01]**

17/23 • • by opening or closing resistor tracks of predetermined resistive values **[6, 2006.01]**

17/232 • • Adjusting the temperature coefficient; Adjusting value of resistance by adjusting temperature coefficient **[6, 2006.01]**

17/235 • • Initial adjustment of potentiometer parts for calibration **[6, 2006.01]**

17/24 • • by removing or adding resistive material (H01C 17/23, H01C 17/232, H01C 17/235 take precedence) **[2, 6, 2006.01]**

17/242 • • • by laser **[6, 2006.01]**

17/245 • • • by mechanical means, e.g. sand-blasting, cutting, ultrasonic treatment **[6, 2006.01]**

17/26 • • by converting resistive material **[2, 2006.01]**

17/28 • adapted for applying terminals **[2, 2006.01]**

17/30 • adapted for baking **[2, 2006.01]**

H01F MAGNETS; INDUCTANCES; TRANSFORMERS; SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES [2]

Subclass index

1/00 Magnets or magnetic bodies characterised by the magnetic materials therefor; Selection of materials for their magnetic properties [1, 2006.01]

Note(s) [2010.01]

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. In this group, the Periodic System used is the 8 group system indicated by Roman numerals in the Periodic Table thereunder.

1/01 • of inorganic materials (H01F 1/44 takes precedence) **[6, 2006.01]**

1/03 • • characterised by their coercivity **[6, 2006.01]**

Note(s) [6]

Group H01F 1/40 takes precedence over H01F 1/03

1/032 • • • of hard-magnetic materials **[6, 2006.01]**

1/04 • • • • metals or alloys **[1, 6, 2006.01]**

1/047 • • • • • Alloys characterised by their composition **[5, 6, 2006.01]**

1/053 • • • • • • containing rare earth metals **[5, 6, 2006.01]**

1/055 • • • • • • • and magnetic transition metals, e.g. $SmCo_5$ **[6, 2006.01]**

1/057 • • • • • • • • and IIIa elements, e.g. $Nd_2Fe_{14}B$ **[6, 2006.01]**

1/058 • • • • • • • • and IVa elements, e.g. $Gd_2Fe_{14}C$ **[6, 2006.01]**

1/059 • • • • • • • • and Va elements, e.g. $Sm_2Fe_{17}N_2$ **[6, 2006.01]**

1/06 • • • • • in the form of particles, e.g. powder (H01F 1/047 takes precedence) **[1, 5, 6, 2006.01]**

1/08 • • • • • • pressed, sintered, or bound together **[1, 6, 2006.01]**

1/09 • • • • mixtures of metallic and non-metallic particles; metallic particles having oxide skin **[1, 6, 2006.01]**

1/10 • • • • non-metallic substances, e.g. ferrites **[1, 6, 2006.01]**

1/11 • • • • • in the form of particles **[1, 6, 2006.01]**

1/113 • • • • • • in a bonding agent **[1, 6, 2006.01]**

1/117 • • • • • • • Flexible bodies **[1, 6, 2006.01]**

1/12 • • • of soft-magnetic materials **[1, 6, 2006.01]**

1/14 • • • • metals or alloys **[1, 6, 2006.01]**

1/147 • • • • • Alloys characterised by their composition **[5, 6, 2006.01]**

1/153 • • • • • • Amorphous metallic alloys, e.g. glassy metals **[5, 6, 2006.01]**

1/16 • • • • • in the form of sheets (H01F 1/147 takes precedence) **[1, 5, 6, 2006.01]**

1/18 • • • • • • with insulating coating **[1, 6, 2006.01]**

1/20 • • • • • in the form of particles, e.g. powder (H01F 1/147 takes precedence) **[1, 5, 6, 2006.01]**

1/22 • • • • • • pressed, sintered, or bound together **[1, 6, 2006.01]**

1/24 • • • • • • • the particles being insulated **[1, 6, 2006.01]**

1/26 • • • • • • • • by macromolecular organic substances **[1, 6, 2006.01]**

1/28 • • • • • • dispersed or suspended in a bonding agent **[1, 6, 2006.01]**

1/33 • • • • mixtures of metallic and non-metallic particles; metallic particles having oxide skin **[1, 6, 2006.01]**

1/34 • • • • non-metallic substances, e.g. ferrites **[1, 6, 2006.01]**

1/36 • • • • • in the form of particles **[1, 6, 2006.01]**

1/37 • • • • • • in a bonding agent **[1, 6, 2006.01]**

1/375 • • • • • • • Flexible bodies **[1, 6, 2006.01]**

1/38 • • • • • amorphous, e.g. amorphous oxides **[6, 2006.01]**

1/40 • • of magnetic semiconductor materials, e.g. $CdCr_2S_4$ **[6, 2006.01]**
1/42 • of organic or organo-metallic materials (H01F 1/44 takes precedence) **[6, 2006.01]**
1/44 • of magnetic liquids, e.g. ferrofluids **[6, 2006.01]**

3/00 Cores, yokes or armatures [1, 2006.01]
3/02 • made from sheets **[1, 2006.01]**
3/04 • made from strips or ribbons **[1, 2006.01]**
3/06 • made from wires **[1, 2006.01]**
3/08 • made from powder **[1, 2006.01]**
3/10 • Composite arrangements of magnetic circuits **[1, 2006.01]**
3/12 • • Magnetic shunt paths **[1, 2006.01]**
3/14 • • Constrictions; Gaps, e.g. air-gaps (in magnetic shunt paths H01F 3/12) **[1, 2006.01]**

5/00 Coils (superconducting coils H01F 6/06; fixed inductances of the signal type H01F 17/00) **[1, 2006.01]**
5/02 • wound on non-magnetic supports, e.g. formers **[1, 2006.01]**
5/04 • Arrangements of electric connections to coils, e.g. leads **[1, 2006.01]**
5/06 • Insulation of windings **[1, 2006.01]**

6/00 Superconducting magnets; Superconducting coils [6, 2006.01]
6/02 • Quenching; Protection arrangements during quenching **[6, 2006.01]**
6/04 • Cooling **[6, 2006.01]**
6/06 • Coils, e.g. winding, insulating, terminating or casing arrangements therefor **[6, 2006.01]**

7/00 Magnets (superconducting magnets H01F 6/00) **[1, 2006.01]**
7/02 • Permanent magnets **[1, 2006.01]**
7/04 • • Means for releasing the attractive force **[1, 2006.01]**
7/06 • Electromagnets; Actuators including electromagnets **[1, 6, 2006.01]**
7/08 • • with armatures **[1, 2006.01]**
7/10 • • • specially adapted for ac **[1, 2006.01]**
7/11 • • • • reducing or eliminating the effects of eddy currents **[6, 2006.01]**
7/12 • • • • having anti-chattering arrangements **[1, 2006.01]**
7/121 • • • Guiding or setting position of armatures, e.g. retaining armatures in their end position **[6, 2006.01]**
7/122 • • • • by permanent magnet **[6, 2006.01]**
7/123 • • • • by ancillary coil **[6, 2006.01]**
7/124 • • • • by mechanical latch, e.g. detent **[6, 2006.01]**
7/126 • • • Supporting or mounting **[6, 2006.01]**
7/127 • • • Assembling **[6, 2006.01]**
7/128 • • • Encapsulating, encasing or sealing **[6, 2006.01]**
7/129 • • • • of armatures **[6, 2006.01]**
7/13 • • • characterised by pulling-force characteristic **[1, 2006.01]**
7/14 • • • Pivoting armatures (H01F 7/17 takes precedence) **[1, 6, 2006.01]**
7/16 • • • Rectilinearly-movable armatures (H01F 7/17 takes precedence) **[1, 6, 2006.01]**
7/17 • • • Pivoting and rectilinearly-movable armatures **[6, 2006.01]**
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 **[1, 2006.01]**
7/20 • • without armatures **[1, 2006.01]**

10/00 Thin magnetic films, e.g. of one-domain structure [1, 2006.01]
10/06 • characterised by the coupling or physical contact with connecting or interacting conductors **[1, 2006.01]**
10/08 • characterised by magnetic layers (applying magnetic films to substrates H01F 41/14) **[3, 2006.01]**
10/10 • • characterised by the composition **[3, 2006.01]**
10/12 • • • being metals or alloys **[3, 2006.01]**
10/13 • • • • Amorphous metallic alloys, e.g. glassy metals **[7, 2006.01]**
10/14 • • • • containing iron or nickel (H01F 10/13, H01F 10/16 take precedence) **[3, 7, 2006.01]**
10/16 • • • • containing cobalt (H01F 10/13 takes precedence) **[3, 7, 2006.01]**
10/18 • • • being compounds **[3, 2006.01]**
10/187 • • • • Amorphous compounds **[7, 2006.01]**
10/193 • • • • Magnetic semiconductor compounds **[7, 2006.01]**
10/20 • • • • Ferrites **[3, 2006.01]**
10/22 • • • • • Orthoferrites **[3, 2006.01]**
10/24 • • • • • Garnets **[3, 2006.01]**
10/26 • characterised by the substrate or intermediate layers (H01F 10/32 takes precedence) **[3, 7, 2006.01]**
10/28 • • characterised by the composition of the substrate **[3, 2006.01]**
10/30 • • characterised by the composition of intermediate layers **[3, 2006.01]**
10/32 • Spin-exchange-coupled multilayers, e.g. nanostructured superlattices **[7, 2006.01]**

13/00 Apparatus or processes for magnetising or demagnetising [1, 2006.01]

Note(s) [6]

Groups H01F 17/00-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.

17/00 Fixed inductances of the signal type [1, 2006.01]
17/02 • without magnetic core **[1, 2006.01]**
17/03 • • with ceramic former **[1, 2006.01]**
17/04 • with magnetic core **[1, 2006.01]**
17/06 • • with core substantially closed in itself, e.g. toroid **[1, 2006.01]**
17/08 • • • Loading coils for telecommunication circuits **[1, 2006.01]**

19/00 Fixed transformers or mutual inductances of the signal type (H01F 36/00 takes precedence) **[1, 3, 2006.01]**
19/02 • Audio-frequency transformers or mutual inductances, i.e. not suitable for handling frequencies considerably beyond the audio range **[1, 2006.01]**
19/04 • Transformers or mutual inductances suitable for handling frequencies considerably beyond the audio range **[1, 2006.01]**

19/06 • • Broad-band transformers, e.g. suitable for handling frequencies well down into the audio range **[1, 2006.01]**

19/08 • • Transformers having magnetic bias, e.g. for handling pulses **[1, 2006.01]**

21/00 Variable inductances or transformers of the signal type (H01F 36/00 takes precedence) **[1, 3, 2006.01]**

21/02 • continuously variable, e.g. variometers **[1, 2006.01]**

21/04 • • by relative movement of turns or parts of windings **[1, 2006.01]**

21/06 • • by movement of core or part of core relative to the windings as a whole **[1, 2006.01]**

21/08 • • by varying the permeability of the core, e.g. by varying magnetic bias **[1, 2006.01]**

21/10 • • by means of a movable shield **[1, 2006.01]**

21/12 • discontinuously variable, e.g. tapped **[1, 2006.01]**

27/00 Details of transformers or inductances, in general [1, 6, 2006.01]

27/02 • Casings **[1, 2006.01]**

27/04 • • Leading of conductors or axles through casings, e.g. for tap-changing arrangements **[1, 2006.01]**

27/06 • Mounting, supporting, or suspending transformers, reactors, or choke coils **[1, 2006.01]**

27/08 • Cooling; Ventilating **[1, 2006.01]**

27/10 • • Liquid cooling **[1, 2006.01]**

27/12 • • • Oil cooling **[1, 2006.01]**

27/14 • • • • Expansion chambers; Oil conservators; Gas cushions; Arrangements for purifying, drying, or filling **[1, 2006.01]**

27/16 • • • Water cooling **[1, 2006.01]**

27/18 • • • by evaporating liquids **[1, 2006.01]**

27/20 • • Cooling by special gases or non-ambient air **[1, 2006.01]**

27/22 • • Cooling by heat conduction through solid or powdered fillings **[1, 2006.01]**

27/23 • Corrosion protection **[6, 2006.01]**

27/24 • Magnetic cores **[1, 2006.01]**

27/245 • • made from sheets, e.g. grain-oriented (H01F 27/26 takes precedence) **[5, 2006.01]**

27/25 • • made from strips or ribbons (H01F 27/26 takes precedence) **[5, 2006.01]**

27/255 • • made from particles (H01F 27/26 takes precedence) **[5, 2006.01]**

27/26 • • Fastening parts of the core together; Fastening or mounting the core on casing or support **[1, 2006.01]**

27/28 • Coils; Windings; Conductive connections **[1, 2006.01]**

27/29 • • Terminals; Tapping arrangements **[6, 2006.01]**

27/30 • • Fastening or clamping coils, windings, or parts thereof together; Fastening or mounting coils or windings on core, casing, or other support **[1, 2006.01]**

27/32 • • Insulating of coils, windings, or parts thereof **[1, 2006.01]**

27/33 • Arrangements for noise damping **[1, 2006.01]**

27/34 • Special means for preventing or reducing unwanted electric or magnetic effects, e.g. no-load losses, reactive currents, harmonics, oscillations, leakage fields **[1, 2006.01]**

27/36 • • Electric or magnetic shields or screens (movable for varying inductance H01F 21/10) **[1, 6, 2006.01]**

27/38 • • Auxiliary core members; Auxiliary coils or windings **[1, 2006.01]**

27/40 • Structural association with built-in electric component, e.g. fuse **[1, 2006.01]**

27/42 • Circuits specially adapted for the purpose of modifying, or compensating for, electric characteristics of transformers, reactors or choke coils **[1, 6, 2006.01]**

29/00 Variable transformers or inductances not covered by group H01F 21/00 [1, 2006.01]

29/02 • with tappings on coil or winding; with provision for rearrangement or interconnection of windings **[1, 2006.01]**

29/04 • • having provision for tap-changing without interrupting the load current **[1, 2006.01]**

29/06 • with current collector gliding or rolling on or along winding **[1, 2006.01]**

29/08 • with core, coil, winding, or shield movable to offset variation of voltage or phase shift, e.g. induction regulators **[1, 2006.01]**

29/10 • • having movable part of magnetic circuit **[1, 2006.01]**

29/12 • • having movable coil, winding, or part thereof; having movable shield **[1, 2006.01]**

29/14 • with variable magnetic bias **[1, 2006.01]**

30/00 Fixed transformers not covered by group H01F 19/00 [6, 2006.01]

30/02 • Auto-transformers **[6, 2006.01]**

30/04 • having two or more secondary windings, each supplying a separate load, e.g. for radio set power supplies **[6, 2006.01]**

30/06 • characterised by the structure **[6, 2006.01]**

30/08 • • without magnetic core **[6, 2006.01]**

30/10 • • Single-phase transformers (H01F 30/16 takes precedence) **[6, 2006.01]**

30/12 • • Two-phase, three-phase or polyphase transformers **[6, 2006.01]**

30/14 • • • for changing the number of phases **[6, 2006.01]**

30/16 • • Toroidal transformers **[6, 2006.01]**

36/00 Transformers with superconductive windings or with windings operating at cryogenic temperatures [3, 2006.01]

37/00 Fixed inductances not covered by group H01F 17/00 [1, 6, 2006.01]

38/00 Adaptations of transformers or inductances for specific applications or functions [6, 2006.01]

38/02 • for non-linear operation **[6, 2006.01]**

38/04 • • for frequency changing **[6, 2006.01]**

38/06 • • for changing the wave shape **[6, 2006.01]**

38/08 • High-leakage transformers or inductances **[6, 2006.01]**

38/10 • • Ballasts, e.g. for discharge lamps **[6, 2006.01]**

38/12 • Ignition, e.g. for IC engines **[6, 2006.01]**

38/14 • Inductive couplings **[6, 2006.01]**

38/16 • Cascade transformers, e.g. for use with extra high tension **[6, 2006.01]**

38/18 • Rotary transformers **[6, 2006.01]**

38/20 • Instrument transformers **[6, 2006.01]**

38/22 • • for single phase ac **[6, 2006.01]**

38/24 • • • Voltage transformers **[6, 2006.01]**

38/26 • • • • Constructions **[6, 2006.01]**

38/28 • • • Current transformers **[6, 2006.01]**

38/30 • • • • Constructions **[6, 2006.01]**

38/32 • • • • Circuit arrangements **[6, 2006.01]**

38/34 • • • Combined voltage and current transformers **[6, 2006.01]**
38/36 • • • • Constructions **[6, 2006.01]**
38/38 • • for polyphase ac **[6, 2006.01]**
38/40 • • for dc **[6, 2006.01]**
38/42 • Flyback transformers **[6, 2006.01]**

41/00 Apparatus or processes specially adapted for manufacturing or assembling the devices covered by this subclass [1, 2006.01]

41/02 • for manufacturing cores, coils or magnets (H01F 41/14 takes precedence) **[1, 3, 2006.01]**
41/04 • • for manufacturing coils **[1, 2006.01]**
41/06 • • • Winding **[1, 2006.01]**
41/08 • • • • Winding conductors on to or threading conductors through cores or formers which are closed in themselves, e.g. toroids **[1, 2006.01]**
41/10 • • • Connecting leads to windings **[1, 2006.01]**
41/12 • • • Insulating of windings **[1, 2006.01]**
41/14 • for applying magnetic films to substrates **[1, 3, 2006.01]**

Note(s) [7]

Group H01F 41/30 takes precedence over groups H01F 41/16-H01F 41/24.

41/16 • • the magnetic material being applied in the form of particles, e.g. by serigraphy (H01F 41/18 takes precedence) **[3, 7, 2006.01]**
41/18 • • by cathode sputtering **[3, 2006.01]**
41/20 • • by evaporation **[3, 2006.01]**
41/22 • • Heat treatment; Thermal decomposition; Chemical vapour deposition **[3, 2006.01]**
41/24 • • from liquids **[3, 2006.01]**
41/26 • • • using electric currents **[3, 2006.01]**
41/28 • • • by liquid phase epitaxy **[3, 2006.01]**
41/30 • • for applying nanostructures, e.g. by molecular beam epitaxy (MBE) **[7, 2006.01]**
41/32 • for applying conductive, insulating or magnetic material on a magnetic film **[7, 2006.01]**
41/34 • • in patterns, e.g. by lithography **[7, 2006.01]**

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)

Note(s) [2013.01]

In this subclass, group H01G 11/00 takes precedence over groups H01G 4/00 and H01G 9/00.

Subclass index

2/00 Details of capacitors not covered by a single one of groups H01G 4/00-H01G 11/00 [6, 2006.01]

2/02 • Mountings **[6, 2006.01]**
2/04 • • specially adapted for mounting on a chassis **[6, 2006.01]**
2/06 • • specially adapted for mounting on a printed-circuit support **[6, 2006.01]**
2/08 • Cooling arrangements; Heating arrangements; Ventilating arrangements **[6, 2006.01]**
2/10 • Housing; Encapsulation **[6, 2006.01]**
2/12 • Protection against corrosion (H01G 2/10 takes precedence) **[6, 2006.01]**
2/14 • Protection against electric or thermal overload (by cooling H01G 2/08) **[6, 2006.01]**
2/16 • • with fusing elements **[6, 2006.01]**
2/18 • • with breakable contacts **[6, 2006.01]**
2/20 • Arrangements for preventing discharge from edges of electrodes **[6, 2006.01]**
2/22 • Electrostatic or magnetic shielding **[6, 2006.01]**
2/24 • Distinguishing marks, e.g. colour coding **[6, 2006.01]**

4/00 Fixed capacitors; Processes of their manufacture (electrolytic capacitors H01G 9/00) **[2, 2006.01]**

4/002 • Details **[6, 2006.01]**
4/005 • • Electrodes **[6, 2006.01]**
4/008 • • • Selection of materials **[6, 2006.01]**
4/01 • • • Form of self-supporting electrodes **[6, 2006.01]**
4/012 • • • Form of non-self-supporting electrodes **[6, 2006.01]**
4/015 • • • Special provisions for self-healing **[6, 2006.01]**
4/018 • • Dielectrics **[6, 2006.01]**
4/02 • • • Gas or vapour dielectrics **[2, 6, 2006.01]**
4/04 • • • Liquid dielectrics **[2, 6, 2006.01]**
4/06 • • • Solid dielectrics **[2, 6, 2006.01]**
4/08 • • • • Inorganic dielectrics **[2, 6, 2006.01]**
4/10 • • • • • Metal-oxide dielectrics **[2, 6, 2006.01]**
4/12 • • • • • Ceramic dielectrics **[2, 6, 2006.01]**
4/14 • • • • Organic dielectrics **[2, 6, 2006.01]**
4/16 • • • • • of fibrous material, e.g. paper **[2, 6, 2006.01]**
4/18 • • • • • of synthetic material, e.g. derivatives of cellulose (H01G 4/16 takes precedence) **[2, 6, 2006.01]**
4/20 • • • using combinations of dielectrics from more than one of groups H01G 4/02-H01G 4/06 (H01G 4/12 takes precedence) **[2, 6, 2006.01]**
4/22 • • • • impregnated **[2, 6, 2006.01]**

4/224 • • Housing; Encapsulation **[6, 2006.01]**
4/228 • • Terminals **[6, 2006.01]**
4/232 • • • electrically connecting two or more layers of a stacked or rolled capacitor **[6, 2006.01]**
4/236 • • • leading through the housing, i.e. lead-through **[6, 2006.01]**
4/242 • • • the capacitive element surrounding the terminal **[6, 2006.01]**
4/245 • • • • Tabs between the layers of a rolled electrode **[6, 2006.01]**
4/248 • • • the terminals embracing or surrounding the capacitive element, e.g. caps (H01G 4/252 takes precedence) **[6, 2006.01]**
4/252 • • • the terminals being coated on the capacitive element (H01G 4/232 takes precedence) **[6, 2006.01]**
4/255 • • Means for correcting the capacitance value **[6, 2006.01]**
4/258 • • Temperature compensation means **[6, 2006.01]**
4/26 • Folded capacitors **[2, 2006.01]**
4/28 • Tubular capacitors **[2, 2006.01]**
4/30 • Stacked capacitors (H01G 4/33 takes precedence) **[2, 6, 2006.01]**
4/32 • Wound capacitors **[2, 2006.01]**
4/33 • Thin- or thick-film capacitors **[6, 2006.01]**
4/35 • Feed-through capacitors or anti-noise capacitors **[6, 2006.01]**
4/38 • Multiple capacitors, i.e. structural combinations of fixed capacitors **[2, 2006.01]**
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 **[2, 2006.01]**

5/00 Capacitors in which the capacitance is varied by mechanical means, e.g. by turning a shaft; Processes of their manufacture [1, 2, 2006.01]

5/01 • Details **[1, 2006.01]**
5/011 • • Electrodes **[6, 2006.01]**
5/012 • • • at least one of the electrodes being a displaceable liquid or powder **[6, 2006.01]**
5/013 • • Dielectrics **[6, 2006.01]**
5/014 • • Housing; Encapsulation **[6, 2006.01]**
5/015 • • Current collectors **[1, 2006.01]**
5/017 • • Temperature compensation **[6, 2006.01]**
5/019 • • Means for correcting the capacitance characteristics **[6, 2006.01]**
5/04 • using variation of effective area of electrode **[1, 6, 2006.01]**
5/06 • • due to rotation of flat or substantially flat electrodes **[1, 6, 2006.01]**
5/08 • • • becoming active in succession **[1, 6, 2006.01]**
5/10 • • due to rotation of helical electrodes **[1, 6, 2006.01]**
5/12 • • due to rotation of part-cylindrical, conical, or spherical electrodes **[1, 6, 2006.01]**
5/14 • • due to longitudinal movement of electrodes **[1, 6, 2006.01]**
5/16 • using variation of distance between electrodes **[1, 6, 2006.01]**
5/18 • • due to change in inclination, e.g. by flexing, by spiral wrapping **[1, 6, 2006.01]**
5/38 • Multiple capacitors, e.g. ganged **[1, 2006.01]**
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 **[6, 2006.01]**

7/00 Capacitors in which the capacitance is varied by non-mechanical means; Processes of their manufacture [1, 2, 2006.01]

7/02 • Electrets, i.e. having a permanently-polarised dielectric **[1, 2006.01]**
7/04 • having a dielectric selected for the variation of its permitivity with applied temperature **[1, 2006.01]**
7/06 • having a dielectric selected for the variation of its permitivity with applied voltage, i.e. ferroelectric capacitors (electrets H01G 7/02) **[1, 2006.01]**

9/00 Electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices; Processes of their manufacture [1, 2, 2006.01]

9/004 • Details **[6, 2006.01]**
9/008 • • Terminals **[6, 2006.01]**
9/012 • • • specially adapted for solid capacitors **[6, 2006.01]**
9/02 • • Diaphragms; Separators **[1, 6, 2006.01]**
9/022 • • Electrolytes; Absorbents **[6, 2006.01]**
9/025 • • • Solid electrolytes (H01G 11/54 takes precedence) **[6, 2006.01]**
9/028 • • • • Organic semiconducting electrolytes, e.g. TCNQ **[6, 2006.01]**
9/032 • • • • Inorganic semiconducting electrolytes, e.g. MnO_2 **[6, 2006.01]**
9/035 • • • Liquid electrolytes, e.g. impregnating materials (H01G 11/54 takes precedence) **[6, 2006.01]**
9/04 • • Electrodes **[1, 6, 2006.01]**
9/042 • • • characterised by the material (H01G 11/22 takes precedence) **[6, 2006.01]**
9/045 • • • • based on aluminium **[6, 2006.01]**
9/048 • • • characterised by their structure (H01G 11/22 takes precedence) **[6, 2006.01]**
9/052 • • • • Sintered electrodes **[6, 2006.01]**
9/055 • • • • Etched foil electrodes **[6, 2006.01]**
9/06 • • • Mounting in containers **[1, 6, 2006.01]**
9/07 • • Dielectric layers **[6, 2006.01]**
9/08 • • Housing; Encapsulation **[1, 6, 2006.01]**
9/10 • • • Sealing, e.g. of lead-in wires **[1, 6, 2006.01]**
9/12 • • • Vents or other means allowing expansion **[1, 6, 2006.01]**
9/14 • • Structural combinations for modifying, or compensating for, electric characteristics of electrolytic capacitors **[1, 2006.01]**
9/145 • Liquid electrolytic capacitors (H01G 11/00 takes precedence) **[6, 2006.01]**
9/15 • Solid electrolytic capacitors (H01G 11/00 takes precedence) **[6, 2006.01]**
9/16 • specially adapted for use as rectifiers or detectors (H01G 9/22 takes precedence) **[1, 2006.01]**
9/18 • Self-interrupters **[1, 2006.01]**
9/20 • Light-sensitive devices **[1, 2006.01]**
9/21 • Temperature-sensitive devices **[6, 2006.01]**
9/22 • Devices using combined reduction and oxidation, e.g. redox arrangement or solion **[1, 2006.01, 2013.01]**
9/26 • Structural combinations of electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices with each other **[6, 2006.01]**
9/28 • Structural combinations of electrolytic capacitors, rectifiers, detectors, switching devices with other electric components not covered by this subclass **[6, 2006.01]**

11/00 Hybrid capacitors, i.e. capacitors having different positive and negative electrodes; Electric double-layer [EDL] capacitors; Processes for the manufacture thereof or of parts thereof [2013.01]

Note(s) [2013.01]

Group H01G 11/02 takes precedence over groups H01G 11/04-H01G 11/14.

11/02 • using combined reduction-oxidation reactions, e.g. redox arrangement or solion **[2013.01]**

11/04 • Hybrid capacitors **[2013.01]**

11/06 • • with one of the electrodes allowing ions to be reversibly doped thereinto, e.g. lithium-ion capacitors [LICs] **[2013.01]**

11/08 • Structural combinations, e.g. assembly or connection, of hybrid or EDL capacitors with other electric components, at least one hybrid or EDL capacitor being the main component **[2013.01]**

11/10 • Multiple hybrid or EDL capacitors, e.g. arrays or modules (housings, cases, encapsulations or mountings thereof H01G 11/78) **[2013.01]**

11/12 • • Stacked hybrid or EDL capacitors **[2013.01]**

11/14 • Arrangements or processes for adjusting or protecting hybrid or EDL capacitors (emergency protective circuit arrangements specially adapted for capacitors, and effecting automatic switching in the event of an undesired change from normal working conditions H02H 7/16; emergency protective circuit arrangements for limiting excess current or voltages without disconnection H02H 9/00) **[2013.01]**

11/16 • • against electric overloads, e.g. including fuses **[2013.01]**

11/18 • • against thermal overloads, e.g. heating, cooling or ventilating **[2013.01]**

11/20 • • Reformation or processes for removal of impurities, e.g. scavenging **[2013.01]**

11/22 • Electrodes **[2013.01]**

11/24 • • characterised by structural features of the materials making up or comprised in the electrodes, e.g. form, surface area or porosity; characterised by the structural features of powders or particles used therefor **[2013.01]**

11/26 • • characterised by their structure, e.g. multi-layered, porosity or surface features **[2013.01]**

11/28 • • • arranged or disposed on a current collector; Layers or phases between electrodes and current collectors, e.g. adhesives **[2013.01]**

11/30 • • characterised by their material **[2013.01]**

11/32 • • • Carbon-based **[2013.01]**

11/34 • • • • characterised by carbonisation or activation of carbon **[2013.01]**

11/36 • • • • Nanostructures, e.g. nanofibres, nanotubes or fullerenes **[2013.01]**

11/38 • • • • Carbon pastes or blends; Binders or additives therein **[2013.01]**

11/40 • • • • Fibres **[2013.01]**

11/42 • • • • Powders or particles, e.g. composition thereof **[2013.01]**

11/44 • • • • Raw materials therefor, e.g. resins or coal **[2013.01]**

11/46 • • • Metal oxides **[2013.01]**

11/48 • • • Conductive polymers **[2013.01]**

11/50 • • • specially adapted for lithium-ion capacitors, e.g. for lithium-doping or for intercalation **[2013.01]**

11/52 • Separators **[2013.01]**

11/54 • Electrolytes **[2013.01]**

11/56 • • Solid electrolytes, e.g. gels; Additives therein **[2013.01]**

11/58 • • Liquid electrolytes **[2013.01]**

11/60 • • • characterised by the solvent **[2013.01]**

11/62 • • • characterised by the solute, e.g. salts, anions or cations therein **[2013.01]**

11/64 • • • characterised by additives **[2013.01]**

11/66 • Current collectors **[2013.01]**

11/68 • • characterised by their material **[2013.01]**

11/70 • • characterised by their structure **[2013.01]**

11/72 • • specially adapted for integration in multiple or stacked hybrid or EDL capacitors **[2013.01]**

11/74 • Terminals, e.g. extensions of current collectors **[2013.01]**

11/76 • • specially adapted for integration in multiple or stacked hybrid or EDL capacitors **[2013.01]**

11/78 • Cases; Housings; Encapsulations; Mountings **[2013.01]**

11/80 • • Gaskets; Sealings **[2013.01]**

11/82 • • Fixing or assembling a capacitive element in a housing, e.g. mounting electrodes, current collectors or terminals in containers or encapsulations **[2013.01]**

11/84 • Processes for the manufacture of hybrid or EDL capacitors, or components thereof **[2013.01]**

11/86 • • specially adapted for electrodes (carbonisation or activation of carbon for the manufacture of electrodes H01G 11/34) **[2013.01]**

13/00 Apparatus specially adapted for manufacturing capacitors; Processes specially adapted for manufacturing capacitors not provided for in groups H01G 4/00-H01G 11/00 [1, 2, 2006.01, 2013.01]

13/02 • Machines for winding capacitors **[1, 2, 2006.01]**

13/04 • Drying; Impregnating **[1, 2, 2006.01]**

13/06 • with provision for removing metal surfaces **[1, 2, 2006.01]**

15/00 Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with each other (involving at least one hybrid or electric double-layer [EDL] capacitor as the main component H01G 11/08) **[6, 2006.01, 2013.01]**

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 [6, 2006.01]

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)

Note(s) [4]

1. This subclass covers (in groups H01H 69/00-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-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-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-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-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-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.

Subclass index

Electric switches

1/00 **Contacts** (liquid contacts H01H 29/04) **[1, 2006.01]**

1/02 • characterised by the material thereof **[1, 2006.01]**

1/021 • • Composite material **[2006.01]**

Note(s) [2006.01]

1. In this group, the following expression is used with the meaning indicated:
   - "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.
2. Subject matter classifiable in more than one of groups H01H 1/023-H01H 1/029 should be classified in all relevant groups.

1/023 • • • having a noble metal as the basic material **[2006.01]**

1/0233 • • • • and containing carbides **[2006.01]**

1/0237 • • • • and containing oxides **[2006.01]**

1/025 • • • having copper as the basic material **[2006.01]**

1/027 • • • containing carbon particles or fibres **[2006.01]**

1/029 • • • comprising conducting material dispersed in an elastic support or binding material **[2006.01]**

1/04 • • Co-operating contacts of different material **[1, 2006.01]**

1/06 • characterised by the shape or structure of the contact-making surface, e.g. grooved **[1, 2006.01]**

1/08 • • wetted with mercury **[1, 2006.01]**

1/10 • • Laminated contacts with divided contact surface **[1, 2006.01]**

1/12 • characterised by the manner in which co-operating contacts engage **[1, 2006.01]**

1/14 • • by abutting **[1, 2006.01]**

1/16 • • • by rolling; by wrapping; Roller or ball contacts **[1, 2006.01]**

1/18 • • • with subsequent sliding **[1, 2006.01]**

1/20 • • • Bridging contacts **[1, 2006.01]**

1/22 • • • with rigid pivoted member carrying the moving contact **[1, 2006.01]**

1/24 • • • with resilient mounting **[1, 2006.01]**

1/26 • • • • with spring blade support **[1, 2006.01]**

1/28 • • • • • Assembly of three or more contact-supporting spring blades **[1, 2006.01]**

1/30 • • • • within supporting guides **[1, 2006.01]**

1/32 • • • Self-aligning contacts **[1, 2006.01]**

1/34 • • • with provision for adjusting position of contact relative to its co-operating contact **[1, 2006.01]**

1/36 • • by sliding **[1, 2006.01]**

1/38 • • • Plug-and-socket contacts **[1, 2006.01]**

1/40 • • • Contact mounted so that its contact-making surface is flush with adjoining insulation **[1, 2006.01]**

1/42 • • • Knife-and-clip contacts **[1, 2006.01]**

1/44 • • • with resilient mounting **[1, 2006.01]**

1/46 • • • self-aligning contacts **[1, 2006.01]**

1/48 • • • with provision for adjusting position of contact relative to its co-operating contact **[1, 2006.01]**

1/50 • Means for increasing contact pressure, preventing vibration of contacts, holding contacts together after engagement, or biasing contacts to the open position **[1, 2006.01]**

1/52 • • Contacts adapted to act as latches **[1, 2006.01]**

1/54 • • by magnetic force **[1, 2006.01]**

1/56 • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing **[1, 2006.01]**

1/58 • Electric connections to or between contacts; Terminals **[1, 2006.01]**

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, 2006.01]**

1/62 • Heating or cooling of contacts **[1, 2006.01]**

1/64 • Protective enclosures, baffle plates, or screens for contacts **[1, 2006.01]**

1/66 • • Contacts sealed in an evacuated or gas-filled envelope, e.g. magnetic dry-reed contacts **[1, 2006.01]**

3/00 **Mechanisms for operating contacts** (thermal actuating or release means H01H 37/02) **[1, 2006.01]**

3/02 • Operating parts, i.e. for operating driving mechanism by a mechanical force external to the switch **[1, 2006.01]**

3/04 • • Levers (tumblers H01H 23/14) **[1, 2006.01]**

3/06 • • • Means for securing to shaft of driving mechanism **[1, 2006.01]**

3/08 • • Turn knobs **[1, 2006.01]**

3/10 • • • Means for securing to shaft of driving mechanism **[1, 2006.01]**
3/12 • • Push-buttons **[1, 2006.01]**
3/14 • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**
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 **[1, 2006.01]**
3/18 • • • the movement in one direction being intentionally by hand, e.g. for setting automatically cancelled trafficators **[1, 2006.01]**
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 **[1, 2006.01]**
3/22 • Power arrangements internal to the switch for operating the driving mechanism **[1, 2006.01]**
3/24 • • using pneumatic or hydraulic actuator **[1, 2006.01]**
3/26 • • using dynamo-electric motor (for storing energy in a spring motor H01H 3/30) **[1, 2006.01]**
3/28 • • using electromagnet (for storing energy in a spring motor H01H 3/30; for operating relays H01H 45/00) **[1, 2006.01]**
3/30 • • using spring motor **[1, 2006.01]**
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) **[1, 2006.01]**
3/34 • • using ratchet **[1, 2006.01]**
3/36 • • using belt, chain, or cord **[1, 2006.01]**
3/38 • • using spring or other flexible shaft coupling **[1, 2006.01]**
3/40 • • using friction, toothed, or screw-and-nut gearing **[1, 2006.01]**
3/42 • • using cam or eccentric **[1, 2006.01]**
3/44 • • using Geneva movement **[1, 2006.01]**
3/46 • • using rod or lever linkage, e.g. toggle **[1, 2006.01]**
3/48 • • using lost-motion device **[1, 2006.01]**
3/50 • • with indexing or locating means, e.g. indexing by ball and spring **[1, 2006.01]**
3/52 • • with means to ensure stopping at intermediate operative positions **[1, 2006.01]**
3/54 • Mechanisms for coupling or uncoupling operating parts, driving mechanisms, or contacts **[1, 2006.01]**
3/56 • • using electromagnetic clutch **[1, 2006.01]**
3/58 • • using friction, toothed, or other mechanical clutch **[1, 2006.01]**
3/60 • Mechanical arrangements for preventing or damping vibration or shock **[1, 2006.01]**
3/62 • Lubricating means structurally associated with the switch (for lubricating contact-making surfaces H01H 1/60) **[1, 2006.01]**

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 [1, 2006.01]

5/02 • Energy stored by the attraction or repulsion of magnetic parts **[1, 2006.01]**
5/04 • Energy stored by deformation of elastic members (by deformation of bimetallic element in thermally-actuated switches H01H 37/54) **[1, 2006.01]**
5/06 • • by compression or extension of coil springs **[1, 2006.01]**
5/08 • • • one end of spring transmitting movement to the contact member when the other end is moved by the operating part **[1, 2006.01]**
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 **[1, 2006.01]**
5/12 • • • having two or more snap-action motions in succession **[1, 2006.01]**
5/14 • • by twisting of torsion members **[1, 2006.01]**
5/16 • • • with auxiliary means for temporarily holding parts until torsion member is sufficiently strained **[1, 2006.01]**
5/18 • • by flexing of blade springs **[1, 2006.01]**
5/20 • • • single blade moved across dead-centre position **[1, 2006.01]**
5/22 • • • blade spring with at least one snap-acting leg and at least one separate contact-carrying or contact-actuating leg **[1, 2006.01]**
5/24 • • • • having three legs **[1, 2006.01]**
5/26 • • • having two or more snap-action motions in succession **[1, 2006.01]**
5/28 • • • two separate blade springs forming a toggle **[1, 2006.01]**
5/30 • • by buckling of disc springs **[1, 2006.01]**

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) **[1, 2006.01]**

7/02 • with fluid timing means **[1, 2006.01]**
7/03 • • with dash-pots **[1, 2006.01]**
7/04 • • with flies, i.e. fan governors **[1, 2006.01]**
7/06 • with thermal timing means **[1, 2006.01]**
7/08 • with timing by mechanical speed-control devices **[1, 2006.01]**
7/10 • • by escapement **[1, 2006.01]**
7/12 • • • mechanical **[1, 2006.01]**
7/14 • • • electromagnetic **[1, 2006.01]**
7/16 • Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 9/56) **[1, 2006.01]**

9/00 Details of switching devices, not covered by groups H01H 1/00-H01H 7/00 [1, 2006.01]

9/02 • Bases, casings, or covers (accommodating more than one switch or a switch and another electrical component H02B 1/26) **[1, 2006.01]**
9/04 • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings **[1, 2006.01]**
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 **[1, 2006.01]**
9/08 • Arrangements to facilitate replacement of switch, e.g. cartridge housing **[1, 2006.01]**
9/10 • Adaptation for built-in fuses (mounting switch and fuse separately on, or in, common support H02B 1/18) **[1, 2006.01]**
9/12 • Means for earthing parts of switch not normally conductively connected to the contacts **[1, 2006.01]**
9/14 • Adaptation for built-in safety spark gaps **[1, 2006.01]**
9/16 • Indicators for switching condition, e.g. "on" or "off" **[1, 2006.01]**

9/18 • Distinguishing marks on switches, e.g. for indicating switch location in the dark; Adaptation of switches to receive distinguishing marks **[1, 2006.01]**

9/20 • Interlocking, locking, or latching mechanisms **[1, 2006.01]**

9/22 • • for interlocking between casing, cover, or protective shutter and mechanism for operating contacts **[1, 2006.01]**

9/24 • • for interlocking two or more parts of the mechanism for operating contacts **[1, 2006.01]**

9/26 • • for interlocking two or more switches (by a detachable member H01H 9/28) **[1, 2006.01]**

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) **[1, 2006.01]**

9/30 • Means for extinguishing or preventing arc between current-carrying parts **[1, 2006.01]**

9/32 • • Insulating body insertable between contacts **[1, 2006.01]**

9/34 • • Stationary parts for restricting or subdividing the arc, e.g. barrier plate **[1, 2006.01]**

9/36 • • • Metal parts **[1, 2006.01]**

9/38 • • Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing-horns H01H 9/46) **[1, 2006.01]**

9/40 • • Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc **[1, 2006.01]**

9/42 • • Impedances connected with contacts **[1, 2006.01]**

9/44 • • using blow-out magnet **[1, 2006.01]**

9/46 • • using arcing horns (using blow-out magnet H01H 9/44) **[1, 2006.01]**

9/48 • Means for preventing discharge to non-current-carrying parts, e.g. using corona ring **[1, 2006.01]**

9/50 • Means for detecting the presence of an arc or discharge **[1, 2006.01]**

9/52 • Cooling of switch parts (cooling of contacts H01H 1/62) **[1, 2006.01]**

9/54 • Circuit arrangements not adapted to a particular application of the switching device and for which no provision exists elsewhere **[1, 2006.01]**

9/56 • • for ensuring operation of the switch at a predetermined point in the ac cycle **[1, 2006.01]**

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, 2006.01]**

11/02 • for mercury switches **[1, 2006.01]**

11/04 • of switch contacts **[1, 2006.01]**

11/06 • • Fixing of contacts to carrier **[1, 2006.01]**

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) **[1, 2006.01]**

13/02 • Details **[1, 2006.01]**

13/04 • • Cases; Covers **[1, 2006.01]**

13/06 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings **[1, 2006.01]**

13/08 • • • Casing of switch constituted by a handle serving a purpose other than the actuation of the switch **[1, 2006.01]**

13/10 • • Bases; Stationary contacts mounted thereon **[1, 2006.01]**

13/12 • • Movable parts; Contacts mounted thereon **[1, 2006.01]**

13/14 • • • Operating parts, e.g. push-button **[1, 2006.01]**

13/16 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

13/20 • • • Driving mechanisms **[1, 2006.01]**

13/22 • • • • acting with snap action (depending upon deformation of elastic members H01H 13/26) **[1, 2006.01]**

13/24 • • • • with means for introducing a predetermined time delay **[1, 2006.01]**

13/26 • • Snap-action arrangements depending upon deformation of elastic members **[1, 2006.01]**

13/28 • • • using compression or extension of coil springs **[1, 2006.01]**

13/30 • • • • one end of spring transmitting movement to the contact member when the other end is moved by the operating part **[1, 2006.01]**

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 **[1, 2006.01]**

13/34 • • • • having two or more snap-action motions in succession **[1, 2006.01]**

13/36 • • • using flexing of blade springs **[1, 2006.01]**

13/38 • • • • Single blade moved across dead-centre position **[1, 2006.01]**

13/40 • • • • Blade spring with at least one snap-acting leg and at least one separate contactcarrying or contact-actuating leg **[1, 2006.01]**

13/42 • • • • • having three legs **[1, 2006.01]**

13/44 • • • • having two or more snap-action motions in succession **[1, 2006.01]**

13/46 • • • • two separate blade springs forming a toggle **[1, 2006.01]**

13/48 • • • using buckling of disc springs **[1, 2006.01]**

13/50 • having a single operating member **[1, 2006.01]**

13/52 • • the contact returning to its original state immediately upon removal of operating force, e.g. bell push switch **[1, 2006.01]**

13/54 • • the contact returning to its original state a predetermined time interval after removal of operating force, e.g. for staircase lighting **[1, 2006.01]**

13/56 • • the contact returning to its original state upon the next application of operating force **[1, 2006.01]**

13/58 • • • with contact-driving member rotated step-wise in one direction **[1, 2006.01]**

13/60 • • • with contact-driving member moved alternately in opposite directions **[1, 2006.01]**

13/62 • • the contact returning to its original state upon manual release of a latch (latch released by second push-button H01H 13/68) **[1, 2006.01]**

13/64 • • wherein the switch has more than two electrically distinguishable positions, e.g. multi-position push-button switches **[1, 2006.01]**

13/66 • • • the operating member having only two positions **[1, 2006.01]**

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) **[1, 2006.01]**

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) **[1, 2006.01]**

13/702 • • with contacts carried by or formed from layers in a multilayer structure, e.g. membrane switches **[7, 2006.01]**

13/703 • • • characterised by spacers between contact carrying layers **[2006.01]**

13/704 • • • characterised by the layers, e.g. by their material or structure (H01H 13/703 takes precedence) **[2006.01]**

13/705 • • • characterised by construction, mounting or arrangement of operating parts, e.g. push-buttons or keys **[7, 2006.01]**

13/7057 • • • • characterised by the arrangement of operating parts in relation to each other, e.g. pre-assembled groups of keys **[2006.01]**

13/7065 • • • • characterised by the mechanism between keys and layered keyboards **[2006.01]**

13/7073 • • • • • characterised by springs, e.g. Euler springs **[2006.01]**

13/708 • • • in which all fixed and movable contacts are carried by insulating members (H01H 13/705 takes precedence) **[7, 2006.01]**

13/712 • • • • all of the insulating members being substantially flat **[7, 2006.01]**

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, 2006.01]**

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, 2006.01]**

13/72 • • wherein the switch has means for limiting the number of operating members that can concurrently be in the actuated position **[1, 2006.01]**

13/74 • • • each contact set returning to its original state only upon actuation of another of the operating members **[1, 2006.01]**

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 **[1, 2006.01]**

13/78 • • characterised by the contacts or the contact sites **[2006.01]**

13/785 • • • characterised by the material of the contacts, e.g. conductive polymers **[2006.01]**

13/79 • • • characterised by the form of the contacts, e.g. interspersed fingers or helical networks **[2006.01]**

13/80 • • • characterised by the manner of cooperation of the contacts, e.g. with both contacts movable or with bounceless contacts **[2006.01]**

13/803 • • • characterised by the switching function thereof, e.g. normally closed contacts or consecutive operation of contacts **[2006.01]**

13/807 • • • characterised by the spatial arrangement of the contact sites, e.g. superimposed sites **[2006.01]**

13/81 • • characterised by electrical connections to external devices **[2006.01]**

13/82 • • characterised by contact space venting means **[2006.01]**

13/83 • • characterised by legends, e.g. Braille, liquid crystal displays, light emitting or optical elements **[2006.01]**

13/84 • • characterised by ergonomic functions, e.g. for miniature keyboards; characterised by operational sensory functions, e.g. sound feedback (legends H01H 13/83) **[2006.01]**

13/85 • • • characterised by tactile feedback features **[2006.01]**

13/86 • • characterised by the casing, e.g. sealed casings or casings reducible in size **[2006.01]**

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 **[2006.01]**

15/00 Switches having rectilinearly-movable operating part or parts adapted for actuation in opposite directions, e.g. slide switch [1, 2006.01]

15/02 • Details **[1, 2006.01]**

15/04 • • Stationary parts; Contacts mounted thereon **[1, 2006.01]**

15/06 • • Movable parts; Contacts mounted thereon **[1, 2006.01]**

15/08 • • • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing **[1, 2006.01]**

15/10 • • • Operating parts **[1, 2006.01]**

15/12 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

15/16 • • • Driving mechanisms **[1, 2006.01]**

15/18 • • • • acting with snap action **[1, 2006.01]**

15/20 • • • • with means for introducing a predetermined time delay **[1, 2006.01]**

15/22 • having a single operating part protruding from different sides of switch casing for alternate actuation from opposite ends **[1, 2006.01]**

15/24 • having a single operating part only protruding from one side of the switch casing for alternate pushing and pulling **[1, 2006.01]**

17/00 Switches having flexible operating part adapted only for pulling, e.g. cord, chain [1, 2006.01]

17/02 • Details **[1, 2006.01]**

17/04 • • Stationary parts (guides H01H 17/14) **[1, 2006.01]**

17/06 • • Movable parts (guides H01H 17/14) **[1, 2006.01]**

17/08 • • • Operating part, e.g. cord **[1, 2006.01]**

17/10 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

17/14 • • Guiding means for flexible operating part **[1, 2006.01]**

17/16 • having a single flexible operating part adapted for pulling at one end only **[1, 2006.01]**

17/18 • • secured to a part of the switch driving mechanism that has only angular movement **[1, 2006.01]**

17/20 • • • the contact returning to its original state immediately upon removal of operating force **[1, 2006.01]**

17/22 • • • the contact returning to its original state upon the next application of operating force **[1, 2006.01]**

17/24 • • secured to a part of the switch driving mechanism that has both angular and rectilinear motion **[1, 2006.01]**

17/26 • having two flexible operating parts; having a single operating part adapted for pulling at both ends **[1, 2006.01]**

17/28 • • secured to a part or parts of the switch driving mechanism having only rectilinear motion **[1, 2006.01]**

17/30 • • secured to a part or parts of the switch driving mechanism having only angular motion **[1, 2006.01]**

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, 2006.01]

19/02 • Details **[1, 2006.01]**

19/03 • • Means for limiting the angle of rotation of the operating part **[2006.01]**

19/04 • • Cases; Covers **[1, 2006.01]**

19/06 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings **[1, 2006.01]**

19/08 • • Bases; Stationary contacts mounted thereon **[1, 2006.01]**

19/10 • • Movable parts; Contacts mounted thereon **[1, 2006.01]**

19/11 • • • with indexing means **[2006.01]**

19/12 • • • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing **[1, 2006.01]**

19/14 • • • Operating parts, e.g. turn knob **[1, 2006.01]**

19/16 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

19/20 • • • Driving mechanisms allowing angular displacement of the operating part to be effective in either direction **[1, 2006.01]**

19/22 • • • • incorporating lost motion **[1, 2006.01]**

19/24 • • • • acting with snap action **[1, 2006.01]**

19/26 • • • • with means for introducing a predetermined time delay **[1, 2006.01]**

19/28 • • • Driving mechanisms allowing angular displacement of the operating part to be effective or possible in only one direction **[1, 2006.01]**

19/30 • • • • incorporating lost motion **[1, 2006.01]**

19/32 • • • • acting with snap action **[1, 2006.01]**

19/34 • • • • with means for introducing a predetermined time delay **[1, 2006.01]**

19/36 • the operating part having only two operative positions, e.g. relatively displaced by 180° **[1, 2006.01]**

19/38 • • Change-over switches **[1, 2006.01]**

19/40 • • • having only axial contact pressure **[1, 2006.01]**

19/42 • • providing more than two electrically-different conditions, e.g. for closing either or both of two circuits **[1, 2006.01]**

19/44 • • • having only axial contact pressure **[1, 2006.01]**

19/46 • the operating part having three operative positions, e.g. off/star/delta **[1, 2006.01]**

19/48 • • having only axial contact pressure **[1, 2006.01]**

19/50 • the operating part having four operative positions, e.g. off/two-in-series/one-only/two-in-parallel **[1, 2006.01]**

19/52 • • having only axial contact pressure **[1, 2006.01]**

19/54 • the operating part having at least five or an unspecified number of operative positions **[1, 2006.01]**

19/56 • • Angularly-movable actuating part carrying contacts, e.g. drum switch **[1, 2006.01]**

19/58 • • • having only axial contact pressure, e.g. disc switch, wafer switch **[1, 2006.01]**

19/60 • • Angularly-movable actuating part carrying no contacts **[1, 2006.01]**

19/62 • • • Contacts actuated by radial cams **[1, 2006.01]**

19/63 • • • Contacts actuated by axial cams **[2, 2006.01]**

19/635 • • • Contacts actuated by rectilinearly-movable member linked to operating part, e.g. by pin and slot **[2006.01]**

19/64 • Encased switches adapted for ganged operation when assembled in a line with identical switches, e.g. stacked switches **[1, 2006.01]**

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, 2006.01]**

21/02 • Details **[1, 2006.01]**

21/04 • • Cases; Covers **[1, 2006.01]**

21/06 • • • interlocked with operating mechanism **[1, 2006.01]**

21/08 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings **[1, 2006.01]**

21/10 • • • Casing of switch constituted by a handle serving a purpose other than the actuation of the switch **[1, 2006.01]**

21/12 • • Bases; Stationary contacts mounted thereon **[1, 2006.01]**

21/14 • • Means for increasing contact pressure **[1, 2006.01]**

21/16 • • Adaptation for built-in fuse **[1, 2006.01]**

21/18 • • Movable parts; Contacts mounted thereon **[1, 2006.01]**

21/20 • • • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing **[1, 2006.01]**

21/22 • • • Operating parts, e.g. handle **[1, 2006.01]**

21/24 • • • • biased to return to original position upon removal of operating force **[1, 2006.01]**

21/26 • • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

21/30 • • • • not biased to return to original position upon removal of operating force **[1, 2006.01]**

21/32 • • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

21/36 • • • Driving mechanisms **[1, 2006.01]**

21/38 • • • • incorporating lost motion **[1, 2006.01]**

21/40 • • • • having snap action **[1, 2006.01]**

21/42 • • • • • produced by compression or extension of coil spring **[1, 2006.01]**

21/44 • • • • • produced by flexing blade springs **[1, 2006.01]**

21/46 • • • • • with two or more snap-action motions in succession **[1, 2006.01]**

21/48 • • • • incorporating a ratchet mechanism **[1, 2006.01]**

21/50 • • • • with indexing or latching means, e.g. indexing by ball and spring; with means to ensure stopping at intermediate operative positions **[1, 2006.01]**

21/52 • • • • with means for introducing a predetermined time delay **[1, 2006.01]**

21/54 • Lever switches with blade-type contact co-operating with one or two spring-clip contacts, e.g. knife switch, sectionalisers **[1, 2006.01]**

21/56 • • making contact in one position only **[1, 2006.01]**

21/58 • • Change-over switches without stable intermediate position **[1, 2006.01]**

21/60 • • Change-over switches with stable intermediate position **[1, 2006.01]**

21/86 • Switches with abutting contact carried by operating part, e.g. telegraph tapping key **[1, 2006.01]**

21/88 • • with intermediate position of rest **[1, 2006.01]**

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 [1, 2006.01]

Note(s) [2006.01]

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.

23/02 • Details **[1, 2006.01]**

23/04 • • Cases; Covers **[1, 2006.01]**

23/06 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings **[1, 2006.01]**

23/08 • • Bases; Stationary contacts mounted thereon **[1, 2006.01]**

23/10 • • Adaptation for built-in fuse **[1, 2006.01]**

23/12 • • Movable parts; Contacts mounted thereon **[1, 2006.01]**

23/14 • • • Tumblers **[1, 2006.01]**

23/16 • • • Driving mechanisms **[1, 2006.01]**

23/18 • • • • incorporating lost motion **[1, 2006.01]**

23/20 • • • • having snap action **[1, 2006.01]**

23/22 • • • • with means for introducing a predetermined time delay **[1, 2006.01]**

23/24 • with two operating positions **[1, 2006.01]**

23/26 • • one of which positions is unstable **[1, 2006.01]**

23/28 • with three operating positions **[1, 2006.01]**

23/30 • • with stable centre position and one or both end positions unstable **[1, 2006.01]**

25/00 Switches with compound movement of handle or other operating part [1, 2006.01]

25/04 • Operating part movable angularly in more than one plane, e.g. joystick **[1, 2006.01]**

25/06 • Operating part movable both angularly and rectilinearly, the rectilinear movement being along the axis of angular movement **[1, 2006.01]**

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) **[1, 2006.01]**

27/04 • Insulating plug or plate inserted between normally-closed contacts **[1, 2006.01]**

27/06 • Key inserted and then turned to effect operation of the switch **[1, 2006.01]**

27/08 • • wherein the key cannot be removed until the switch is returned to its original position **[1, 2006.01]**

27/10 • Switch operated by setting members according to a single predetermined combination out of several possible settings **[1, 2006.01]**

29/00 Switches having at least one liquid contact (solid contacts wetted or soaked with mercury H01H 1/08) **[1, 2006.01]**

29/02 • Details **[1, 2006.01]**

29/04 • • Contacts; Containers for liquid contacts **[1, 2006.01]**

29/06 • • • Liquid contacts characterised by the material thereof **[1, 2006.01]**

29/08 • • Means for introducing a predetermined time delay **[1, 2006.01]**

29/10 • • • by constricting the flow of the contact liquid **[1, 2006.01]**

29/12 • • Operating mechanisms adapted for operation by a part of the human body other than the hand, e.g. by foot **[1, 2006.01]**

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 **[1, 2006.01]**

29/16 • operated by dipping solid contact into stationary contact liquid **[1, 2006.01]**

29/18 • with level of surface of contact liquid displaced by non-electrical contact-making plunger **[1, 2006.01]**

29/20 • operated by tilting contact-liquid container **[1, 2006.01]**
29/22 • • wherein contact is made and broken between liquid and solid **[1, 2006.01]**
29/24 • • wherein contact is made and broken between liquid and liquid **[1, 2006.01]**
29/26 • with level of surface of contact liquid displaced by centrifugal action **[1, 2006.01]**
29/28 • with level of surface of contact liquid displaced by fluid pressure **[1, 2006.01]**
29/30 • with level of surface of contact liquid displaced by expansion or evaporation thereof **[1, 2006.01]**
29/32 • with contact made by a liquid jet, e.g. earthing switch with contact made by jet of water **[1, 2006.01]**

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) **[1, 3, 2006.01]**
31/02 • Details **[1, 2006.01]**
31/04 • • Interlocking mechanisms **[1, 2006.01]**
31/06 • • • for interlocking between casing, cover, or protective shutter and mechanism for operating contacts **[1, 2006.01]**
31/08 • • • for interlocking two or more parts of the mechanism for operating contacts **[1, 2006.01]**
31/10 • • • for interlocking two or more switches **[1, 2006.01]**
31/12 • • Adaptation for built-in fuse **[1, 2006.01]**
31/14 • with bridging contact that is not electrically connected to either line contact in open position of switch **[1, 2006.01]**
31/16 • • with angularly-movable bridging contact or contact-carrying member **[1, 2006.01]**
31/18 • • • actuated through the movement of one or more insulators **[1, 2006.01]**
31/20 • • • • at least one insulator being rotatable about its own geometrical axis **[1, 2006.01]**
31/22 • • • wherein the contact or contacts are rectilinearly movable with respect to the carrying member **[1, 2006.01]**
31/24 • • with rectilinearly-movable bridging contact **[1, 2006.01]**
31/26 • with movable contact that remains electrically connected to one line in open position of switch **[1, 2006.01]**
31/28 • • with angularly-movable contact **[1, 2006.01]**
31/30 • • • actuated-through the movement of one or more insulators **[1, 2006.01]**
31/32 • • with rectilinearly-movable contact **[1, 2006.01]**
31/34 • with movable contact adapted to engage an overhead transmission line, e.g. for branching **[1, 2006.01]**
31/36 • • Contact moved by pantograph **[1, 2006.01]**

33/00 High-tension or heavy-current switches with arc-extinguishing or arc-preventing means [1, 2006.01]
33/02 • Details **[1, 2006.01]**
33/04 • • Means for extinguishing or preventing arc between current-carrying parts **[1, 2006.01]**
33/06 • • • Insulating body insertable between contacts **[1, 2006.01]**
33/08 • • • Stationary parts for restricting or subdividing the arc, e.g. barrier plate **[1, 2006.01]**
33/10 • • • • Metal parts **[1, 2006.01]**
33/12 • • • Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing horns H01H 33/20) **[1, 2006.01]**
33/14 • • • Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc **[1, 2006.01]**
33/16 • • • Impedances connected with contacts **[1, 2006.01]**
33/18 • • • using blow-out magnet **[1, 2006.01]**
33/20 • • • using arcing horns (using blow-out magnet H01H 33/18) **[1, 2006.01]**
33/22 • • • Selection of fluids for arc-extinguishing **[1, 2006.01]**
33/24 • • Means for preventing discharge to non-current-carrying parts, e.g. using corona ring **[1, 2006.01]**
33/26 • • Means for detecting the presence of an arc or other discharge **[1, 2006.01]**
33/28 • • Power arrangements internal to the switch for operating the driving mechanism **[1, 2006.01]**
33/30 • • • using fluid actuator **[1, 2006.01]**
33/32 • • • • pneumatic **[1, 2006.01]**
33/34 • • • • hydraulic **[1, 2006.01]**
33/36 • • • using dynamo-electric motor **[1, 2006.01]**
33/38 • • • using electromagnet **[1, 2006.01]**
33/40 • • • using spring motor **[1, 2006.01]**
33/42 • • Driving mechanisms **[1, 2006.01]**
33/44 • • Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 33/59) **[1, 2006.01]**
33/46 • • Interlocking mechanisms **[1, 2006.01]**
33/48 • • • for interlocking between casing or cover and mechanism for operating contacts **[1, 2006.01]**
33/50 • • • for interlocking two or more parts of the mechanism for operating contacts **[1, 2006.01]**
33/52 • • • for interlocking two or more switches **[1, 2006.01]**
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, 2006.01]**
33/55 • • • Oil reservoirs or tanks; Lowering means therefor (associated with withdrawal mechanism for isolation of switch H02B 11/08) **[1, 2006.01]**
33/56 • • • Gas reservoirs **[1, 2006.01]**
33/57 • • • Recuperation of liquid or gas **[1, 2006.01]**
33/575 • • • Pressure relief devices for normal or emergency use **[3, 2006.01]**
33/58 • • • Silencers for suppressing noise of switch operation **[1, 3, 2006.01]**
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 **[1, 2006.01]**
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 **[1, 2006.01]**
33/64 • • wherein the break is in gas (vacuum switches H01H 33/66) **[1, 2006.01]**
33/65 • • • wherein the break is in air at atmospheric pressure, e.g. in open air **[2009.01]**
33/66 • • Vacuum switches **[1, 2006.01]**
33/662 • • • Housings or protective screens **[7, 2006.01]**
33/664 • • • Contacts; Arc-extinguishing means, e.g. arcing rings **[7, 2006.01]**

33/666 • • • Operating arrangements **[7, 2006.01]**
33/668 • • • Means for obtaining or monitoring the vacuum **[7, 2006.01]**
33/68 • • Liquid-break switches, e.g. oil-break **[1, 2006.01]**
33/70 • Switches with separate means for directing, obtaining, or increasing flow of arc-extinguishing fluid **[1, 2006.01]**
33/72 • • having stationary parts for directing the flow of arc-extinguishing fluid, e.g. arc-extinguishing chamber **[1, 2006.01]**
33/73 • • • wherein the break is in air at atmospheric pressure, e.g. in open air **[1, 2006.01]**
33/74 • • • wherein the break is in gas (in air at atmospheric pressure H01H 33/73) **[1, 2006.01]**
33/75 • • • Liquid-break switches, e.g. oil-break **[1, 2006.01]**
33/76 • • wherein arc-extinguishing gas is evolved from stationary parts; Selection of material therefor **[1, 2006.01]**
33/77 • • • wherein the break is in air at atmospheric pressure **[1, 2006.01]**
33/78 • • • wherein the break is in gas (in air at atmospheric pressure H01H 33/77) **[1, 2006.01]**
33/80 • • flow of arc-extinguishing fluid from a pressure source being controlled by a valve **[1, 2006.01]**
33/82 • • • the fluid being air or gas **[1, 2006.01]**
33/825 • • • • with closed circuit of air or gas (H01H 33/835 takes precedence) **[3, 2006.01]**
33/83 • • • • wherein the contacts are opened by the flow of air or gas **[1, 2006.01]**
33/835 • • • • • with closed circuit of air or gas **[3, 2006.01]**
33/84 • • • the fluid being liquid, e.g. oil **[1, 2006.01]**
33/85 • • • • wherein the contacts are opened by the flow of liquid **[1, 2006.01]**
33/86 • • the flow of arc-extinguishing fluid under pressure from the contact space being controlled by a valve **[1, 2006.01]**
33/867 • • • the fluid being air or gas **[3, 2006.01]**
33/873 • • • • with closed circuit of air or gas **[3, 2006.01]**
33/88 • • the flow of arc-extinguishing fluid being produced or increased by movement of pistons or other pressure-producing parts **[1, 2006.01]**
33/90 • • • this movement being effected by, or in conjunction with, the contact-operating mechanism **[1, 2006.01]**
33/91 • • • • the arc-extinguishing fluid being air or gas **[1, 2006.01]**
33/915 • • • • • with closed circuit of air or gas **[3, 2006.01]**
33/92 • • • • the arc-extinguishing fluid being liquid, e.g. oil **[1, 2006.01]**
33/94 • • • this movement being effected solely due to the pressure caused by the arc itself or by an auxiliary arc **[1, 2006.01]**
33/95 • • • • the arc-extinguishing fluid being air or gas **[1, 2006.01]**
33/96 • • • • the arc-extinguishing fluid being liquid, e.g. oil **[1, 2006.01]**
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 **[1, 2006.01]**
33/985 • • • the fluid being air or gas **[3, 2006.01]**
33/99 • • • the fluid being liquid **[3, 2006.01]**

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) **[1, 2006.01]**

Note(s)

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) **[1, 2006.01]**
35/06 • Switches operated by change of speed (operated by change of fluid flow H01H 35/24) **[1, 2006.01]**
35/10 • • Centrifugal switches (level of mercury displaced by centrifugal action H01H 29/26) **[1, 2006.01]**
35/12 • • operated by reversal of direction of movement **[1, 2006.01]**
35/14 • Switches operated by change of acceleration, e.g. by shock or vibration, inertia switch **[1, 2006.01]**
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) **[1, 2006.01]**
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) **[1, 2006.01]**
35/26 • • Details **[1, 2006.01]**
35/28 • • • Compensation for variation of ambient pressure or temperature **[1, 2006.01]**
35/30 • • • Means for transmitting pressure to pressure-responsive operating part, e.g. by capsule and capillary tube **[1, 2006.01]**
35/32 • • actuated by bellows **[1, 2006.01]**
35/34 • • actuated by diaphragm **[1, 2006.01]**
35/36 • • actuated by curled flexible tube, e.g. Bourdon tube **[1, 2006.01]**
35/38 • • actuated by piston and cylinder **[1, 2006.01]**
35/40 • • actuated by devices allowing continual flow of fluid, e.g. vane **[1, 2006.01]**
35/42 • Switches operated by change of humidity **[1, 2006.01]**

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 [1, 2006.01]

36/02 • actuated by movement of a float carrying a magnet **[1, 2006.01]**

37/00 Thermally-actuated switches [1, 2006.01]

37/02 • Details **[1, 2006.01]**
37/04 • • Bases; Housings; Mountings **[1, 2006.01]**
37/06 • • • to facilitate replacement, e.g. cartridge housing **[1, 2006.01]**
37/08 • • Indicators; Distinguishing marks **[1, 2006.01]**
37/10 • • Compensation for variation of ambient temperature or pressure **[1, 2006.01]**
37/12 • • Means for adjustment of "on" or "off" operating temperature **[1, 2006.01]**
37/14 • • • by anticipatory electric heater **[1, 2006.01]**

37/16 • • • by varying the proportion of input heat received by the thermal element, e.g. by displacement of a shield **[1, 2006.01]**
37/18 • • • by varying bias on the thermal element due to a separate spring **[1, 2006.01]**
37/20 • • • by varying the position of the thermal element in relation to switch base or casing **[1, 2006.01]**
37/22 • • • by adjustment of a member transmitting motion from the thermal element to contacts or latch **[1, 2006.01]**
37/24 • • • by adjustment of position of the movable contact on its driving member **[1, 2006.01]**
37/26 • • • by adjustment of abutment for "off" position of the movable contact **[1, 2006.01]**
37/28 • • • by adjustment of the position of the fixed contact **[1, 2006.01]**
37/30 • • • by varying the position of the contact unit in relation to switch base or casing **[1, 2006.01]**
37/32 • • Thermally-sensitive members **[1, 2006.01]**
37/34 • • • Means for transmitting heat thereto, e.g. capsule remote from contact member **[1, 2006.01]**
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) **[1, 2006.01]**
37/38 • • • • with bellows **[1, 2006.01]**
37/40 • • • • with diaphragm **[1, 2006.01]**
37/42 • • • • with curled flexible tube, e.g. Bourdon tube **[1, 2006.01]**
37/44 • • • • with piston and cylinder **[1, 2006.01]**
37/46 • • • actuated due to expansion or contraction of a solid (deflection of a bimetallic element H01H 37/52) **[1, 2006.01]**
37/48 • • • • with extensible rigid rods or tubes **[1, 2006.01]**
37/50 • • • • with extensible wires under tension **[1, 2006.01]**
37/52 • • • actuated due to deflection of bimetallic element **[1, 2006.01]**
37/54 • • • • wherein the bimetallic element is inherently snap acting **[1, 2006.01]**
37/56 • • • • having spirally wound or helically wound bimetallic element **[1, 2006.01]**
37/58 • • • actuated due to thermally controlled change of magnetic permeability **[1, 2006.01]**
37/60 • • Means for producing snap action (inherent in bimetallic element H01H 37/54; caused by a magnet H01H 37/66) **[1, 2006.01]**
37/62 • • Means other than thermal means for introducing a predetermined time delay **[1, 2006.01]**
37/64 • • Contacts **[1, 2006.01]**
37/66 • • • Magnetic reinforcement of contact pressure; Magnet causing snap action **[1, 2006.01]**
37/68 • • • sealed in evacuated or gas-filled tube **[1, 2006.01]**
37/70 • • • Resetting means **[1, 2006.01]**
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 **[1, 2006.01]**
37/74 • Switches in which only the opening movement or only the closing movement of a contact is effected by heating or cooling **[1, 2006.01]**
37/76 • • Contact member actuated by melting of fusible material, actuated due to burning of combustible material or due to explosion of explosive material **[1, 2006.01]**

39/00 Switching devices actuated by an explosion produced within the device and initiated by an electric current [1, 2006.01]

41/00 Switches providing a selected number of consecutive operations of the contacts by a single manual actuation of the operating part [1, 2006.01]
41/04 • Switches without means for setting or mechanically storing a multidigit number **[1, 2006.01]**
41/06 • • dial or slide operated **[1, 2006.01]**
41/08 • • keyboard operated **[1, 2006.01]**
41/10 • Switches with means for setting or mechanically storing a multidigit number **[1, 2006.01]**
41/12 • • dial or slide operated **[1, 2006.01]**
41/14 • • keyboard operated **[1, 2006.01]**

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 [1, 2006.01]
43/02 • Details **[1, 2006.01]**
43/04 • • Means for time setting **[1, 2006.01]**
43/06 • • • comprising separately adjustable parts for each programme step, e.g. with tappets **[1, 2006.01]**
43/08 • • • comprising an interchangeable programme part which is common for all programme steps, e.g. with a punched card **[1, 2006.01]**
43/10 • with timing of actuation of contacts due to a part rotating at substantially constant speed **[1, 2006.01]**
43/12 • • stopping automatically after a single cycle of operation **[1, 2006.01]**
43/14 • • • wherein repetition of operation necessitates resetting of time intervals **[1, 2006.01]**
43/16 • • stopping automatically after a predetermined plurality of cycles of operation **[1, 2006.01]**
43/24 • with timing of actuation of contacts due to a non-rotatably moving part **[1, 2006.01]**
43/26 • • the actuation being produced by a substance flowing due to gravity, e.g. sand, water **[1, 2006.01]**
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 **[1, 2006.01]**
43/30 • with timing of actuation of contacts due to thermal action **[1, 2006.01]**
43/32 • with timing of actuation of contacts due to electrolytic processes; with timing of actuation of contacts due to chemical processes **[1, 2006.01]**

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) **[1, 2006.01]**
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) **[1, 2006.01]**
45/04 • • Mounting complete relay or separate parts of relay on a base or inside a case **[1, 2006.01]**

45/06 • • having windows; Transparent cases or covers **[1, 2006.01]**
45/08 • Indicators; Distinguishing marks **[1, 2006.01]**
45/10 • Electromagnetic or electrostatic shielding (casings H01H 45/02) **[1, 2006.01]**
45/12 • Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013) **[1, 2006.01]**
45/14 • Terminal arrangements **[1, 2006.01]**

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 [1, 2006.01]

47/02 • for modifying the operation of the relay **[1, 2006.01]**
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 **[1, 2006.01]**
47/06 • • • by changing number of serially-connected turns or winding **[1, 2006.01]**
47/08 • • • by changing number of parallel-connected turns or windings **[1, 2006.01]**
47/10 • • • by switching-in or -out impedance external to the relay winding **[1, 2006.01]**
47/12 • • for biasing the electromagnet **[1, 2006.01]**
47/14 • • for differential operation of the relay **[1, 2006.01]**
47/16 • • for conjoint, e.g. additive, operation of the relay **[1, 2006.01]**
47/18 • • for introducing delay in the operation of the relay (short-circuited conducting sleeves, bands, or discs H01H 50/46) **[1, 2006.01]**
47/20 • • for producing frequency-selective operation of the relay **[1, 2006.01]**
47/22 • for supplying energising current for relay coil **[1, 2006.01]**
47/24 • • having light-sensitive input **[1, 2006.01]**
47/26 • • having thermo-sensitive input **[1, 2006.01]**
47/28 • • Energising current supplied by discharge tube **[1, 2006.01]**
47/30 • • • by gas-filled discharge tube **[1, 2006.01]**
47/32 • • Energising current supplied by semiconductor device **[1, 2006.01]**
47/34 • • Energising current supplied by magnetic amplifier **[1, 2006.01]**
47/36 • • Relay coil or coils forming part of a bridge circuit **[1, 2006.01]**

49/00 Apparatus or processes specially adapted to the manufacture of relays or parts thereof [1, 2006.01]

50/00 Details of electromagnetic relays (electric circuit arrangements H01H 47/00; details of electrically-operated selector switches H01H 63/00) **[1, 2006.01]**

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) **[1, 2006.01]**
50/04 • • Mounting complete relay or separate parts of relay on a base or inside a case **[1, 2006.01]**
50/06 • • having windows; Transparent cases or covers **[1, 2006.01]**
50/08 • Indicators; Distinguishing marks **[1, 2006.01]**
50/10 • Electromagnetic or electrostatic shielding (casings H01H 50/02) **[1, 2006.01]**
50/12 • Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013) **[1, 2006.01]**
50/14 • Terminal arrangements **[1, 2006.01]**
50/16 • Magnetic circuit arrangements **[1, 2006.01]**
50/18 • • Movable parts of magnetic circuits, e.g. armature **[1, 2006.01]**
50/20 • • • movable inside coil and substantially lengthwise with respect to axis thereof; movable coaxially with respect to coil **[1, 2006.01]**
50/22 • • • • wherein the magnetic circuit is substantially closed **[1, 2006.01]**
50/24 • • • Parts rotatable or rockable outside coil **[1, 2006.01]**
50/26 • • • • Parts movable about a knife edge **[1, 2006.01]**
50/28 • • • • Parts movable due to bending of a blade spring or reed **[1, 2006.01]**
50/30 • • • Mechanical arrangements for preventing or damping vibration or shock, e.g. by balancing of armature **[1, 2006.01]**
50/32 • • • Latching movable parts mechanically **[1, 2006.01]**
50/34 • • • Means for adjusting limits of movement; Mechanical means for adjusting returning force **[1, 2006.01]**
50/36 • • Stationary parts of magnetic circuit, e.g. yoke **[1, 2006.01]**
50/38 • • • Part of main magnetic circuit shaped to suppress arcing between the contacts of the relay **[1, 2006.01]**
50/40 • • • Branched or multiple-limb main magnetic circuits **[1, 2006.01]**
50/42 • • • Auxiliary magnetic circuits, e.g. for maintaining armature in, or returning armature to, position of rest, for damping or accelerating movement **[1, 2006.01]**
50/44 • Magnetic coils or windings **[1, 2006.01]**
50/46 • • Short-circuited conducting sleeves, bands, or discs **[1, 2006.01]**
50/54 • Contact arrangements **[1, 2006.01]**
50/56 • • Contact spring sets **[1, 2006.01]**
50/58 • • • Driving arrangements structurally associated therewith; Mounting of driving arrangement on armature **[1, 2006.01]**
50/60 • • moving contact being rigidly combined with movable part of magnetic circuit **[1, 2006.01]**
50/62 • • Co-operating movable contacts operated by separate electrical actuating means **[1, 2006.01]**
50/64 • Driving arrangements between movable part of magnetic circuit and contact (structurally associated with contact spring sets H01H 50/58) **[1, 2006.01]**
50/66 • • with lost motion **[1, 2006.01]**
50/68 • • with snap action **[1, 2006.01]**
50/70 • • operating contact momentarily during stroke of armature **[1, 2006.01]**
50/72 • • for mercury contact **[1, 2006.01]**
50/74 • • Mechanical means for producing a desired natural frequency of operation of the contacts, e.g. for self-interrupter **[1, 2006.01]**
50/76 • • • using reed or blade spring **[1, 2006.01]**
50/78 • • • using diaphragm; using stretched wire or ribbon vibrating sideways **[1, 2006.01]**
50/80 • • • using torsionally vibrating member, e.g. wire, strip **[1, 2006.01]**
50/82 • • • using spring-loaded pivoted inertia member **[1, 2006.01]**
50/84 • • • with means for adjustment of frequency or of make-to-break ratio **[1, 2006.01]**

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) **[1, 2006.01]**

50/88 • • Mechanical means, e.g. dash-pot **[1, 2006.01]**

50/90 • • • the delay being effective in both directions of operation **[1, 2006.01]**

50/92 • • Thermal means (inherent in electrothermal relays H01H 61/00) **[1, 2006.01]**

51/00 Electromagnetic relays (relays using the dynamo-electric effect H01H 53/00) **[1, 2006.01]**

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, 2006.01]**

51/02 • Non-polarised relays (H01H 51/01 takes precedence) **[1, 3, 2006.01]**

51/04 • • with single armature; with single set of ganged armatures **[1, 2006.01]**

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 **[1, 2006.01]**

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 **[1, 2006.01]**

51/10 • • • • Contacts retained open or closed by a mechanical latch which is controlled by an electromagnet **[1, 2006.01]**

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 **[1, 2006.01]**

51/14 • • • • without intermediate neutral position of rest **[1, 2006.01]**

51/16 • • • • with intermediate neutral position of rest **[1, 2006.01]**

51/18 • • • Armature is rotatable through an unlimited number of revolutions **[1, 2006.01]**

51/20 • • with two or more independent armatures **[1, 2006.01]**

51/22 • Polarised relays **[1, 2006.01]**

51/24 • • without intermediate neutral position of rest **[1, 2006.01]**

51/26 • • with intermediate neutral position of rest **[1, 2006.01]**

51/27 • Relays with armature having two stable magnetic states and operated by change from one state to the other **[1, 2006.01]**

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) **[1, 2006.01]**

51/29 • Relays having armature, contacts, and operating coil within a sealed casing (H01H 51/27 takes precedence) **[1, 2006.01]**

51/30 • specially adapted for actuation by ac **[1, 2006.01]**

51/32 • • Frequency relays; Mechanically-tuned relays **[1, 2006.01]**

51/34 • Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts **[1, 2006.01]**

51/36 • • wherein the make-to-break ratio is varied by hand setting or current strength **[1, 2006.01]**

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 [1, 2006.01]

53/01 • Details **[1, 2006.01]**

53/015 • • Moving coils; Contact-driving arrangements associated therewith **[1, 2006.01]**

53/02 • Electrodynamic relays, i.e. relays in which the interaction is between two current-carrying conductors **[1, 2006.01]**

53/04 • • Ferrodynamic relays, i.e. relays in which the magnetic field is concentrated in ferromagnetic parts **[1, 2006.01]**

53/06 • Magnetodynamic relays, i.e. relays in which the magnetic field is produced by a permanent magnet **[1, 2006.01]**

53/08 • wherein a mercury contact constitutes the current-carrying conductor **[1, 2006.01]**

53/10 • Induction relays, i.e. relays in which the interaction is between a magnetic field and current induced thereby in a conductor **[1, 2006.01]**

53/12 • • Ferraris relays **[1, 2006.01]**

53/14 • Contacts actuated by an electric motor through fluid-pressure transmission, e.g. using a motor-driven pump **[1, 2006.01]**

55/00 Magnetostrictive relays [1, 2006.01]

57/00 Electrostrictive relays; Piezo-electric relays [1, 2006.01]

59/00 Electrostatic relays; Electro-adhesion relays [1, 2006.01]

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) **[1, 2006.01]**

61/01 • Details **[1, 2006.01]**

61/013 • • Heating arrangements for operating relays **[1, 2006.01]**

61/017 • • • Heating by glow discharge or arc in confined space **[1, 2006.01]**

61/02 • wherein the thermally-sensitive member is heated indirectly, e.g. resistively, inductively **[1, 2006.01]**

61/04 • wherein the thermally-sensitive member is only heated directly **[1, 2006.01]**

61/06 • Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts **[1, 2006.01]**

61/08 • • wherein the make-to-break ratio is varied by hand setting or current strength **[1, 2006.01]**

Selectors [3]

63/00 Details of electrically-operated selector switches [1, 2006.01]

63/02 • Contacts; Wipers; Connections thereto **[1, 2006.01]**

63/04 • • Contact-making or contact-breaking wipers; Position indicators therefor **[1, 2006.01]**

63/06 • • Contact banks **[1, 2006.01]**

63/08 • • • cylindrical **[1, 2006.01]**
63/10 • • • plane **[1, 2006.01]**
63/12 • • Multiplying connections to contact banks, e.g. using ribbon cables **[1, 2006.01]**
63/14 • • • without soldering **[1, 2006.01]**
63/16 • Driving arrangements for multi-position wipers **[1, 2006.01]**
63/18 • • with step-by-step motion of wiper to a selector position **[1, 2006.01]**
63/20 • • • using stepping magnet and ratchet **[1, 2006.01]**
63/22 • • • using step-by-step electromagnetic drive without ratchet, e.g. self-interrupting driving magnet **[1, 2006.01]**
63/24 • • with continuous motion of wiper until a selected position is reached **[1, 2006.01]**
63/26 • • • with an individual clutch-drive from a shaft common to more than one selector switch **[1, 2006.01]**
63/28 • • • with an individual motor for each selector switch **[1, 2006.01]**
63/30 • • • • Pneumatic motor for moving wiper to selected position **[1, 2006.01]**
63/32 • • • • Spring motor for moving wiper to selected position **[1, 2006.01]**
63/33 • Constructional details of co-ordinate-type selector switches not having relays at cross-points **[1, 2006.01]**
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 **[1, 2006.01]**
63/36 • Circuit arrangements for ensuring correct or desired operation and not adapted to a particular application of the selector switch **[1, 2006.01]**
63/38 • • for multi-position wiper switches **[1, 2006.01]**
63/40 • • for multi-position switches without wipers **[1, 2006.01]**
63/42 • • • for co-ordinate-type selector switches not having relays at cross-points **[1, 2006.01]**

65/00 Apparatus or processes specially adapted to the manufacture of selector switches or parts thereof [1, 2006.01]

67/00 Electrically-operated selector switches [1, 2006.01]
67/02 • Multi-position wiper switches **[1, 2006.01]**
67/04 • • having wipers movable only in one direction for purpose of selection **[1, 2006.01]**
67/06 • • • Rotary switches, i.e. having angularly movable wipers **[1, 2006.01]**
67/08 • • • • with wiper selection **[1, 2006.01]**
67/10 • • • • with coarse and fine positioning of wipers **[1, 2006.01]**
67/12 • • • Linear-motion switches **[1, 2006.01]**
67/14 • • having wipers movable in two mutually perpendicular directions for purpose of selection **[1, 2006.01]**
67/16 • • • one motion being rotary and the other being parallel to the axis of rotation, e.g. Strowger or "up and around" switches **[1, 2006.01]**
67/18 • • • one motion being rotary and the other being perpendicular to the axis of rotation, e.g. "round and in" switches **[1, 2006.01]**
67/20 • • • both motions being linear **[1, 2006.01]**
67/22 • Switches without multi-position wipers **[1, 2006.01]**
67/24 • • Co-ordinate-type relay switches having an individual electromagnet at each cross-point **[1, 2006.01]**
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 **[1, 2006.01]**
67/30 • • Co-ordinate-type selector switches with field of co-ordinate coil acting directly upon magnetic leaf spring or reed-type contact member **[1, 2006.01]**
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 **[1, 2006.01]**

Emergency protective devices

69/00 Apparatus or processes for the manufacture of emergency protective devices [1, 2006.01]
69/01 • for calibrating or setting of devices to function under predetermined conditions **[1, 2006.01]**
69/02 • Manufacture of fuses **[1, 2006.01]**

71/00 Details of the protective switches or relays covered by groups H01H 73/00-H01H 83/00 [1, 2006.01]
71/02 • Housings; Casings; Bases; Mountings **[1, 2006.01]**
71/04 • Means for indicating condition of the switching device **[1, 2006.01]**
71/06 • Distinguishing marks, e.g. colour coding **[1, 2006.01]**
71/08 • Terminals; Connections **[1, 2006.01]**
71/10 • Operating or release mechanisms **[1, 2006.01]**
71/12 • • Automatic release mechanisms with or without manual release **[1, 2006.01]**
71/14 • • • Electrothermal mechanisms **[1, 2006.01]**
71/16 • • • • with bimetal element **[1, 2006.01]**
71/18 • • • • with expanding rod, strip, or wire **[1, 2006.01]**
71/20 • • • • with fusible mass **[1, 2006.01]**
71/22 • • • • with compensation for variation of ambient temperature **[1, 2006.01]**
71/24 • • • Electromagnetic mechanisms **[1, 2006.01]**
71/26 • • • • with windings acting in opposition **[1, 2006.01]**
71/28 • • • • with windings acting in conjunction **[1, 2006.01]**
71/30 • • • • having additional short-circuited winding **[1, 2006.01]**
71/32 • • • • having permanently magnetised part **[1, 2006.01]**
71/34 • • • • having two or more armatures controlled by a common winding **[1, 2006.01]**
71/36 • • • • frequency selective **[1, 2006.01]**
71/38 • • • • wherein the magnet coil also acts as arc blow-out device **[1, 2006.01]**
71/40 • • • Combined electrothermal and electromagnetic mechanisms **[1, 2006.01]**
71/42 • • • Induction-motor, induced-current, or electrodynamic release mechanisms **[1, 2006.01]**
71/43 • • • • Electrodynamic release mechanisms **[1, 2006.01]**
71/44 • • • having means for introducing a predetermined time delay (by short-circuited winding H01H 71/30; by additional armature H01H 71/34) **[1, 2006.01]**

71/46 • • • having means for operating auxiliary contacts additional to the main contacts **[1, 2006.01]**
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 **[1, 2006.01]**
71/50 • • Manual reset mechanisms **[1, 2006.01]**
71/52 • • • actuated by lever **[1, 2006.01]**
71/54 • • • actuated by tumbler **[1, 2006.01]**
71/56 • • • actuated by rotatable knob or wheel **[1, 2006.01]**
71/58 • • • actuated by push-button, pull-knob, or slide **[1, 2006.01]**
71/60 • • • actuated by closure of switch casing **[1, 2006.01]**
71/62 • • • with means for preventing resetting while abnormal condition persists, e.g. loose handle arrangement **[1, 2006.01]**
71/64 • • • • incorporating toggle linkage **[1, 2006.01]**
71/66 • • Power reset mechanisms **[1, 2006.01]**
71/68 • • • actuated by electromagnet **[1, 2006.01]**
71/70 • • • actuated by electric motor **[1, 2006.01]**
71/72 • • • actuated automatically a limited number of times **[1, 2006.01]**
71/74 • Means for adjusting the conditions under which the device will function to provide protection **[1, 2006.01]**

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 [1, 2006.01]

73/02 • Details **[1, 2006.01]**
73/04 • • Contacts **[1, 2006.01]**
73/06 • • Housings; Casings; Bases; Mountings **[1, 2006.01]**
73/08 • • • Plug-in housings **[1, 2006.01]**
73/10 • • • Cartridge housings, e.g. screw-in housing **[1, 2006.01]**
73/12 • • Means for indicating condition of the switch **[1, 2006.01]**
73/14 • • • Indicating lamp structurally associated with the switch **[1, 2006.01]**
73/16 • • Distinguishing marks, e.g. colour coding **[1, 2006.01]**
73/18 • • Means for extinguishing or suppressing arc **[1, 2006.01]**
73/20 • • Terminals; Connections **[1, 2006.01]**
73/22 • having electrothermal release and no other automatic release (cartridge type H01H 73/62) **[1, 2006.01]**
73/24 • • reset by lever **[1, 2006.01]**
73/26 • • reset by tumbler **[1, 2006.01]**
73/28 • • reset by rotatable knob or wheel **[1, 2006.01]**
73/30 • • reset by push-button, pull-knob, or slide **[1, 2006.01]**
73/32 • • reset by closure of switch casing **[1, 2006.01]**
73/34 • • reset action requiring replacement or reconditioning of a fusible or explosive part **[1, 2006.01]**
73/36 • having electromagnetic release and no other automatic release (cartridge type H01H 73/64) **[1, 2006.01]**
73/38 • • reset by lever **[1, 2006.01]**
73/40 • • reset by tumbler **[1, 2006.01]**
73/42 • • reset by rotatable knob or wheel **[1, 2006.01]**
73/44 • • reset by push-button, pull-knob, or slide **[1, 2006.01]**
73/46 • • reset by closure of switch casing **[1, 2006.01]**
73/48 • having both electrothermal and electromagnetic automatic release (cartridge type H01H 73/66) **[1, 2006.01]**
73/50 • • reset by lever **[1, 2006.01]**
73/52 • • reset by tumbler **[1, 2006.01]**
73/54 • • reset by rotatable knob or wheel **[1, 2006.01]**
73/56 • • reset by push-button, pull-knob, or slide **[1, 2006.01]**
73/58 • • reset by closure of switch casing **[1, 2006.01]**
73/60 • cartridge type, e.g. screw-in cartridge **[1, 2006.01]**
73/62 • • having only electrothermal release **[1, 2006.01]**
73/64 • • having only electromagnetic release **[1, 2006.01]**
73/66 • • having combined electrothermal and electromagnetic release **[1, 2006.01]**

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 [1, 2006.01]

75/02 • Details **[1, 2006.01]**
75/04 • • Reset mechanisms for automatically reclosing a limited number of times (circuit arrangements H02H 3/06) **[1, 2006.01]**
75/06 • • • effecting one reclosing action only **[1, 2006.01]**
75/08 • having only electrothermal release **[1, 2006.01]**
75/10 • having only electromagnetic release **[1, 2006.01]**
75/12 • having combined electrothermal and electromagnetic release **[1, 2006.01]**

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) **[1, 2006.01]**

77/02 • in which the excess current itself provides the energy for opening the contacts, and having a separate reset mechanism **[1, 2006.01]**
77/04 • • with electrothermal opening **[1, 2006.01]**
77/06 • • with electromagnetic opening **[1, 2006.01]**
77/08 • • • retained closed by permanent or remanent magnetism and opened by windings acting in opposition **[1, 2006.01]**
77/10 • • with electrodynamic opening **[1, 2006.01]**

79/00 Protective switches in which excess current causes the closing of contacts, e.g. for short-circuiting the apparatus to be protected [1, 2006.01]

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 [1, 2006.01]

81/02 • electrothermally-operated **[1, 2006.01]**
81/04 • electromagnetically-operated **[1, 2006.01]**

83/00 Protective switches, e.g. circuit-breaking switches, or protective relays operated by abnormal electrical conditions otherwise than solely by excess current [1, 2006.01]

83/02 • operated by earth fault currents (H01H 83/14 takes precedence) **[1, 2006.01]**
83/04 • • with testing means for indicating the ability of the switch or relay to function properly **[1, 2006.01]**
83/06 • operated by current falling below a predetermined value **[1, 2006.01]**
83/08 • operated by reversal of dc **[1, 2006.01]**
83/10 • operated by excess voltage, e.g. for lightning protection **[1, 2006.01]**

83/12 • operated by voltage falling below a predetermined value, e.g. for no-volt protection **[1, 2006.01]**

83/14 • operated by unbalance of two or more currents or voltages, e.g. for differential protection **[1, 2006.01]**

83/16 • operated by abnormal ratio of voltage and current, e.g. distance relay **[1, 2006.01]**

83/18 • operated by abnormal product of, or abnormal phase angle between, voltage and current, e.g. directional relay **[1, 2006.01]**

83/20 • operated by excess current as well as by some other abnormal electrical condition **[1, 2006.01]**

83/22 • • the other condition being unbalance of two or more currents or voltages **[1, 2006.01]**

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 fusses on boards H02B 1/18) **[1, 2006.01]**

85/02 • Details **[1, 2006.01]**

85/04 • • Fuses, i.e. expendable parts of the protective device, e.g. cartridges **[1, 2006.01]**

85/041 • • • characterised by the type **[5, 2006.01]**

85/042 • • • • General constructions or structure of high voltage fuses, i.e. above 1,000 V **[5, 2006.01]**

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-H01H 85/048 take precedence) **[5, 2006.01]**

85/0445 • • • • • fast or slow type (H01H 85/045-H01H 85/048 take precedence) **[5, 2006.01]**

85/045 • • • • • cartridge type **[5, 2006.01]**

85/046 • • • • Fuses formed as printed circuits **[5, 2006.01]**

85/047 • • • • Vacuum fuses **[5, 2006.01]**

85/048 • • • • Fuse resistors **[5, 2006.01]**

85/05 • • • Component parts thereof **[5, 2006.01]**

85/055 • • • • Fusible members **[5, 2006.01]**

85/06 • • • • • characterised by the fusible material (H01H 85/11 takes precedence) **[1, 5, 2006.01]**

85/08 • • • • • characterised by the shape or form of the fusible member **[1, 5, 2006.01]**

85/10 • • • • • • with constriction for localised fusing (H01H 85/11 takes precedence) **[1, 5, 2006.01]**

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, 2006.01]**

85/12 • • • • • Two or more separate fusible members in parallel **[1, 5, 2006.01]**

85/143 • • • • Electrical contacts; Fastening fusible members to such contacts **[5, 2006.01]**

85/147 • • • • • Parallel-side contacts **[5, 2006.01]**

85/15 • • • • • Screw-in contacts **[5, 2006.01]**

85/153 • • • • • Knife-blade-end contacts **[5, 2006.01]**

85/157 • • • • • Ferrule-end contacts **[5, 2006.01]**

85/165 • • • • Casings **[5, 2006.01]**

85/17 • • • • • characterised by the casing material **[5, 2006.01]**

85/175 • • • • • • characterised by the casing shape or form **[5, 2006.01]**

85/18 • • • • Casing fillings, e.g. powder **[1, 2006.01]**

85/20 • • Bases for supporting the fuse; Separate parts thereof **[1, 2006.01]**

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 **[1, 2006.01]**

85/24 • • Means for preventing insertion of incorrect fuse **[1, 2006.01]**

85/25 • • Safety arrangements preventing or inhibiting contact with live parts, including operation of isolation on removal of cover **[5, 2006.01]**

85/26 • • Magazine arrangements **[1, 2006.01]**

85/28 • • • effecting automatic replacement **[1, 2006.01]**

85/30 • • Means for indicating condition of fuse structurally associated with the fuse **[1, 2006.01]**

85/32 • • • Indicating lamp structurally associated with the protective device **[1, 2006.01]**

85/34 • • Distinguishing marks, e.g. colour coding **[1, 2006.01]**

85/36 • • Means for applying mechanical tension to fusible member **[1, 2006.01]**

85/38 • • Means for extinguishing or suppressing arc (by powder filling H01H 85/18; by mechanical tension applied to fusible member H01H 85/36) **[1, 2006.01]**

85/40 • • • using an arc-extinguishing liquid (characterised by the composition of the liquid H01H 33/22) **[1, 2006.01]**

85/42 • • • using an arc-extinguishing gas (characterised by the composition of the gas H01H 33/22) **[1, 2006.01]**

85/43 • • Means for exhausting or absorbing gases liberated by fusing arc, or for ventilating excess pressure generated by heating **[5, 2006.01]**

85/44 • • Structural association with spark-gap arrester **[1, 2006.01]**

85/46 • • Circuit arrangements not adapted to a particular application of the protective device **[1, 2006.01]**

85/47 • • Means for cooling **[5, 2006.01]**

85/48 • Protective devices wherein the fuse is carried or held directly by the base **[1, 2006.01]**

85/50 • • the fuse having contacts at opposite ends for co-operation with the base **[1, 2006.01]**

85/52 • • the fuse being adapted for screwing into the base **[1, 2006.01]**

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 **[1, 2006.01]**

85/56 • • the intermediate or auxiliary part having side contacts for plugging into the base, e.g. bridge-carrier type **[1, 2006.01]**

85/58 • • • with intermediate auxiliary part and base shaped to interfit and thereby enclose the fuse **[1, 2006.01]**

85/60 • • the intermediate or auxiliary part having contacts at opposite ends for co-operation with the base **[1, 2006.01]**

85/62 • • the intermediate or auxiliary part being adapted for screwing into the base **[1, 2006.01]**

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 [1, 3, 2006.01]**

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 [2006.01]**

89/02 • Combination of a key operated switch with a manually operated switch, e.g. ignition and lighting switches **[2006.01]**

89/04 • Combination of a thermally actuated switch with a manually operated switch **[2006.01]**

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 **[2006.01]**

89/08 • • with both devices using the same contact pair **[2006.01]**

89/10 • • • with each device controlling one of the two co-operating contacts **[2006.01]**

H01J **ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS** (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)

Note(s) [4]

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-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.
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

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, 2006.01]**

1/02 • Main electrodes **[1, 2006.01]**

1/04 • • Liquid electrodes, e.g. liquid cathode **[1, 2006.01]**

1/05 • • • characterised by material **[1, 2006.01]**

1/06 • • • Containers for liquid-pool electrodes; Arrangement or mounting thereof **[1, 2006.01]**

1/08 • • • Positioning or moving the cathode spot on the surface of a liquid-pool cathode **[1, 2006.01]**
1/10 • • • Cooling, heating, circulating, filtering, or controlling level of liquid in a liquid-pool electrode **[1, 2006.01]**
1/12 • • Cathodes having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube **[1, 2006.01]**
1/13 • • Solid thermionic cathodes **[1, 2006.01]**
1/14 • • • characterised by the material **[1, 2006.01]**
1/142 • • • • with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material **[6, 2006.01]**
1/144 • • • • with other metal oxides as an emissive material **[6, 2006.01]**
1/146 • • • • with metals or alloys as an emissive material **[6, 2006.01]**
1/148 • • • • with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material **[6, 2006.01]**
1/15 • • • Cathodes heated directly by an electric current **[1, 2006.01]**
1/16 • • • • characterised by the shape **[1, 2006.01]**
1/18 • • • • Supports; Vibration-damping arrangements **[1, 2006.01]**
1/20 • • • Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment **[1, 2006.01]**
1/22 • • • • Heaters **[1, 2006.01]**
1/24 • • • • Insulating layer or body located between heater and emissive material **[1, 2006.01]**
1/26 • • • • Supports for the emissive material **[1, 2006.01]**
1/28 • • • • Dispenser-type cathodes, e.g. L-cathode **[1, 2006.01]**
1/30 • • Cold cathodes **[1, 2006.01]**
1/304 • • • Field-emissive cathodes **[7, 2006.01]**
1/308 • • • Semiconductor cathodes, e.g. cathodes with PN junction layers **[7, 2006.01]**
1/312 • • • having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of Metal-Insulator-Metal (MIM) type **[7, 2006.01]**
1/316 • • • having an electric field parallel to the surface, e.g. thin film cathodes **[7, 2006.01]**
1/32 • • Secondary-electron emitting electrodes (H01J 1/35 takes precedence) **[1, 2006.01]**
1/34 • • Photo-emissive cathodes (H01J 1/35 takes precedence) **[1, 2006.01]**
1/35 • • Electrodes exhibiting both secondary emission and photo-emission **[1, 2006.01]**
1/36 • • Solid anodes; Solid auxiliary anodes for maintaining a discharge **[1, 2006.01]**
1/38 • • • characterised by the material **[1, 2006.01]**
1/40 • • • forming part of the envelope of the tube or lamp **[1, 2006.01]**
1/42 • • • Cooling of anodes (H01J 1/44 takes precedence); Heating of anodes **[1, 2006.01]**
1/44 • • • Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes **[1, 2006.01]**
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, 2006.01]**
1/48 • • characterised by the material **[1, 2006.01]**
1/50 • Magnetic means for controlling the discharge **[1, 2006.01]**
1/52 • Screens for shielding; Guides for influencing the discharge; Masks interposed in the electron stream **[1, 2006.01]**
1/53 • Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked-up, converted, or stored **[1, 2006.01]**
1/54 • Screens on or from which an image or pattern is formed, picked-up, converted, or stored; Luminescent coatings on vessels **[1, 2006.01]**
1/56 • • acting as light valves by shutter operation, e.g. for eidophor **[1, 2006.01]**
1/58 • • acting by discolouration, e.g. halide screen **[1, 2006.01]**
1/60 • • Incandescent screens **[1, 2006.01]**
1/62 • • Luminescent screens; Selection of materials for luminescent coatings on vessels **[1, 2006.01]**
1/63 • • • characterised by the luminescent material **[1, 2006.01]**
1/64 • • • characterised by the binder or adhesive for securing the luminescent material to its support **[1, 2006.01]**
1/66 • • • Supports for luminescent material **[1, 2006.01]**
1/68 • • • with superimposed luminescent layers **[1, 2006.01]**
1/70 • • • with protective, conductive, or reflective layers **[1, 2006.01]**
1/72 • • • with luminescent material discontinuously arranged, e.g. in dots or lines **[1, 2006.01]**
1/74 • • • • with adjacent dots or lines of different luminescent material **[1, 2006.01]**
1/76 • • • provided with permanent marks or references **[1, 2006.01]**
1/78 • • Photoelectric screens; Charge-storage screens **[1, 2006.01]**
1/88 • Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies **[1, 2006.01]**
1/90 • • Insulation between electrodes or supports within the vacuum space **[1, 2006.01]**
1/92 • • Mountings for the electrode assembly as a whole **[1, 2006.01]**
1/94 • • Mountings for individual electrodes **[1, 2006.01]**
1/96 • • Spacing members extending to the envelope **[1, 2006.01]**
1/98 • • • without fixed connection between spacing member and envelope **[1, 2006.01]**

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 [1, 2006.01]
3/02 • Electron guns **[1, 2006.01]**
3/04 • Ion guns **[1, 2006.01]**
3/06 • two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 3/07 takes precedence) **[1, 2, 2006.01]**
3/07 • Arrangements for controlling convergence of a plurality of beams **[2, 2006.01]**
3/08 • Arrangements for controlling intensity of ray or beam (H01J 3/02, H01J 3/04 take precedence) **[1, 2006.01]**
3/10 • Arrangements for centering ray or beam (H01J 3/02, H01J 3/04 take precedence) **[1, 2006.01]**
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) **[1, 2006.01]**
3/14 • Arrangements for focusing or reflecting ray or beam (H01J 3/02, H01J 3/04 take precedence) **[1, 2006.01]**
3/16 • • Mirrors **[1, 2006.01]**

3/18 • • Electrostatic lenses **[1, 2006.01]**
3/20 • • Magnetic lenses **[1, 2006.01]**
3/22 • • • using electromagnetic means only **[1, 2006.01]**
3/24 • • • using permanent magnets only **[1, 2006.01]**
3/26 • Arrangements for deflecting ray or beam **[1, 2006.01]**
3/28 • • along one straight line or along two perpendicular straight lines **[1, 2006.01]**
3/30 • • • by electric fields only **[1, 2006.01]**
3/32 • • • by magnetic fields only **[1, 2006.01]**
3/34 • • along a circle, spiral, or rotating radial line **[1, 2006.01]**
3/36 • Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration **[1, 2006.01]**
3/38 • Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements **[1, 2006.01]**
3/40 • Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection **[1, 2006.01]**

5/00 Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps [1, 2006.01]

5/02 • Vessels; Containers; Shields associated therewith; Vacuum locks **[1, 2006.01]**
5/03 • • Arrangements for preventing or mitigating effects of implosion of vessels or containers **[2, 2006.01]**
5/04 • • Vessels or containers characterised by the material thereof **[1, 2006.01]**
5/06 • • Vessels or containers specially adapted for operation at high tension, e.g. by improved potential distribution over surface of vessel **[1, 2006.01]**
5/08 • • provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent coatings H01J 1/62) **[1, 2006.01]**
5/10 • • • on internal surfaces **[1, 2006.01]**
5/12 • • Double-wall vessels or containers **[1, 2006.01]**
5/14 • • Dismountable vessels or containers, e.g. for replacing cathode heater **[1, 2006.01]**
5/16 • • Optical or photographic arrangements structurally combined with the vessel **[1, 2006.01]**
5/18 • • Windows permeable to X-rays, gamma-rays, or particles **[1, 2006.01]**
5/20 • Seals between parts of vessels **[1, 2006.01]**
5/22 • • Vacuum-tight joints between parts of vessel **[1, 2006.01]**
5/24 • • • between insulating parts of vessel **[1, 2006.01]**
5/26 • • • between insulating and conductive parts of vessel **[1, 2006.01]**
5/28 • • • between conductive parts of vessel **[1, 2006.01]**
5/30 • • • using packing material, e.g. sealing liquid or elastic insert **[1, 2006.01]**
5/32 • Seals for leading-in conductors **[1, 2006.01]**
5/34 • • for an individual conductor (pinched-stem seals H01J 5/38; end-disc seals H01J 5/40; annular seals H01J 5/44) **[1, 2006.01]**
5/36 • • • using intermediate part **[1, 2006.01]**
5/38 • • Pinched-stem or analogous seals **[1, 2006.01]**
5/40 • • End-disc seals, e.g. flat header **[1, 2006.01]**
5/42 • • • using intermediate part **[1, 2006.01]**
5/44 • • Annular seals disposed between the ends of the vessel **[1, 2006.01]**
5/46 • Leading-in conductors **[1, 2006.01]**
5/48 • Means forming part of the tube or lamp for the purpose of supporting it **[1, 2006.01]**
5/50 • Means forming part of the tube or lamp for the purpose of providing electrical connection to it **[1, 2006.01]**
5/52 • • directly applied to, or forming part of, the vessel **[1, 2006.01]**
5/54 • • supported by a separate part, e.g. base **[1, 2006.01]**
5/56 • • • Shape of the separate part **[1, 2006.01]**
5/58 • • • Means for fastening the separate part to the vessel, e.g. by cement **[1, 2006.01]**
5/60 • • • • for fastening by mechanical means **[1, 2006.01]**
5/62 • • • Connection of wires protruding from the vessel to connectors carried by the separate part **[1, 2006.01]**

7/00 Details not provided for in groups H01J 1/00-H01J 5/00 and common to two or more basic types of discharge tubes or lamps [1, 2006.01]

7/02 • Selection of substances for gas fillings; Specified operating pressure or temperature **[1, 2006.01]**
7/04 • • having one or more carbon compounds as the principal constituent **[1, 2006.01]**
7/06 • • having helium, argon, neon, krypton, or xenon as the principal constituent **[1, 2006.01]**
7/08 • • having a metallic vapour as the principal constituent **[1, 2006.01]**
7/10 • • • mercury vapour **[1, 2006.01]**
7/12 • • • vapour of an alkali metal **[1, 2006.01]**
7/14 • Means for obtaining or maintaining the desired pressure within the vessel **[1, 2006.01]**
7/16 • • Means for permitting pumping during operation of the tube or lamp **[1, 2006.01]**
7/18 • • Means for absorbing or adsorbing gas, e.g. by gettering **[1, 2006.01]**
7/20 • • Means for producing, introducing, or replenishing gas or vapour during operation of the tube or lamp **[1, 2006.01]**
7/22 • • Tubulations therefor, e.g. for exhausting; Closures therefor **[1, 2006.01]**
7/24 • Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space **[1, 2006.01]**
7/26 • • by flow of fluid through passages associated with tube or lamp **[1, 2006.01]**
7/28 • • by latent heat or evaporation of cooling liquid **[1, 2006.01]**
7/30 • Igniting arrangements **[1, 2006.01]**
7/32 • • having resistive or capacitative igniter **[1, 2006.01]**
7/34 • • • having resistive igniter only **[1, 2006.01]**
7/36 • • Igniting by movement of a solid electrode **[1, 2006.01]**
7/38 • • Igniting by movement of vessel as a whole, e.g. tilting **[1, 2006.01]**
7/40 • • Igniting by associated radioactive materials or fillings **[1, 2006.01]**
7/42 • Means structurally associated with the tube or lamp for indicating defects or previous use **[1, 2006.01]**
7/44 • One or more circuit elements structurally associated with the tube or lamp **[1, 2006.01]**
7/46 • • Structurally associated resonator having distributed inductance and capacitance **[1, 2006.01]**

9/00 Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof; Recovery of material from discharge tubes or lamps [1, 7, 2006.01]

9/02 • Manufacture of electrodes or electrode systems **[1, 2006.01]**

9/04 • • of thermionic cathodes **[1, 2006.01]**

9/06 • • • Machines therefor **[1, 2006.01]**

9/08 • • Manufacture of heaters for indirectly-heated cathodes **[1, 2006.01]**

9/10 • • • Machines therefor **[1, 2006.01]**

9/12 • • of photo-emissive cathodes; of secondary-emission electrodes **[1, 2006.01]**

9/14 • • of non-emitting electrodes **[1, 2006.01]**

9/16 • • • Machines for making wire grids **[1, 2006.01]**

9/18 • • Assembling together the component parts of electrode systems **[1, 2006.01]**

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 **[1, 2006.01]**

9/22 • • Applying luminescent coatings **[1, 2006.01]**

9/227 • • • with luminescent material discontinuously arranged, e.g. in dots or lines **[2, 2006.01]**

9/233 • • Manufacture of photoelectric screens or charge-storage screens **[2, 2006.01]**

9/236 • Manufacture of magnetic deflecting devices for cathode-ray tubes **[3, 2006.01]**

9/24 • Manufacture or joining of vessels, leading-in conductors, or bases **[1, 2006.01]**

9/26 • • Sealing together parts of vessels **[1, 2006.01]**

9/28 • • Manufacture of leading-in conductors **[1, 2006.01]**

9/30 • • Manufacture of bases **[1, 2006.01]**

9/32 • • Sealing leading-in conductors **[1, 2006.01]**

9/34 • • Joining base to vessel **[1, 2006.01]**

9/36 • • Joining connectors to internal electrode system **[1, 2006.01]**

9/38 • Exhausting, degassing, filling, or cleaning vessels **[1, 2006.01]**

9/385 • • Exhausting vessels **[2, 2006.01]**

9/39 • • Degassing vessels **[2, 2006.01]**

9/395 • • Filling vessels **[2, 2006.01]**

9/40 • Closing vessels **[1, 2006.01]**

9/42 • Measurement or testing during manufacture **[1, 2006.01]**

9/44 • Factory adjustment of completed discharge tubes or lamps to comply with desired tolerances **[1, 2006.01]**

9/46 • Machines having sequentially-arranged operating stations **[1, 2006.01]**

9/48 • • with automatic transfer of workpieces between operating stations **[1, 2006.01]**

9/50 • Repairing or regenerating used or defective discharge tubes, lamps or their salvageable components **[1, 2006.01]**

9/52 • Recovery of material from discharge tubes or lamps (H01J 9/50 takes precedence) **[7, 2006.01]**

11/00 Gas-filled discharge tubes with alternating current induction of the discharge, e.g. AC-PDPs [Alternating Current Plasma Display Panels] (circuits or methods for driving PDPs G09G 3/28)**; Gas-filled discharge tubes without any main electrode inside the vessel; Gas-filled discharge tubes with at least one main electrode outside the vessel [1, 2006.01, 2012.01]**

Note(s) [2012.01]

1. When classifying in this group, classification is made in all appropriate places.
2. In this group, the following term is used with the meaning indicated:
   - "main electrode" means any of a sustain electrode, scan electrode or address electrode.

11/10 • AC-PDPs with at least one main electrode being out of contact with the plasma **[2012.01]**

11/12 • • with main electrodes provided on both sides of the discharge space **[2012.01]**

11/14 • • with main electrodes provided only on one side of the discharge space **[2012.01]**

11/16 • • with main electrodes provided inside or on the side face of the spacers **[2012.01]**

11/18 • • containing a plurality of independent closed structures for containing the gas, e.g. plasma tube array [PTA] display panels **[2012.01]**

11/20 • Constructional details **[2012.01]**

11/22 • • Electrodes, e.g. special shape, material or configuration **[2012.01]**

11/24 • • • Sustain electrodes or scan electrodes **[2012.01]**

11/26 • • • Address electrodes **[2012.01]**

11/28 • • • Auxiliary electrodes, e.g. priming electrodes or trigger electrodes **[2012.01]**

11/30 • • • Floating electrodes **[2012.01]**

11/32 • • • Disposition of the electrodes **[2012.01]**

11/34 • • Vessels, containers or parts thereof, e.g. substrates **[2012.01]**

11/36 • • • Spacers, barriers, ribs, partitions or the like **[2012.01]**

11/38 • • • Dielectric or insulating layers **[2012.01]**

11/40 • • • Layers for protecting or enhancing the electron emission, e.g. MgO layers **[2012.01]**

11/42 • • • Fluorescent layers **[2012.01]**

11/44 • • • Optical arrangements or shielding arrangements, e.g. filters, black matrices, light reflecting means or electromagnetic shielding means **[2012.01]**

11/46 • • Connecting or feeding means, e.g. leading-in conductors **[2012.01]**

11/48 • • Sealing, e.g. seals specially adapted for leading-in conductors **[2012.01]**

11/50 • • Filling, e.g. selection of gas mixture **[2012.01]**

11/52 • • Means for absorbing or adsorbing the gas mixture, e.g. by gettering **[2012.01]**

11/54 • • Means for exhausting the gas **[2012.01]**

13/00 Discharge tubes with liquid-pool cathodes, e.g. metal-vapour rectifying tubes [1, 2006.01]

13/02 • Details **[1, 2006.01]**

13/04 • • Main electrodes; Auxiliary anodes **[1, 2006.01]**

13/06 • • • Cathodes **[1, 2006.01]**

13/08 • • • • characterised by the material **[1, 2006.01]**

13/10 • • • • Containers for the liquid pool; Arrangement or mounting thereof **[1, 2006.01]**

13/12 • • • • Positioning or moving the cathode spot on the surface of the pool **[1, 2006.01]**

13/14 • • • • Cooling, heating, circulating, filtering, or controlling level of the liquid **[1, 2006.01]**

13/16 • • • Anodes; Auxiliary anodes for maintaining the discharge **[1, 2006.01]**

13/18 • • • • Cooling or heating of anodes **[1, 2006.01]**

13/20 • • Control electrodes, e.g. grid (for igniting arrangements H01J 13/34) **[1, 2006.01]**

13/22 • • Screens, e.g. for preventing or eliminating arcing-back **[1, 2006.01]**
13/24 • • Vessels; Containers **[1, 2006.01]**
13/26 • • Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors **[1, 2006.01]**
13/28 • • Selection of substances for gas filling; Means for obtaining or maintaining the desired pressure within the tube **[1, 2, 2006.01]**
13/30 • • • Means for permitting pumping during operation of the tube **[1, 2006.01]**
13/32 • • Cooling arrangements; Heating arrangements (for cathodes H01J 13/14; for anodes H01J 13/18) **[1, 2006.01]**
13/34 • • Igniting arrangements **[1, 2006.01]**
13/36 • • • having resistive or capacitative igniter **[1, 2006.01]**
13/38 • • • • having resistive igniter only **[1, 2006.01]**
13/40 • • • Igniting by movement of a solid electrode **[1, 2006.01]**
13/42 • • • Igniting by movement of vessel as a whole, e.g. tilting **[1, 2006.01]**
13/44 • • Devices for preventing or eliminating arcing-back **[1, 2006.01]**
13/46 • • One or more circuit elements structurally associated with the tube **[1, 2006.01]**
13/48 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**
13/50 • Tubes having a single main anode **[1, 2006.01]**
13/52 • • with control by one or more intermediate control electrodes **[1, 2006.01]**
13/54 • • with control by igniter, e.g. single-anode ignitron **[1, 2006.01]**
13/56 • Tubes having two or more main anodes **[1, 2006.01]**
13/58 • • with control by one or more intermediate control electrodes **[1, 2006.01]**

15/00 Gas-filled discharge tubes with gaseous cathodes, e.g. plasma cathodes [1, 2006.01]
15/02 • Details, e.g. electrode, gas filling, shape of vessel **[1, 2006.01]**
15/04 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**

17/00 Gas-filled discharge tubes with solid cathodes (H01J 25/00, H01J 27/00, H01J 31/00-H01J 41/00 take precedence; gas filled spark gaps H01T; Marx converters H02M 7/26) **[1, 2006.01]**
17/02 • Details **[1, 2006.01]**
17/04 • • Electrodes; Screens **[1, 2006.01, 2012.01]**
17/06 • • • Cathodes **[1, 2006.01]**
17/08 • • • • having mercury or liquid alkali metal deposited on the cathode surface during operation of the tube **[1, 2006.01]**
17/10 • • • Anodes **[1, 2006.01]**
17/12 • • • Control electrodes **[1, 2006.01]**
17/14 • • Magnetic means for controlling the discharge **[1, 2006.01]**
17/16 • • Vessels; Containers **[1, 2006.01, 2012.01]**
17/18 • • Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors **[1, 2006.01, 2012.01]**
17/20 • • Selection of substances for gas fillings; Specified operating pressures or temperatures **[1, 2006.01, 2012.01]**
17/22 • • Means for obtaining or maintaining the desired pressure within the tube **[1, 2006.01, 2012.01]**
17/24 • • • Means for absorbing or adsorbing gas, e.g. by gettering **[1, 2006.01, 2012.01]**
17/26 • • • Means for producing, introducing, or replenishing gas or vapour during operation of the tube **[1, 2006.01, 2012.01]**
17/28 • • Cooling arrangements **[1, 2006.01]**
17/30 • • Igniting arrangements **[1, 2006.01]**
17/32 • • • Igniting by associated radioactive materials or fillings **[1, 2006.01]**
17/34 • • One or more circuit elements structurally associated with the tube **[1, 2006.01]**
17/36 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**
17/38 • Cold-cathode tubes **[1, 2006.01]**
17/40 • • with one cathode and one anode, e.g. glow tubes, tuning-indicator glow tubes, voltage-stabiliser tubes or voltage-indicator tubes **[1, 2006.01]**
17/42 • • • having one or more probe electrodes, e.g. for potential dividing **[1, 2006.01]**
17/44 • • • having one or more control electrodes **[1, 2006.01]**
17/46 • • • • for preventing and then permitting ignition, but thereafter having no control **[1, 2006.01]**
17/48 • • with more than one cathode or anode, e.g. sequence-discharge tube, counting tube, dekatron **[1, 2006.01]**
17/49 • • • Display panels, e.g. with crossed electrodes **[3, 2006.01, 2012.01]**
17/50 • Thermionic-cathode tubes **[1, 2006.01]**
17/52 • • with one cathode and one anode **[1, 2006.01]**
17/54 • • • having one or more control electrodes **[1, 2006.01]**
17/56 • • • • for preventing and then permitting ignition, but thereafter having no control **[1, 2006.01]**
17/58 • • with more than one cathode or anode **[1, 2006.01]**
17/60 • • • the discharge paths priming each other in a predetermined sequence, e.g. counting tube **[1, 2006.01]**
17/62 • • • with independent discharge paths controlled by intermediate electrodes, e.g. polyphase rectifier **[1, 2006.01]**
17/64 • Tubes specially designed for switching or modulating in a waveguide, e.g. TR box **[1, 2006.01]**

19/00 Details of vacuum tubes of the types covered by group H01J 21/00 [1, 2006.01]
19/02 • Electron-emitting electrodes; Cathodes **[1, 2006.01]**
19/04 • • Thermionic cathodes **[1, 2006.01]**
19/06 • • • characterised by the material **[1, 2006.01]**
19/062 • • • • with alkaline-earth metal oxides, or such oxides used in conjunction with reducing agents, as an emissive material **[6, 2006.01]**
19/064 • • • • with other metal oxides as an emissive material **[6, 2006.01]**
19/066 • • • • with metals or alloys as an emissive material **[6, 2006.01]**
19/068 • • • • with compounds having metallic conductive properties, e.g. lanthanum boride, as an emissive material **[6, 2006.01]**
19/08 • • • Cathodes heated directly by an electric current **[1, 2006.01]**
19/10 • • • characterised by the shape **[1, 2006.01]**
19/12 • • • • Supports; Vibration-damping arrangements **[1, 2006.01]**

19/14 • • • Cathodes heated indirectly by an electric current; Cathodes heated by electron or ion bombardment **[1, 2006.01]**
19/16 • • • • Heaters **[1, 2006.01]**
19/18 • • • • Insulating layer or body located between heater and emissive material **[1, 2006.01]**
19/20 • • • • Supports for the emissive material **[1, 2006.01]**
19/22 • • • • Dispenser-type cathodes, e.g. L-cathode **[1, 2006.01]**
19/24 • • Cold cathodes, e.g. field-emissive cathode **[1, 2006.01]**
19/28 • Non-electron-emitting electrodes; Screens **[1, 2006.01]**
19/30 • • characterised by the material **[1, 2006.01]**
19/32 • • Anodes **[1, 2006.01]**
19/34 • • • forming part of the envelope **[1, 2006.01]**
19/36 • • • Cooling of anodes **[1, 2006.01]**
19/38 • • Control electrodes, e.g. grid **[1, 2006.01]**
19/40 • • Screens for shielding **[1, 2006.01]**
19/42 • Mounting, supporting, spacing, or insulating of electrodes or of electrode assemblies **[1, 2006.01]**
19/44 • • Insulation between electrodes or supports within the vacuum space **[1, 2006.01]**
19/46 • • Mountings for the electrode assembly as a whole **[1, 2006.01]**
19/48 • • Mountings for individual electrodes **[1, 2006.01]**
19/50 • • Spacing members extending to the envelope **[1, 2006.01]**
19/52 • • • without fixed connection between spacing member and envelope **[1, 2006.01]**
19/54 • Vessels; Containers; Shields associated therewith **[1, 2006.01]**
19/56 • • characterised by the material of the vessel or container **[1, 2006.01]**
19/57 • • provided with coatings on the walls thereof; Selection of materials for the coatings **[1, 2006.01]**
19/58 • Seals between parts of vessels **[1, 2006.01]**
19/60 • Seals for leading-in conductors **[1, 2006.01]**
19/62 • Leading-in conductors **[1, 2006.01]**
19/64 • Means forming part of the tube for the purpose of supporting it **[1, 2006.01]**
19/66 • Means forming part of the tube for the purpose of providing electrical connection to it **[1, 2006.01]**
19/68 • Specified gas introduced into the tube at low pressure, e.g. for reducing or influencing space charge **[1, 2006.01]**
19/70 • Means for obtaining or maintaining the vacuum, e.g. by gettering **[1, 2006.01]**
19/72 • • Tubulations therefor, e.g. for exhausting; Closures therefor **[1, 2006.01]**
19/74 • Cooling arrangements (cooling of anodes H01J 19/36) **[1, 2006.01]**
19/76 • Means structurally associated with the tube for indicating defects or previous use **[1, 2006.01]**
19/78 • One or more circuit elements structurally associated with the tube **[1, 2006.01]**
19/80 • • Structurally associated resonator having distributed inductance and capacitance **[1, 2006.01]**
19/82 • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**

21/00 **Vacuum tubes** (H01J 25/00, H01J 31/00-H01J 40/00, H01J 43/00, H01J 47/00, H01J 49/00 take precedence; details of vacuum tubes H01J 19/00) **[1, 2006.01]**
21/02 • Tubes with a single discharge path **[1, 2006.01]**
21/04 • • without control means, i.e. diodes **[1, 2006.01]**
21/06 • • having electrostatic control means only **[1, 2006.01]**
21/08 • • • with movable electrode or electrodes **[1, 2006.01]**
21/10 • • • with one or more immovable internal control electrodes, e.g. triode, pentode, octode **[1, 2006.01]**
21/12 • • • • Tubes with variable amplification factor **[1, 2006.01]**
21/14 • • • • Tubes with means for concentrating the electron stream, e.g. beam tetrode **[1, 2006.01]**
21/16 • • • with external electrostatic control means and with or without internal control electrodes **[1, 2006.01]**
21/18 • • having magnetic control means; having both magnetic and electrostatic control means **[1, 2006.01]**
21/20 • Tubes with more than one discharge path; Multiple tubes, e.g. double diode or triode-hexode **[1, 2006.01]**
21/22 • • with movable electrode or electrodes **[1, 2006.01]**
21/24 • • with variable amplification factor **[1, 2006.01]**
21/26 • • with means for concentrating the electron stream **[1, 2006.01]**
21/34 • Tubes with electrode system arranged or dimensioned so as to eliminate transit-time effect (with flat electrodes H01J 21/36) **[1, 2006.01]**
21/36 • Tubes with flat electrodes, e.g. disc electrode **[1, 2006.01]**

23/00 **Details of transit-time tubes of the types covered by group H01J 25/00 [1, 2006.01]**
23/02 • Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16) **[1, 2006.01]**
23/027 • • Collectors **[2, 2006.01]**
23/033 • • • Collector cooling devices **[2, 2006.01]**
23/04 • • Cathodes **[1, 2006.01]**
23/05 • • • having a cylindrical emissive surface, e.g. cathodes for magnetrons **[3, 2006.01]**
23/06 • • Electron or ion guns **[1, 2006.01]**
23/065 • • • producing a solid cylindrical beam (H01J 23/075 takes precedence) **[3, 2006.01]**
23/07 • • • producing a hollow cylindrical beam (H01J 23/075 takes precedence) **[3, 2006.01]**
23/075 • • • Magnetron injection guns **[3, 2006.01]**
23/08 • • Focusing arrangements, e.g. for concentrating stream of electrons, for preventing spreading of stream **[1, 2006.01]**
23/083 • • • Electrostatic focusing arrangements **[3, 2006.01]**
23/087 • • • Magnetic focusing arrangements **[3, 2006.01]**
23/09 • • Electric systems for directing or deflecting the discharge along a desired path, e.g. E-type (focusing arrangements H01J 23/08) **[1, 2006.01]**
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) **[1, 2006.01]**
23/11 • • Means for reducing noise (in electron or ion gun H01J 23/06) **[1, 2006.01]**
23/12 • Vessels; Containers **[1, 2006.01]**

23/14 • Leading-in arrangements; Seals therefor **[1, 2006.01]**

23/15 • • Means for preventing wave energy leakage structurally associated with tube leading-in arrangements, e.g. filters, chokes, attenuating devices **[4, 2006.01]**

23/16 • Circuit elements, having distributed capacitance and inductance, structurally associated with the tube and interacting with the discharge **[1, 2006.01]**

23/18 • • Resonators **[1, 2006.01]**

23/20 • • • Cavity resonators; Adjustment or tuning thereof **[1, 2006.01]**

23/207 • • • • Tuning of single resonator **[2, 2006.01]**

23/213 • • • • Simultaneous tuning of more than one resonator, e.g. resonant cavities of a magnetron **[2, 2006.01]**

23/22 • • • Connections between resonators, e.g. strapping for connecting resonators of a magnetron **[1, 2006.01]**

23/24 • • Slow-wave structures **[1, 2006.01]**

23/26 • • • Helical slow-wave structures; Adjustment therefor **[1, 2006.01]**

23/27 • • • • Helix-derived slow-wave structures **[3, 2006.01]**

23/28 • • • Interdigital slow-wave structures; Adjustment therefor **[1, 2006.01]**

23/30 • • • Damping arrangements associated with slow-wave structures, e.g. for suppression of unwanted oscillations **[1, 2006.01]**

23/34 • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**

23/36 • Coupling devices having distributed capacitance and inductance, structurally associated with the tube, for introducing or removing wave energy **[4, 2006.01]**

23/38 • • to or from the discharge **[4, 2006.01]**

23/40 • • to or from the interaction circuit **[4, 2006.01]**

23/42 • • • the interaction circuit being a helix or a helix-derived slow-wave structure (H01J 23/44-H01J 23/48 take precedence) **[4, 2006.01]**

23/44 • • • Rod-type coupling devices (H01J 23/46, H01J 23/48, H01J 23/54 take precedence) **[4, 2006.01]**

23/46 • • • Loop coupling devices **[4, 2006.01]**

23/48 • • • for linking interaction circuit with coaxial lines; Devices of the coupled helices type (H01J 23/46 takes precedence) **[4, 2006.01]**

23/50 • • • • the interaction circuit being a helix or derived from a helix (H01J 23/52 takes precedence) **[4, 2006.01]**

23/52 • • • • the coupled helices being disposed coaxially around one another **[4, 2006.01]**

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, 2006.01]**

25/00 Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons (details of transit-time tubes H01J 23/00; particle accelerators H05H) **[1, 2006.01]**

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 **[1, 2006.01]**

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 **[1, 2006.01]**

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 **[1, 2006.01]**

25/08 • • • with electron stream perpendicular to the axis of the resonator **[1, 2006.01]**

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 **[1, 2006.01]**

25/11 • • • Extended interaction klystrons **[2, 2006.01]**

25/12 • • • with pencil-like electron stream in the axis of the resonators **[1, 2006.01]**

25/14 • • • with tube-like electron stream coaxial with the axis of the resonators **[1, 2006.01]**

25/16 • • • with pencil-like electron stream perpendicular to the axis of the resonators **[1, 2006.01]**

25/18 • • • with radial or disc-like electron stream perpendicular to the axis of the resonators **[1, 2006.01]**

25/20 • • • having special arrangements in the space between resonators, e.g. resistive-wall amplifier tube, space-charge amplifier tube, velocity-jump tube **[1, 2006.01]**

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 **[1, 2006.01]**

25/24 • • • in which the electron stream is in the axis of the resonator or resonators and is pencil-like before reflection **[1, 2006.01]**

25/26 • • • in which the electron stream is coaxial with the axis of the resonator or resonators and is tube-like before reflection **[1, 2006.01]**

25/28 • • • in which the electron stream is perpendicular to the axis of the resonator or resonators and is pencil-like before reflection **[1, 2006.01]**

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 **[1, 2006.01]**

25/32 • • Tubes with plural reflection, e.g. Coeterier tube **[1, 2006.01]**

25/34 • Travelling-wave tubes; Tubes in which a travelling wave is simulated at spaced gaps **[1, 2006.01]**

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 **[1, 2006.01]**

25/38 • • • the forward-travelling wave being utilised **[1, 2006.01]**

25/40 • • • the backward-travelling wave being utilised **[1, 2006.01]**

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) **[1, 2006.01]**

25/44 • • • the forward-travelling wave being utilised **[1, 2006.01]**

25/46 • • • the backward-travelling wave being utilised **[1, 2006.01]**

25/48 • • Tubes in which two electron streams of different velocities interact with one another, e.g. electron-wave tube **[1, 2006.01]**

25/49 • • Tubes using the parametric principle, e.g. for parametric amplification **[1, 2006.01]**

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) **[1, 2006.01]**

25/52 • • with an electron space having a shape that does not prevent any electron from moving completely around the cathode or guide electrode **[1, 2006.01]**

25/54 • • • having only one cavity or other resonator, e.g. neutrode tubes **[1, 2006.01]**

25/55 • • • • Coaxial-cavity magnetrons **[2, 2006.01]**

25/56 • • • • with interdigital arrangement of anodes, e.g. turbator tube **[1, 2006.01]**

25/58 • • • having a number of resonators; having a composite resonator, e.g. a helix **[1, 2006.01]**

25/587 • • • • Multi-cavity magnetrons **[2, 2006.01]**

25/593 • • • • • Rising-sun magnetrons **[2, 2006.01]**

25/60 • • with an electron space having a shape that prevents any electron from moving completely around the cathode or guide electrode; Linear magnetrons **[1, 2006.01]**

25/61 • Hybrid tubes, i.e. tubes comprising a klystron section and a travelling-wave section **[2, 2006.01]**

25/62 • Strophotrons, i.e. tubes with H-field crossing the E-field and functioning with plural reflection **[1, 2006.01]**

25/64 • Turbine tubes, i.e. tubes with H-field crossing the E-field and functioning with reversed cyclotron action **[1, 2006.01]**

25/66 • Tubes with electron stream crossing itself and thereby interrupting, or interfering with, itself **[1, 2006.01]**

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) **[1, 2006.01]**

25/70 • • with resonator having distributed inductance and capacitance, e.g. Pintsch tube **[1, 2006.01]**

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) **[1, 2006.01]**

25/74 • Tubes specially designed to act as transit-time diode oscillators, e.g. monotrons **[1, 2006.01]**

25/76 • Dynamic electron-multiplier tubes, e.g. Farnsworth multiplier tube, multipactor **[1, 2006.01]**

25/78 • Tubes with electron stream modulated by deflection in a resonator **[1, 2006.01]**

27/00 **Ion beam tubes** (H01J 25/00, H01J 33/00, H01J 37/00 take precedence; particle accelerators H05H) **[1, 2006.01]**

27/02 • Ion sources; Ion guns **[3, 2006.01]**

27/04 • • using reflex discharge, e.g. Penning ion sources **[3, 2006.01]**

27/06 • • • without applied magnetic field **[3, 2006.01]**

27/08 • • using arc discharge **[3, 2006.01]**

27/10 • • • Duoplasmatrons **[3, 2006.01]**

27/12 • • • • provided with an expansion cup **[3, 2006.01]**

27/14 • • • Other arc discharge ion sources using an applied magnetic field **[3, 2006.01]**

27/16 • • using high-frequency excitation, e.g. microwave excitation **[3, 2006.01]**

27/18 • • • with an applied axial magnetic field **[3, 2006.01]**

27/20 • • using particle bombardment, e.g. ionisers **[3, 2006.01]**

27/22 • • • Metal ion sources **[3, 2006.01]**

27/24 • • using photo-ionisation, e.g. using laser beam **[3, 2006.01]**

27/26 • • using surface ionisation, e.g. field effect ion sources, thermionic ion sources (H01J 27/20, H01J 27/24 take precedence) **[3, 2006.01]**

29/00 **Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00 [1, 2006.01]**

29/02 • Electrodes; Screens; Mounting, supporting, spacing, or insulating thereof **[1, 2006.01]**

29/04 • • Cathodes **[1, 2006.01]**

29/06 • • Screens for shielding; Masks interposed in the electron stream **[1, 2006.01]**

29/07 • • • Shadow masks for colour-television tubes **[2, 2006.01]**

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-plates for storage tubes or electrodes for collecting secondary electrons **[1, 2006.01]**

29/10 • • Screens on, or from, which an image or pattern is formed, picked-up, converted, or stored **[1, 2006.01]**

29/12 • • • acting as light valves by shutter operation, e.g. for eidophor **[1, 2006.01]**

29/14 • • • acting by discolouration, e.g. halide screen **[1, 2006.01]**

29/16 • • • Incandescent screens **[1, 2006.01]**

29/18 • • • Luminescent screens **[1, 2006.01]**

29/20 • • • • characterised by the luminescent material **[1, 2006.01]**

29/22 • • • • characterised by the binder or adhesive for securing the luminescent material to its support, e.g. vessel **[1, 2006.01]**

29/24 • • • • Supports for luminescent material **[1, 2006.01]**

29/26 • • • • with superimposed luminescent layers **[1, 2006.01]**

29/28 • • • • with protective, conductive, or reflective layers **[1, 2006.01]**

29/30 • • • • with luminescent material discontinuously arranged, e.g. in dots or lines **[1, 2006.01]**

29/32 • • • • • with adjacent dots or lines of different luminescent material, e.g. for colour television **[1, 2006.01]**

29/34 • • • • provided with permanent marks or references **[1, 2006.01]**

29/36 • • • Photoelectric screens; Charge-storage screens **[1, 2006.01]**

29/38 • • • • not using charge storage, e.g. photo-emissive screen, extended cathode **[1, 2006.01]**

29/39 • • • • Charge-storage screens **[1, 2006.01]**

29/41 • • • • • using secondary emission, e.g. for supericonoscope **[1, 2006.01]**

29/43 • • • • • using photo-emissive mosaic, e.g. for orthicon, for iconoscope **[1, 2006.01]**

29/44 • • • • • exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity **[1, 2006.01]**

29/45 • • • • • exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodielectric screen, photovoltaic screen **[1, 2006.01]**

29/46 • Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement **[1, 2006.01]**

29/48 • • Electron guns **[1, 2006.01]**

29/50 • • • two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 29/51 takes precedence) **[1, 2, 2006.01]**

29/51 • • • Arrangements for controlling convergence of a plurality of beams **[2, 2006.01]**

Note(s)

Group H01J 29/48 takes precedence over groups H01J 29/52-H01J 29/58.

29/52 • • Arrangements for controlling intensity of ray or beam, e.g. for modulation **[1, 2006.01]**

29/54 • • Arrangements for centring ray or beam **[1, 2006.01]**

29/56 • • Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses **[1, 2006.01]**

29/58 • • Arrangements for focusing or reflecting ray or beam **[1, 2006.01]**

29/60 • • • Mirrors **[1, 2006.01]**

29/62 • • • Electrostatic lenses **[1, 2006.01]**

29/64 • • • Magnetic lenses **[1, 2006.01]**

29/66 • • • • using electromagnetic means only **[1, 2006.01]**

29/68 • • • • using permanent magnets only **[1, 2006.01]**

29/70 • • Arrangements for deflecting ray or beam **[1, 2006.01]**

29/72 • • • along one straight line or along two perpendicular straight lines **[1, 2006.01]**

29/74 • • • • Deflecting by electric fields only **[1, 2006.01]**

29/76 • • • • Deflecting by magnetic fields only **[1, 2006.01]**

29/78 • • • along a circle, spiral, or rotating radial line, e.g. for radar display **[1, 2006.01]**

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 **[1, 2006.01]**

29/81 • • • using shadow masks **[3, 2006.01]**

29/82 • • Mounting, supporting, spacing, or insulating electron-optical or ion-optical arrangements **[1, 2006.01]**

29/84 • Traps for removing or diverting unwanted particles, e.g. negative ions or fringing electrons; Arrangements for velocity or mass selection **[1, 2006.01]**

29/86 • Vessels; Containers; Vacuum locks **[1, 2006.01]**

29/87 • • Arrangements for preventing or mitigating effects of implosion of vessels or containers **[2, 2006.01]**

29/88 • • provided with coatings on the walls thereof; Selection of materials for the coatings **[1, 2006.01]**

29/89 • • Optical or photographic arrangements structurally combined with the vessel **[1, 2006.01]**

29/90 • Leading-in arrangements; Seals therefor **[1, 2006.01]**

29/92 • Means forming part of the tube for the purpose of providing electrical connection to it **[1, 2006.01]**

29/94 • Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering **[1, 2006.01]**

29/96 • One or more circuit elements structurally associated with the tube **[1, 2006.01]**

29/98 • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**

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) **[1, 2006.01]**

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 **[1, 2006.01]**

31/04 • • with only one or two output electrodes **[1, 2006.01]**

31/06 • • with more than two output electrodes, e.g. for multiple switching or counting **[1, 2006.01]**

31/08 • having a screen on or from which an image or pattern is formed, picked-up, converted, or stored **[1, 2006.01]**

31/10 • • Image or pattern display tubes, i.e. having electrical input and optical output; Flying-spot tubes for scanning purposes **[1, 2006.01]**

31/12 • • • with luminescent screen **[1, 2006.01]**

31/14 • • • • Magic-eye or analogous tuning indicators **[1, 2006.01]**

31/15 • • • • with ray or beam selectively directed to luminescent anode segments **[3, 2006.01]**

31/16 • • • • with mask carrying a number of selectively displayable signs, e.g. numeroscope **[1, 2006.01]**

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 **[1, 2006.01]**

31/20 • • • for displaying images or patterns in two or more colours **[1, 2006.01]**

31/22 • • • for stereoscopic displays **[1, 2006.01]**

31/24 • • • with screen acting as light valve by shutter operation, e.g. eidophor **[1, 2006.01]**

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) **[1, 2006.01]**

31/28 • • • with electron ray scanning the image screen **[1, 2006.01]**

31/30 • • • • having regulation of screen potential at anode potential, e.g. iconoscope **[1, 2006.01]**

31/32 • • • • • Tubes with image-amplification section, e.g. image-iconoscope, supericonoscope **[1, 2006.01]**

31/34 • • • • having regulation of screen potential at cathode potential, e.g. orthicon **[1, 2006.01]**

31/36 • • • • • Tubes with image-amplification section, e.g. image-orthicon **[1, 2006.01]**

31/38 • • • • • Tubes with photoconductive screen, e.g. vidicon **[1, 2006.01]**

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" **[1, 2006.01]**

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 **[1, 2006.01]**

31/44 • • • • Tubes with image-amplification section **[1, 2006.01]**

31/46 • • • Tubes in which electrical output represents both intensity and colour of image **[1, 2006.01]**

31/48 • • • Tubes with amplification of output effected by electron-multiplier arrangements within the vacuum space **[1, 2006.01]**

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 **[1, 2006.01]**

31/495 • • Pick-up tubes adapted for an input of sonic, ultrasonic, or mechanical vibrations and having an electric output **[1, 2006.01]**

31/50 • • Image-conversion or image-amplification tubes, i.e. having optical, X-ray, or analogous input, and optical output **[1, 2006.01]**

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" **[1, 2006.01]**

31/54 • • • in which the electron ray or beam is reflected by the image input screen on to the image output screen **[1, 2006.01]**

31/56 • • • for converting or amplifying images in two or more colours **[1, 2006.01]**

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 **[1, 2006.01]**

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) **[1, 2006.01]**

31/62 • • • • with separate reading and writing rays **[1, 2006.01]**

31/64 • • • • • • on opposite sides of screen, e.g. for conversion of definition **[1, 2006.01]**

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 **[1, 2006.01]**

31/68 • • • in which the information pattern represents two or more colours **[1, 2006.01]**

33/00 Discharge tubes with provision for emergence of electrons or ions from the vessel (particle accelerators H05H)**; Lenard tubes [1, 2006.01]**

33/02 • Details **[1, 2006.01]**

33/04 • • Windows **[1, 2006.01]**

35/00 X-ray tubes [1, 2006.01]

35/02 • Details **[1, 2006.01]**

35/04 • • Electrodes **[1, 2006.01]**

35/06 • • • Cathodes **[1, 2006.01]**

35/08 • • • Anodes; Anticathodes **[1, 2006.01]**

35/10 • • • • Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes **[1, 2006.01]**

35/12 • • • • Cooling non-rotary anodes **[1, 2006.01]**

35/14 • • Arrangements for concentrating, focusing, or directing the cathode ray **[1, 2006.01]**

35/16 • • Vessels; Containers; Shields associated therewith **[1, 2006.01]**

35/18 • • • Windows **[1, 2006.01]**

35/20 • • Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering **[1, 2006.01]**

35/22 • specially designed for passing a very high current for a very short time, e.g. for flash operation **[1, 2006.01]**

35/24 • Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof **[1, 2006.01]**

35/26 • • by rotation of the anode or anticathode **[1, 2006.01]**

35/28 • • by vibration, oscillation, reciprocation, or swash-plate motion of the anode or anticathode **[1, 2006.01]**

35/30 • • by deflection of the cathode ray **[1, 2006.01]**

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 **[1, 2006.01]**

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) **[1, 2, 5, 2006.01]**

37/02 • Details **[1, 2006.01]**

37/04 • • Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement **[1, 2006.01]**

37/05 • • • Electron- or ion-optical arrangements for separating electrons or ions according to their energy (particle separator tubes H01J 49/00) **[3, 2006.01]**

37/06 • • • Electron sources; Electron guns **[1, 2006.01]**

37/063 • • • • Geometrical arrangement of electrodes for beam-forming **[3, 2006.01]**

37/065 • • • • Construction of guns or parts thereof (H01J 37/067-H01J 37/077 take precedence) **[3, 2006.01]**

37/067 • • • • Replacing parts of guns; Mutual adjustment of electrodes (H01J 37/073-H01J 37/077 take precedence; vacuum locks H01J 37/18) **[3, 2006.01]**

37/07 • • • • Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073-H01J 37/077 take precedence) **[3, 2006.01]**

37/073 • • • • Electron guns using field emission, photo emission, or secondary emission electron sources **[3, 2006.01]**

37/075 • • • • Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser **[3, 2006.01]**

37/077 • • • • Electron guns using discharge in gases or vapours as electron sources **[3, 2006.01]**

37/08 • • • Ion sources; Ion guns **[1, 2006.01]**

37/09 • • • Diaphragms; Shields associated with electron- or ion-optical arrangements; Compensation of disturbing fields **[3, 2006.01]**

37/10 • • • Lenses **[1, 2006.01]**

37/12 • • • • electrostatic **[1, 2006.01]**

37/14 • • • • magnetic **[1, 2006.01]**

37/141 • • • • • Electromagnetic lenses **[3, 2006.01]**

37/143 • • • • • Permanent magnetic lenses **[3, 2006.01]**
37/145 • • • • Combinations of electrostatic and magnetic lenses **[3, 2006.01]**
37/147 • • • Arrangements for directing or deflecting the discharge along a desired path (lenses H01J 37/10) **[2, 2006.01]**
37/15 • • • • External mechanical adjustment of electron- or ion-optical components (H01J 37/067, H01J 37/20 take precedence) **[3, 2006.01]**
37/153 • • • Electron-optical or ion-optical arrangements for the correction of image defects, e.g. stigmators **[2, 2006.01]**
37/16 • • Vessels; Containers **[1, 2006.01]**
37/18 • • Vacuum locks **[1, 2006.01]**
37/20 • • Means for supporting or positioning the object or the material; Means for adjusting diaphragms or lenses associated with the support **[1, 2006.01]**
37/21 • • Means for adjusting the focus **[2, 2006.01]**
37/22 • • Optical or photographic arrangements associated with the tube **[1, 2006.01]**
37/24 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**
37/244 • • Detectors; Associated components or circuits therefor **[3, 2006.01]**
37/248 • • Components associated with high voltage supply **[3, 2006.01]**
37/252 • Tubes for spot-analysing by electron or ion beams; Microanalysers **[3, 2006.01]**
37/256 • • using scanning beams **[3, 2006.01]**
37/26 • Electron or ion microscopes; Electron- or ion-diffraction tubes **[1, 2, 2006.01]**
37/27 • • Shadow microscopy **[3, 2006.01]**
37/28 • • with scanning beams **[1, 2006.01]**
37/285 • • Emission microscopes, e.g. field-emission microscopes **[2, 2006.01]**
37/29 • • Reflection microscopes **[2, 2006.01]**
37/295 • • Electron- or ion-diffraction tubes **[2, 2006.01]**
37/30 • Electron-beam or ion-beam tubes for localised treatment of objects **[1, 2006.01]**
37/301 • • Arrangements enabling beams to pass between regions of different pressure **[3, 2006.01]**
37/302 • • Controlling tubes by external information, e.g. programme control (H01J 37/304 takes precedence) **[3, 2006.01]**
37/304 • • Controlling tubes by information coming from the objects, e.g. correction signals **[3, 2006.01]**
37/305 • • for casting, melting, evaporating, or etching **[2, 2006.01]**
37/31 • • for cutting or drilling **[2, 2006.01]**
37/315 • • for welding **[2, 2006.01]**
37/317 • • for changing properties of the objects or for applying thin layers thereon, e.g. ion implantation (H01J 37/36 takes precedence) **[3, 2006.01]**
37/32 • Gas-filled discharge tubes (heating by discharge H05B) **[1, 2006.01]**
37/34 • • operating with cathodic sputtering (H01J 37/36 takes precedence) **[1, 3, 2006.01]**
37/36 • • for cleaning surfaces while plating with ions of materials introduced into the discharge, e.g. introduced by evaporation **[3, 2006.01]**

40/00 Photoelectric discharge tubes not involving the ionisation of a gas (H01J 49/00 takes precedence) **[3, 2006.01]**
40/02 • Details **[3, 2006.01]**
40/04 • • Electrodes **[3, 2006.01]**
40/06 • • • Photo-emissive cathodes **[3, 2006.01]**
40/08 • • Magnetic means for controlling discharge **[3, 2006.01]**
40/10 • • Selection of substances for gas fillings **[3, 2006.01]**
40/12 • • One or more circuit elements structurally associated with the tube **[3, 2006.01]**
40/14 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[3, 2006.01]**
40/16 • having photo-emissive cathode, e.g. alkaline photoelectric cell (operating with secondary emission H01J 43/00) **[3, 2006.01]**
40/18 • • with luminescent coatings for influencing the sensitivity of the tube, e.g. by converting the input wavelength **[3, 2006.01]**
40/20 • • wherein a light-ray scans a photo-emissive screen **[3, 2006.01]**

41/00 Discharge tubes and means integral therewith for measuring gas pressure; Discharge tubes for evacuation by diffusion of ions [1, 2006.01]
41/02 • Discharge tubes and means integral therewith for measuring gas pressure **[2, 2006.01]**
41/04 • • with ionisation by means of thermionic cathodes **[2, 2006.01]**
41/06 • • with ionisation by means of cold cathodes **[2, 2006.01]**
41/08 • • with ionisation by means of radioactive substances, e.g. alphatrons **[2, 2006.01]**
41/10 • • of particle-spectrometer type (particle spectrometers in general H01J 49/00) **[2, 2006.01]**
41/12 • Discharge tubes for evacuating by diffusion of ions, e.g. ion pumps, getter ion pumps **[2, 2006.01]**
41/14 • • with ionisation by means of thermionic cathodes **[2, 2006.01]**
41/16 • • • using gettering substances **[2, 2006.01]**
41/18 • • with ionisation by means of cold cathodes **[2, 2006.01]**
41/20 • • • using gettering substances **[2, 2006.01]**

43/00 Secondary-emission tubes; Electron-multiplier tubes (dynamic electron-multiplier tubes H01J 25/76) **[1, 2006.01]**
43/02 • Tubes in which one or a few electrodes are secondary-electron-emitting electrodes **[1, 2006.01]**
43/04 • Electron multipliers **[1, 2006.01]**
43/06 • • Electrode arrangements **[1, 2006.01]**
43/08 • • • Cathode arrangements (construction of photo cathodes H01J 40/06, H01J 40/16, H01J 47/00, H01J 49/08) **[1, 2006.01]**
43/10 • • • Dynodes (H01J 43/24, H01J 43/26 take precedence) **[1, 2006.01]**
43/12 • • • Anode arrangements **[1, 2006.01]**
43/14 • • • Control of electron beam by magnetic field **[1, 2006.01]**
43/16 • • • Electrode arrangements using essentially one dynode **[1, 2006.01]**
43/18 • • • Electrode arrangements using essentially more than one dynode **[1, 2006.01]**
43/20 • • • • Dynodes consisting of sheet material, e.g. plane, bent **[1, 2006.01]**
43/22 • • • • Dynodes consisting of electron-permeable material, e.g. foil, grid, tube, venetian blind **[1, 2006.01]**
43/24 • • • • Dynodes having potential gradient along their surfaces **[1, 2006.01]**

43/26 • • • • Box dynodes **[1, 2006.01]**
43/28 • • Vessels; Windows; Screens; Suppressing undesired discharges or currents **[1, 2006.01]**
43/30 • • Circuit arrangements not adapted to a particular application of the tube and not otherwise provided for **[1, 2006.01]**

45/00 Discharge tubes functioning as thermionic generators [1, 2006.01]

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, 2006.01]**
47/02 • Ionisation chambers **[3, 2006.01]**
47/04 • • Capacitive ionisation chambers, e.g. the electrodes of which are used as electrometers **[3, 2006.01]**
47/06 • Proportional counter tubes **[3, 2006.01]**
47/08 • Geiger-Müller counter tubes **[3, 2006.01]**
47/10 • Spark counters (H01J 47/14 takes precedence; spark gaps H01T) **[3, 2006.01]**
47/12 • Neutron detector tubes, e.g. BF_3 tubes **[3, 2006.01]**
47/14 • Parallel electrode spark or streamer chambers; Wire spark or streamer chambers **[3, 2006.01]**
47/16 • • characterised by readout of each individual wire **[3, 2006.01]**
47/18 • • • the readout being electrical (H01J 47/20 takes precedence) **[3, 2006.01]**
47/20 • • • the readout employing electrical or mechanical delay lines, e.g. magnetostrictive delay lines **[3, 2006.01]**
47/22 • • characterised by another type of readout **[3, 2006.01]**
47/24 • • • the readout being acoustical **[3, 2006.01]**
47/26 • • • the readout being optical **[3, 2006.01]**

49/00 Particle spectrometers or separator tubes [3, 2006.01]

Note(s) [3]

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.

49/02 • Details **[3, 2006.01]**
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, 2006.01]**
49/06 • • Electron- or ion-optical arrangements (H01J 49/04 takes precedence) **[3, 2006.01]**
49/08 • • Electron sources, e.g. for generating photo-electrons, secondary electrons or Auger electrons **[3, 2006.01]**
49/10 • • Ion sources; Ion guns **[3, 2006.01]**
49/12 • • • using an arc discharge, e.g. of the duoplasmatron type **[3, 2006.01]**
49/14 • • • using particle bombardment, e.g. ionisation chambers **[3, 2006.01]**
49/16 • • • using surface ionisation, e.g. field-, thermionic- or photo-emission **[3, 2006.01]**
49/18 • • • using spark ionisation **[3, 2006.01]**
49/20 • • Magnetic deflection **[3, 2006.01]**
49/22 • • Electrostatic deflection **[3, 2006.01]**
49/24 • • Vacuum systems, e.g. maintaining desired pressures **[3, 2006.01]**
49/26 • Mass spectrometers or separator tubes **[3, 2006.01]**
49/28 • • Static spectrometers **[3, 2006.01]**
49/30 • • • using magnetic analysers **[3, 2006.01]**
49/32 • • • using double focusing **[3, 2006.01]**
49/34 • • Dynamic spectrometers **[3, 2006.01]**
49/36 • • • Radio frequency spectrometers, e.g. Bennett-type spectrometers, Redhead-type spectrometers **[3, 2006.01]**
49/38 • • • • Omegatrons **[3, 2006.01]**
49/40 • • • Time-of-flight spectrometers (H01J 49/36 takes precedence) **[3, 2006.01]**
49/42 • • • Stability-of-path spectrometers, e.g. monopole, quadrupole, multipole, farvitrons **[3, 2006.01]**
49/44 • Energy spectrometers, e.g. alpha-, beta-spectrometers **[3, 2006.01]**
49/46 • • Static spectrometers **[3, 2006.01]**
49/48 • • • using electrostatic analysers, e.g. cylindrical sector, Wien filter **[3, 2006.01]**

Discharge lamps

61/00 Gas-discharge or vapour-discharge lamps (arc lamps with consumable electrodes H05B; electroluminescent lamps H05B) **[1, 2006.01]**
61/02 • Details **[1, 2006.01]**
61/04 • • Electrodes (for igniting H01J 61/54); Screens; Shields **[1, 2006.01]**
61/06 • • • Main electrodes **[1, 2006.01]**
61/067 • • • • for low-pressure discharge lamps **[2, 2006.01]**
61/073 • • • • for high-pressure discharge lamps **[2, 2006.01]**
61/09 • • • • Hollow cathodes **[2, 2006.01]**
61/10 • • • Shield, screens, or guides for influencing the discharge **[1, 2006.01]**
61/12 • • Selection of substances for gas fillings; Specified operating pressure or temperature **[1, 2006.01]**
61/14 • • • having one or more carbon compounds as the principal constituents **[1, 2006.01]**
61/16 • • • having helium, argon, neon, krypton, or xenon as the principle constituent **[1, 2006.01]**
61/18 • • • having a metallic vapour as the principal constituent **[1, 2006.01]**
61/20 • • • • mercury vapour **[1, 2006.01]**
61/22 • • • • vapour of an alkali metal **[1, 2006.01]**
61/24 • • Means for obtaining or maintaining the desired pressure within the vessel **[1, 2006.01]**
61/26 • • • Means for absorbing or adsorbing gas, e.g. by gettering; Means for preventing blackening of the envelope **[1, 2006.01]**
61/28 • • • Means for producing, introducing, or replenishing gas or vapour during operation of the lamp **[1, 2006.01]**
61/30 • • Vessels; Containers **[1, 2006.01]**
61/32 • • • Special longitudinal shape, e.g. for advertising purposes **[1, 2006.01]**
61/33 • • • Special shape of cross-section, e.g. for producing cool spot **[1, 2006.01]**
61/34 • • • Double-wall vessels or containers **[1, 2006.01]**
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) **[1, 2006.01]**
61/36 • • Seals between parts of vessels; Seals for leading-in conductors; Leading-in conductors **[1, 2006.01]**

61/38 • • Devices for influencing the colour or wavelength of the light **[1, 2006.01]**
61/40 • • • by light-filters; by coloured coatings in or on the envelope **[1, 2006.01]**
61/42 • • • by transforming the wavelength of the light by luminescence **[1, 2006.01]**
61/44 • • • • Devices characterised by the luminescent material **[1, 2006.01]**
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 **[1, 2006.01]**
61/48 • • • • Separate coatings of different luminous materials **[1, 2006.01]**
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 **[1, 2006.01]**
61/52 • • Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space **[1, 2006.01]**
61/54 • • Igniting arrangements, e.g. promoting ionisation for starting **[1, 2006.01]**
61/56 • • One or more circuit elements structurally associated with the lamp **[1, 2006.01]**
61/58 • Lamps with both liquid anode and liquid cathode **[1, 2006.01]**
61/60 • Lamps in which the discharge space is substantially filled with mercury before ignition **[1, 2006.01]**
61/62 • Lamps with gaseous, e.g. plasma cathode **[1, 2006.01]**
61/64 • Cathode glow lamps **[1, 2006.01]**
61/66 • • having one or more specially shaped cathodes, e.g. for advertising purposes **[1, 2006.01]**
61/68 • Lamps in which the main discharge is between parts of a current-carrying guide, e.g. halo lamp **[1, 2006.01]**
61/70 • Lamps with low-pressure unconstricted discharge **[1, 2006.01]**
61/72 • • having a main light-emitting filling of easily vaporisable metal vapour, e.g. mercury **[1, 2006.01]**
61/74 • • having a main light-emitting filling of difficult vaporisable metal vapour, e.g. sodium **[1, 2006.01]**
61/76 • • having a filling of permanent gas or gases only **[1, 2006.01]**
61/78 • • • with cold cathode; with cathode heated only by discharge, e.g. high-tension lamp for advertising **[1, 2006.01]**
61/80 • • Lamps suitable only for intermittent operation, e.g. flash lamp **[1, 2006.01]**
61/82 • Lamps with high-pressure unconstricted discharge **[1, 2006.01]**
61/84 • Lamps with discharge constricted by high pressure **[1, 2006.01]**
61/86 • • with discharge additionally constricted by close spacing of electrodes, e.g. for optical projection **[1, 2006.01]**
61/88 • • with discharge additionally constricted by envelope **[1, 2006.01]**
61/90 • • Lamps suitable only for intermittent operation, e.g. flash lamp **[1, 2006.01]**
61/92 • Lamps with more than one main discharge path **[1, 2006.01]**
61/94 • • Paths producing light of different wavelengths, e.g. for simulating daylight **[1, 2006.01]**
61/95 • Lamps with control electrode for varying intensity or wavelength of the light, e.g. for producing modulated light **[1, 2006.01]**
61/96 • Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight **[1, 2006.01]**
61/98 • Lamps with closely spaced electrodes heated to incandescence by light-emitting discharge, e.g. tungsten arc lamp **[1, 2006.01]**

63/00 Cathode-ray or electron-stream lamps [1, 2006.01]
63/02 • Details, e.g. electrode, gas filling, shape of vessel **[1, 2006.01]**
63/04 • • Vessels provided with luminescent coatings; Selection of materials for the coatings **[1, 2006.01]**
63/06 • Lamps with luminescent screen excited by the ray or stream **[1, 2006.01]**
63/08 • Lamps with gas plasma excited by the ray or stream **[1, 2006.01]**

65/00 Lamps without any electrode inside the vessel; Lamps with at least one main electrode outside the vessel [1, 2006.01]
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 **[1, 2006.01]**
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 **[1, 2006.01]**
65/08 • Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel **[1, 2006.01]**

99/00 Subject matter not provided for in other groups of this subclass [2006.01]

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)

Note(s)

In this subclass, the following term is used with the meaning indicated:
- "lamp" includes tubes emitting ultra-violet or infra-red light.

Subclass index

CHARACTERISED BY UTILISATION
General lighting; other lighting.....5/00, 7/00

1/00 **Details [1, 2006.01]**

1/02 • Incandescent bodies **[1, 2006.01]**
1/04 • • characterised by the material thereof **[1, 2006.01]**
1/06 • • • Carbon bodies **[1, 2006.01]**
1/08 • • • Metallic bodies **[1, 2006.01]**
1/10 • • • Bodies of metal or carbon combined with other substance **[1, 2006.01]**
1/12 • • • Bodies which are non-conductive when cold, e.g. for Nernst lamp **[1, 2006.01]**
1/14 • • characterised by the shape **[1, 2006.01]**
1/16 • • Electric connection thereto **[1, 2006.01]**
1/18 • Mountings or supports for the incandescent body **[1, 2006.01]**
1/20 • • characterised by the material thereof **[1, 2006.01]**
1/22 • • Lamp stems **[1, 2006.01]**
1/24 • • Mounts for lamps with connections at opposite ends, e.g. for tubular lamp **[1, 2006.01]**
1/26 • Screens; Filters (associated with envelope H01K 1/28) **[1, 2006.01]**
1/28 • Envelopes; Vessels **[1, 2006.01]**
1/30 • • incorporating lenses **[1, 2006.01]**
1/32 • • provided with coatings on the walls; Vessels or coatings thereon characterised by the material thereof **[1, 2006.01]**
1/34 • • Double-wall vessels **[1, 2006.01]**
1/36 • Seals between parts of vessel, e.g. between stem and envelope **[1, 2006.01]**
1/38 • Seals for leading-in conductors **[1, 2006.01]**
1/40 • Leading-in conductors **[1, 2006.01]**
1/42 • Means forming part of the lamp for the purpose of providing electrical connection to, or support for, the lamp **[1, 2006.01]**
1/44 • • directly applied to, or forming part of, the vessel **[1, 2006.01]**
1/46 • • supported by a separate part, e.g. base, cap **[1, 2006.01]**
1/48 • • • Removable caps **[1, 2006.01]**
1/50 • Selection of substances for gas fillings; Specified pressure thereof **[1, 2006.01]**
1/52 • Means for obtaining or maintaining the desired pressure within the vessel **[1, 2006.01]**
1/54 • • Means for adsorbing or absorbing gas, or for preventing or removing efflorescence, e.g. by gettering **[1, 2006.01]**
1/56 • • • characterised by the material of the getter **[1, 2006.01]**
1/58 • Cooling arrangements **[1, 2006.01]**
1/60 • Means structurally associated with the lamp for indicating defects or previous use **[1, 2006.01]**
1/62 • One or more circuit elements structurally associated with the lamp **[1, 2006.01]**
1/64 • • with built-in switch **[1, 2006.01]**
1/66 • • with built-in fuse **[1, 2006.01]**
1/68 • • with built-in spark gap **[1, 2006.01]**
1/70 • • with built-in short-circuiting device, e.g. for serially-connected lamps **[1, 2006.01]**

3/00 **Apparatus or processes adapted to the manufacture, installing, removal or maintenance of incandescent lamps or parts thereof [1, 2006.01]**

3/02 • Manufacture of incandescent bodies **[1, 2006.01]**
3/04 • • Machines therefor **[1, 2006.01]**
3/06 • Attaching of incandescent bodies to mount **[1, 2006.01]**
3/08 • Manufacture of mounts or stems **[1, 2006.01]**
3/10 • • Machines therefor **[1, 2006.01]**
3/12 • Joining of mount or stem to vessel; Joining parts of the vessel, e.g. by butt sealing **[1, 2006.01]**
3/14 • • Machines therefor **[1, 2006.01]**
3/16 • Joining of caps to vessel **[1, 2006.01]**
3/18 • • Machines therefor **[1, 2006.01]**
3/20 • Sealing-in wires directly into the envelope **[1, 2006.01]**
3/22 • Exhausting, degassing, filling, or cleaning vessels **[1, 2006.01]**
3/24 • • Machines therefor **[1, 2006.01]**
3/26 • Closing of vessels **[1, 2006.01]**
3/28 • Machines having sequentially arranged operating stations **[1, 2006.01]**
3/30 • Repairing or regenerating used or defective lamps **[1, 2006.01]**
3/32 • Auxiliary devices for cleaning, placing, or removing incandescent lamps **[1, 2006.01]**

5/00 **Lamps for general lighting** (H01K 9/00-H01K 13/00 take precedence) **[1, 2006.01]**

5/02 • with connections made at opposite ends, e.g. tubular lamp with axially arranged filament **[1, 2006.01]**

7/00 **Lamps for purposes other than general lighting** (H01K 9/00-H01K 13/00 take precedence) **[1, 2006.01]**

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) **[1, 2006.01]**
7/04 • for indicating **[1, 2006.01]**
7/06 • for decorative purposes **[1, 2006.01]**

9/00 **Lamps having two or more incandescent bodies separately heated** (H01K 11/00, H01K 13/00 take precedence) **[1, 2006.01]**

9/02 • to provide substitution in the event of failure of one of the bodies **[1, 2006.01]**
9/04 • • with built-in manually-operated switch **[1, 2006.01]**
9/06 • • with built-in device, e.g. switch, for automatically completing circuit of reserve body **[1, 2006.01]**
9/08 • to provide selectively different light effects, e.g. for automobile headlamp **[1, 2006.01]**

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) **[1, 2006.01]**

13/00 Lamps having an incandescent body which is substantially non-conductive until heated, e.g. Nernst lamp [1, 2006.01]

13/02 • Heating arrangements **[1, 2006.01]**

13/04 • • using electric discharge **[1, 2006.01]**

13/06 • • using induction heating; using high-frequency field **[1, 2006.01]**

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]**

Note(s) [2, 6, 2006.01, 2010.01]

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;
   - 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;
   - 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. 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;
   - "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;

   - "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";
   - "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;
   - "parts" includes all structural units which are included in a complete device;
   - "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";
   - "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;
   - "assembly" of a device is the building up of the device from its component constructional units and includes the provision of fillings in containers.

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.
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. In this subclass, the Periodic System used is the 8 group system indicated by Roman numerals in the Periodic Table thereunder.

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, 2006.01]

Note(s) [2]

Group H01L 21/70 takes precedence over groups H01L 21/02-H01L 21/67.

21/02 • Manufacture or treatment of semiconductor devices or of parts thereof **[2, 2006.01]**

21/027 • • Making masks on semiconductor bodies for further photolithographic processing, not provided for in group H01L 21/18 or H01L 21/34 **[5, 2006.01]**

21/033 • • • comprising inorganic layers **[5, 2006.01]**

21/04 • • the devices having at least one potential-jump barrier or surface barrier, e.g. PN junction, depletion layer, carrier concentration layer **[2, 2006.01]**

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, 2006.01]**

21/08 • • • • Preparation of the foundation plate **[2, 2006.01]**

21/10 • • • • Preliminary treatment of the selenium or tellurium, its application to the foundation plate, or the subsequent treatment of the combination **[2, 2006.01]**

21/103 • • • • • Conversion of the selenium or tellurium to the conductive state **[2, 2006.01]**

21/105 • • • • • Treatment of the surface of the selenium or tellurium layer after having been made conductive **[2, 2006.01]**

21/108 • • • • • Provision of discrete insulating layers, i.e. non-genetic barrier layers **[2, 2006.01]**

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, 2006.01]**

21/14 • • • • Treatment of the complete device, e.g. by electroforming to form a barrier **[2, 2006.01]**

21/145 • • • • • Ageing **[2, 2006.01]**

21/16 • • • the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide **[2, 2006.01]**

21/18 • • • the devices having semiconductor bodies comprising elements of group IV of the Periodic System or $A_{III}B_{V}$ compounds with or without impurities, e.g. doping materials **[2, 6, 7, 2006.01]**

Note(s) [7]

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 Group IV of the Periodic System or $A_{III}B_{V}$ compounds, even if the material used is not explicitly specified.

21/20 • • • • Deposition of semiconductor materials on a substrate, e.g. epitaxial growth **[2, 2006.01]**

21/203 • • • • • using physical deposition, e.g. vacuum deposition, sputtering **[2, 2006.01]**

21/205 • • • • • using reduction or decomposition of a gaseous compound yielding a solid condensate, i.e. chemical deposition **[2, 2006.01]**

21/208 • • • • • using liquid deposition **[2, 2006.01]**

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, 2006.01]**

21/223 • • • • • using diffusion into, or out of, a solid from or into a gaseous phase **[2, 2006.01]**

21/225 • • • • • using diffusion into, or out of, a solid from or into a solid phase, e.g. a doped oxide layer **[2, 2006.01]**

21/228 • • • • • using diffusion into, or out of, a solid from or into a liquid phase, e.g. alloy diffusion processes **[2, 2006.01]**

21/24 • • • • Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body **[2, 2006.01]**

21/26 • • • • Bombardment with wave or particle radiation **[2, 2006.01]**

21/261 • • • • • to produce a nuclear reaction transmuting chemical elements **[6, 2006.01]**

21/263 • • • • • with high-energy radiation (H01L 21/261 takes precedence) **[2, 6, 2006.01]**

21/265 • • • • • • producing ion implantation **[2, 2006.01]**

21/266 • • • • • • • using masks **[5, 2006.01]**

21/268 • • • • • • using electromagnetic radiation, e.g. laser radiation **[2, 2006.01]**

21/28 • • • • Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20-H01L 21/268 **[2, 2006.01]**

21/283 • • • • • Deposition of conductive or insulating materials for electrodes **[2, 2006.01]**

21/285 • • • • • • from a gas or vapour, e.g. condensation **[2, 2006.01]**

21/288 • • • • • • from a liquid, e.g. electrolytic deposition **[2, 2006.01]**

21/30 • • • • Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/20-H01L 21/26 (manufacture of electrodes thereon H01L 21/28) **[2, 2006.01]**

21/301 • • • • • to subdivide a semiconductor body into separate parts, e.g. making partitions (cutting H01L 21/304) **[6, 2006.01]**

21/302 • • • • • to change the physical characteristics of their surfaces, or to change their shape, e.g. etching, polishing, cutting **[2, 2006.01]**

21/304 • • • • • • Mechanical treatment, e.g. grinding, polishing, cutting **[2, 2006.01]**

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, 2006.01]**

21/3063 • • • • • • • Electrolytic etching **[6, 2006.01]**

21/3065 • • • • • • • Plasma etching; Reactive-ion etching **[6, 2006.01]**

21/308 • • • • • • • using masks (H01L 21/3063, H01L 21/3065, take precedence) **[2, 6, 2006.01]**

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, 2006.01]**

21/3105 • • • • • • After-treatment **[5, 2006.01]**

21/311 • • • • • • • Etching the insulating layers **[5, 2006.01]**

21/3115 • • • • • • • Doping the insulating layers **[5, 2006.01]**

21/312 • • • • • • Organic layers, e.g. photoresist (H01L 21/3105, H01L 21/32 take precedence) **[2, 5, 2006.01]**

21/314 • • • • • • Inorganic layers (H01L 21/3105, H01L 21/32 take precedence) **[2, 5, 2006.01]**

21/316 • • • • • • • composed of oxides or glassy oxides or oxide-based glass **[2, 2006.01]**

21/318 • • • • • • • composed of nitrides **[2, 2006.01]**

21/32 • • • • • • using masks **[2, 5, 2006.01]**

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, 2006.01]**

21/321 • • • • • • • After-treatment **[5, 2006.01]**

21/3213 • • • • • • • • Physical or chemical etching of the layers, e.g. to produce a patterned layer from a pre-deposited extensive layer **[6, 2006.01]**

21/3215 • • • • • • • • Doping the layers **[5, 2006.01]**

21/322 • • • • • to modify their internal properties, e.g. to produce internal imperfections **[2, 2006.01]**

21/324 • • • • • Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/20-H01L 21/288, H01L 21/302-H01L 21/322 take precedence) **[2, 2006.01]**

21/326 • • • • • Application of electric currents or fields, e.g. for electroforming (H01L 21/20-H01L 21/288, H01L 21/302-H01L 21/324 take precedence) **[2, 2006.01]**

21/328 • • • • Multistep processes for the manufacture of devices of the bipolar type, e.g. diodes, transistors, thyristors **[5, 2006.01]**

21/329 • • • • • the devices comprising one or two electrodes, e.g. diodes **[5, 2006.01]**

21/33 • • • • • the devices comprising three or more electrodes **[5, 2006.01]**

21/331 • • • • • • Transistors **[5, 2006.01]**

21/332 • • • • • • Thyristors **[5, 2006.01]**

21/334 • • • • Multistep processes for the manufacture of devices of the unipolar type **[5, 2006.01]**

21/335 • • • • • Field-effect transistors **[5, 2006.01]**

21/336 • • • • • • with an insulated gate **[5, 2006.01]**

21/337 • • • • • • with a PN junction gate **[5, 2006.01]**

21/338 • • • • • • with a Schottky gate **[5, 2006.01]**

21/339 • • • • • Charge transfer devices **[5, 6, 2006.01]**

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, 2006.01]**

21/36 • • • • Deposition of semiconductor materials on a substrate, e.g. epitaxial growth **[2, 2006.01]**

21/363 • • • • • using physical deposition, e.g. vacuum deposition, sputtering **[2, 2006.01]**

21/365 • • • • • using reduction or decomposition of a gaseous compound yielding a solid condensate, i.e. chemical deposition **[2, 2006.01]**

21/368 • • • • • using liquid deposition **[2, 2006.01]**

21/38 • • • • Diffusion of impurity materials, e.g. doping materials, electrode materials, into, or out of, a semiconductor body, or between semiconductor regions **[2, 2006.01]**

21/383 • • • • • using diffusion into, or out of, a solid from or into a gaseous phase **[2, 2006.01]**

21/385 • • • • • using diffusion into, or out of, a solid from or into a solid phase, e.g. a doped oxide layer **[2, 2006.01]**

21/388 • • • • • using diffusion into, or out of, a solid from or into a liquid phase, e.g. alloy diffusion processes **[2, 2006.01]**

21/40 • • • • Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body **[2, 2006.01]**

21/42 • • • • Bombardment with radiation **[2, 2006.01]**

21/423 • • • • • with high-energy radiation **[2, 2006.01]**

21/425 • • • • • • producing ion implantation **[2, 2006.01]**

21/426 • • • • • • • using masks **[5, 2006.01]**

21/428 • • • • • • using electromagnetic radiation, e.g. laser radiation **[2, 2006.01]**

21/44 • • • • Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups H01L 21/36-H01L 21/428 **[2, 2006.01]**

21/441 • • • • • Deposition of conductive or insulating materials for electrodes **[2, 2006.01]**

21/443 • • • • • • from a gas or vapour, e.g. condensation **[2, 2006.01]**

21/445 • • • • • • from a liquid, e.g. electrolytic deposition **[2, 2006.01]**

21/447 • • • • • involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence) **[2, 2006.01]**

21/449 • • • • • involving the application of mechanical vibrations, e.g. ultrasonic vibrations **[2, 2006.01]**

21/46 • • • • Treatment of semiconductor bodies using processes or apparatus not provided for in groups H01L 21/36-H01L 21/428 (manufacture of electrodes thereon H01L 21/44) **[2, 2006.01]**

21/461 • • • • • to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting **[2, 2006.01]**

21/463 • • • • • • Mechanical treatment, e.g. grinding, ultrasonic treatment **[2, 2006.01]**

21/465 • • • • • • Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers H01L 21/469) **[2, 2006.01]**

21/467 • • • • • • • using masks **[2, 2006.01]**

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, 2006.01]**

21/47 • • • • • • • Organic layers, e.g. photoresist (H01L 21/475, H01L 21/4757 take precedence) **[2, 5, 2006.01]**

21/471 • • • • • • • Inorganic layers (H01L 21/475, H01L 21/4757 take precedence) **[2, 5, 2006.01]**

21/473 • • • • • • • • composed of oxides or glassy oxides or oxide-based glass **[2, 2006.01]**

21/475 • • • • • • • using masks **[2, 5, 2006.01]**

21/4757 • • • • • • After-treatment **[5, 2006.01]**

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, 2006.01]**

21/477 • • • • • Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering (H01L 21/36-H01L 21/449, H01L 21/461-H01L 21/475 take precedence) **[2, 2006.01]**

21/479 • • • • • Application of electric currents or fields, e.g. for electroforming (H01L 21/36-H01L 21/449, H01L 21/461-H01L 21/477 take precedence) **[2, 2006.01]**

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-H01L 21/326 **[2, 2006.01]**

21/50 • • • Assembly of semiconductor devices using processes or apparatus not provided for in a single one of the groups H01L 21/06-H01L 21/326 **[2, 2006.01]**

21/52 • • • • Mounting semiconductor bodies in containers **[2, 2006.01]**

21/54 • • • • Providing fillings in containers, e.g. gas fillings **[2, 2006.01]**

21/56 • • • • Encapsulations, e.g. encapsulating layers, coatings **[2, 2006.01]**

21/58 • • • • Mounting semiconductor devices on supports **[2, 2006.01]**

21/60 • • • • Attaching leads or other conductive members, to be used for carrying current to or from the device in operation **[2, 2006.01]**

21/603 • • • • • involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence) **[2, 2006.01]**

21/607 • • • • • involving the application of mechanical vibrations, e.g. ultrasonic vibrations **[2, 2006.01]**

21/62 • • the devices having no potential-jump barriers or surface barriers **[2, 2006.01]**

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-H01L 51/00 **[2, 2006.01]**

21/66 • Testing or measuring during manufacture or treatment **[2, 2006.01]**

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 **[2006.01]**

21/673 • • using specially adapted carriers **[2006.01]**

21/677 • • for conveying, e.g. between different work stations **[2006.01]**

21/68 • • for positioning, orientation or alignment **[2, 2006.01]**

21/683 • • for supporting or gripping (for positioning, orientation or alignment H01L 21/68) **[2006.01]**

21/687 • • • using mechanical means, e.g. chucks, clamps or pinches **[2006.01]**

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, 2006.01]**

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, 2006.01]**

21/74 • • • Making of buried regions of high impurity concentration, e.g. buried collector layers, internal connections **[2, 2006.01]**

21/76 • • • Making of isolation regions between components **[2, 2006.01]**

21/761 • • • • PN junctions **[6, 2006.01]**

21/762 • • • • Dielectric regions **[6, 2006.01]**

21/763 • • • • Polycrystalline semiconductor regions **[6, 2006.01]**

21/764 • • • • Air gaps **[6, 2006.01]**

21/765 • • • • by field-effect **[6, 2006.01]**

21/768 • • • Applying interconnections to be used for carrying current between separate components within a device **[6, 2006.01]**

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, 2006.01]**

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, 2006.01]**

21/782 • • • • to produce devices, each consisting of a single circuit element (H01L 21/82 takes precedence) **[6, 2006.01]**

21/784 • • • • • the substrate being a semiconductor body **[6, 2006.01]**

21/786 • • • • • the substrate being other than a semiconductor body, e.g. insulating body **[6, 2006.01]**

21/82 • • • • to produce devices, e.g. integrated circuits, each consisting of a plurality of components **[2, 2006.01]**

21/822 • • • • • the substrate being a semiconductor, using silicon technology (H01L 21/8258 takes precedence) **[6, 2006.01]**

21/8222 • • • • • • Bipolar technology **[6, 2006.01]**

21/8224 • • • • • • • comprising a combination of vertical and lateral transistors **[6, 2006.01]**

21/8226 • • • • • • • comprising merged transistor logic or integrated injection logic **[6, 2006.01]**

21/8228 • • • • • • • Complementary devices, e.g. complementary transistors **[6, 2006.01]**

21/8229 • • • • • • • Memory structures **[6, 2006.01]**

21/8232 • • • • • • Field-effect technology **[6, 2006.01]**

21/8234 • • • • • • • MIS technology **[6, 2006.01]**

21/8236 • • • • • • • • Combination of enhancement and depletion transistors **[6, 2006.01]**

21/8238 • • • • • • • • Complementary field-effect transistors, e.g. CMOS **[6, 2006.01]**

21/8239 • • • • • • • • Memory structures **[6, 2006.01]**

21/8242 • • • • • • • • • Dynamic random access memory structures (DRAM) **[6, 2006.01]**

21/8244 • • • • • • • • • Static random access memory structures (SRAM) **[6, 2006.01]**

21/8246 • • • • • • • • • Read-only memory structures (ROM) **[6, 2006.01]**

21/8247 • • • • • • • • • • electrically-programmable (EPROM) **[6, 2006.01]**

21/8248 • • • • • • Combination of bipolar and field-effect technology **[6, 2006.01]**

21/8249 • • • • • • • Bipolar and MOS technology **[6, 2006.01]**

21/8252 • • • • • the substrate being a semiconductor, using III-V technology (H01L 21/8258 takes precedence) **[6, 2006.01]**

21/8254 • • • • • the substrate being a semiconductor, using II-VI technology (H01L 21/8258 takes precedence) **[6, 2006.01]**

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, 2006.01]**

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, 2006.01]**

21/84 • • • • • the substrate being other than a semiconductor body, e.g. being an insulating body **[2, 6, 2006.01]**

21/86 • • • • • • the insulating body being sapphire, e.g. silicon on sapphire structure, i.e. SOS **[2, 6, 2006.01]**

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, 2006.01]**

23/00 Details of semiconductor or other solid state devices (H01L 25/00 takes precedence) **[2, 5, 2006.01]**

Note(s)

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-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, 2006.01]**

23/04 • • characterised by the shape **[2, 2006.01]**

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, 2006.01]**

23/045 • • • • the other leads having an insulating passage through the base **[5, 2006.01]**

23/047 • • • • the other leads being parallel to the base **[5, 2006.01]**

23/049 • • • • the other leads being perpendicular to the base **[5, 2006.01]**

23/051 • • • • another lead being formed by a cover plate parallel to the base plate, e.g. sandwich type **[5, 2006.01]**

23/053 • • • the container being a hollow construction and having an insulating base as a mounting for the semiconductor body **[5, 2006.01]**

23/055 • • • • the leads having a passage through the base **[5, 2006.01]**

23/057 • • • • the leads being parallel to the base **[5, 2006.01]**

23/06 • • characterised by the material of the container or its electrical properties **[2, 2006.01]**

23/08 • • • the material being an electrical insulator, e.g. glass **[2, 2006.01]**

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, 2006.01]**

23/12 • Mountings, e.g. non-detachable insulating substrates **[2, 2006.01]**

23/13 • • characterised by the shape **[5, 2006.01]**

23/14 • • characterised by the material or its electrical properties **[2, 2006.01]**

23/15 • • • Ceramic or glass substrates **[5, 2006.01]**

23/16 • Fillings or auxiliary members in containers, e.g. centering rings (H01L 23/42, H01L 23/552 take precedence) **[2, 5, 2006.01]**

23/18 • • Fillings characterised by the material, its physical or chemical properties, or its arrangement within the complete device **[2, 2006.01]**

Note(s) [2]

Group H01L 23/26 takes precedence over groups H01L 23/20-H01L 23/24.

23/20 • • • gaseous at the normal operating temperature of the device **[2, 2006.01]**

23/22 • • • liquid at the normal operating temperature of the device **[2, 2006.01]**

23/24 • • • solid or gel, at the normal operating temperature of the device **[2, 2006.01]**

23/26 • • • including materials for absorbing or reacting with moisture or other undesired substances **[2, 2006.01]**

23/28 • Encapsulation, e.g. encapsulating layers, coatings (H01L 23/552 takes precedence) **[2, 5, 2006.01]**

23/29 • • characterised by the material **[5, 2006.01]**

23/31 • • characterised by the arrangement **[5, 2006.01]**

23/32 • Holders for supporting the complete device in operation, i.e. detachable fixtures (H01L 23/40 takes precedence) **[2, 5, 2006.01]**

23/34 • Arrangements for cooling, heating, ventilating or temperature compensation **[2, 5, 2006.01]**

23/36 • • Selection of materials, or shaping, to facilitate cooling or heating, e.g. heat sinks **[2, 2006.01]**

23/367 • • • Cooling facilitated by shape of device **[5, 2006.01]**

23/373 • • • Cooling facilitated by selection of materials for the device **[5, 2006.01]**

23/38 • • Cooling arrangements using the Peltier effect **[2, 2006.01]**

23/40 • • Mountings or securing means for detachable cooling or heating arrangements **[2, 2006.01]**

23/42 • • Fillings or auxiliary members in containers selected or arranged to facilitate heating or cooling **[2, 5, 2006.01]**

23/427 • • • Cooling by change of state, e.g. use of heat pipes **[5, 2006.01]**

23/433 • • • Auxiliary members characterised by their shape, e.g. pistons **[5, 2006.01]**

23/44 • • the complete device being wholly immersed in a fluid other than air (H01L 23/427 takes precedence) **[2, 5, 2006.01]**

23/46 • • involving the transfer of heat by flowing fluids (H01L 23/42, H01L 23/44 take precedence) **[2, 2006.01]**

23/467 • • • by flowing gases, e.g. air **[5, 2006.01]**

23/473 • • • by flowing liquids **[5, 2006.01]**

23/48 • Arrangements for conducting electric current to or from the solid state body in operation, e.g. leads or terminal arrangements **[2, 2006.01]**

23/482 • • consisting of lead-in layers inseparably applied to the semiconductor body **[5, 2006.01]**

23/485 • • • consisting of layered constructions comprising conductive layers and insulating layers, e.g. planar contacts **[5, 2006.01]**

23/488 • • consisting of soldered or bonded constructions **[5, 2006.01]**

23/49 • • • wire-like **[5, 2006.01]**

23/492 • • • Bases or plates **[5, 2006.01]**

23/495 • • • Lead-frames **[5, 2006.01]**

23/498 • • • Leads on insulating substrates **[5, 2006.01]**

23/50 • • for integrated circuit devices (H01L 23/482-H01L 23/498 take precedence) **[2, 5, 2006.01]**

23/52 • Arrangements for conducting electric current within the device in operation from one component to another **[2, 2006.01]**

23/522 • • including external interconnections consisting of a multilayer structure of conductive and insulating layers inseparably formed on the semiconductor body **[5, 2006.01]**

23/525 • • • with adaptable interconnections **[5, 2006.01]**

23/528 • • • Layout of the interconnection structure **[5, 2006.01]**

23/532 • • • characterised by the materials **[5, 2006.01]**

23/535 • • including internal interconnections, e.g. cross-under constructions **[5, 2006.01]**

23/538 • • the interconnection structure between a plurality of semiconductor chips being formed on, or in, insulating substrates **[5, 2006.01]**

23/544 • Marks applied to semiconductor devices, e.g. registration marks, test patterns **[5, 2006.01]**

23/552 • Protection against radiation, e.g. light **[5, 2006.01]**

23/556 • • against alpha rays **[5, 2006.01]**

23/58 • Structural electrical arrangements for semiconductor devices not otherwise provided for **[5, 2006.01]**

23/60 • • Protection against electrostatic charges or discharges, e.g. Faraday shields **[5, 2006.01]**

23/62 • • Protection against overcurrent or overload, e.g. fuses, shunts **[5, 2006.01]**

23/64 • • Impedance arrangements **[5, 2006.01]**

23/66 • • • High-frequency adaptations **[5, 2006.01]**

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; photovoltaic modules or arrays of photovoltaic cells H01L 31/042) **[2, 5, 2006.01]**

25/03 • all the devices being of a type provided for in the same subgroup of groups H01L 27/00-H01L 51/00, e.g. assemblies of rectifier diodes **[5, 2006.01]**

25/04 • • the devices not having separate containers **[2, 2006.01, 2014.01]**

25/065 • • • the devices being of a type provided for in group H01L 27/00 **[5, 2006.01]**

25/07 • • • the devices being of a type provided for in group H01L 29/00 **[5, 2006.01]**

25/075 • • • the devices being of a type provided for in group H01L 33/00 **[5, 2006.01]**

25/10 • • the devices having separate containers **[2, 2006.01]**

25/11 • • • the devices being of a type provided for in group H01L 29/00 **[5, 2006.01]**

25/13 • • • the devices being of a type provided for in group H01L 33/00 **[5, 2006.01]**

25/16 • the devices being of types provided for in two or more different main groups of groups H01L 27/00-H01L 51/00, e.g. forming hybrid circuits **[2, 2006.01]**

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-H01L 51/00 **[5, 2006.01]**

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-H01L 51/00; assemblies consisting of a plurality of individual solid state devices H01L 25/00) **[2, 2006.01]**

Note(s) [2]

In groups H01L 27/01-H01L 27/28, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.

27/01 • comprising only passive thin-film or thick-film elements formed on a common insulating substrate **[3, 2006.01]**

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, 2006.01]**

27/04 • • the substrate being a semiconductor body **[2, 2006.01]**

27/06 • • • including a plurality of individual components in a non-repetitive configuration **[2, 2006.01]**

27/07 • • • • the components having an active region in common **[5, 2006.01]**

27/08 • • including only semiconductor components of a single kind **[2, 2006.01]**

27/082 • • • • including bipolar components only **[5, 2006.01]**

27/085 • • • • including field-effect components only **[5, 2006.01]**

27/088 • • • • • the components being field-effect transistors with insulated gate **[5, 2006.01]**

27/092 • • • • • • complementary MIS field-effect transistors **[5, 2006.01]**

27/095 • • • • • the components being Schottky barrier gate field-effect transistors **[5, 2006.01]**

27/098 • • • • • the components being PN junction gate field-effect transistors **[5, 2006.01]**

27/10 • • • including a plurality of individual components in a repetitive configuration **[2, 2006.01]**

27/102 • • • • including bipolar components **[5, 2006.01]**

27/105 • • • • including field-effect components **[5, 2006.01]**

27/108 • • • • • Dynamic random access memory structures **[5, 2006.01]**

27/11 • • • • • Static random access memory structures **[5, 2006.01]**

27/112 • • • • • Read-only memory structures **[5, 2006.01]**

27/115 • • • • • • Electrically programmable read-only memories **[5, 2006.01]**

27/118 • • • • Masterslice integrated circuits **[5, 2006.01]**

27/12 • • the substrate being other than a semiconductor body, e.g. an insulating body **[2, 2006.01]**

27/13 • • • combined with thin-film or thick-film passive components **[3, 2006.01]**

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, 2006.01]**

27/142 • • Energy conversion devices (photovoltaic modules or arrays of single photovoltaic cells comprising bypass diodes integrated or directly associated with the devices H01L 31/0443; photovoltaic modules composed of a plurality of thin film solar cells deposited on the same substrate H01L 31/046) **[5, 2006.01, 2014.01]**

27/144 • • Devices controlled by radiation **[5, 2006.01]**

27/146 • • • Imager structures **[5, 2006.01]**

27/148 • • • • Charge coupled imagers **[5, 2006.01]**

27/15 • including semiconductor components with at least one potential-jump barrier or surface barrier, specially adapted for light emission **[2, 2006.01]**

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, 2006.01]**

27/18 • including components exhibiting superconductivity **[2, 2006.01]**

27/20 • including piezo-electric components; including electrostrictive components; including magnetostrictive components **[2, 7, 2006.01]**

27/22 • including components using galvano-magnetic effects, e.g. Hall effect; using similar magnetic field effects **[2, 2006.01]**

27/24 • including solid state components for rectifying, amplifying, or switching without a potential-jump barrier or surface barrier **[2, 2006.01]**

27/26 • including bulk negative resistance effect components **[2, 2006.01]**

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 **[2006.01]**

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 **[2006.01]**

27/32 • • with components specially adapted for light emission, e.g. flat-panel displays using organic light-emitting diodes **[2006.01]**

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-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, 2006.01]**

Note(s) [2]

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.

29/02 • Semiconductor bodies **[2, 2006.01]**

29/04 • • characterised by their crystalline structure, e.g. polycrystalline, cubic or particular orientation of crystalline planes (characterised by physical imperfections H01L 29/30) **[2, 2006.01]**

29/06 • • characterised by their shape; characterised by the shapes, relative sizes, or dispositions of the semiconductor regions **[2, 2006.01]**

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, 2006.01]**

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, 2006.01]**

29/12 • • characterised by the materials of which they are formed **[2, 2006.01]**

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, 2006.01]**

Note(s) [6]

Group H01L 29/15 takes precedence over groups H01L 29/16-H01L 29/26.

29/16 • • • including, apart from doping materials or other impurities, only elements of Group IV of the Periodic System in uncombined form **[2, 2006.01]**

29/161 • • • • including two or more of the elements provided for in group H01L 29/16 **[2, 2006.01]**

29/165 • • • • • in different semiconductor regions **[2, 2006.01]**

29/167 • • • • further characterised by the doping material **[2, 2006.01]**

29/18 • • • Selenium or tellurium only, apart from doping materials or other impurities **[2, 2006.01]**

29/20 • • • including, apart from doping materials or other impurities, only $A_{III}B_{V}$ compounds **[2, 6, 2006.01]**

29/201 • • • • including two or more compounds **[2, 2006.01]**

29/205 • • • • • in different semiconductor regions **[2, 2006.01]**

29/207 • • • • further characterised by the doping material **[2, 2006.01]**

29/22 • • • including, apart from doping materials or other impurities, only $A_{II}B_{VI}$ compounds **[2, 2006.01]**

29/221 • • • • including two or more compounds **[2, 2006.01]**

29/225 • • • • • in different semiconductor regions **[2, 2006.01]**

29/227 • • • • further characterised by the doping material **[2, 2006.01]**

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, 2006.01]**

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, 2006.01]**

29/267 • • • • in different semiconductor regions **[2, 2006.01]**

29/30 • • characterised by physical imperfections; having polished or roughened surface **[2, 2006.01]**

29/32 • • • the imperfections being within the semiconductor body **[2, 2006.01]**

29/34 • • • the imperfections being on the surface **[2, 2006.01]**

29/36 • • characterised by the concentration or distribution of impurities **[2, 2006.01]**

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, 2006.01]**

29/40 • Electrodes **[2, 2006.01]**

29/41 • • characterised by their shape, relative sizes or dispositions **[6, 2006.01]**

29/417 • • • carrying the current to be rectified, amplified or switched **[6, 2006.01]**

29/423 • • • not carrying the current to be rectified, amplified or switched **[6, 2006.01]**

29/43 • • characterised by the materials of which they are formed **[6, 2006.01]**

29/45 • • • Ohmic electrodes **[6, 2006.01]**

29/47 • • • Schottky barrier electrodes **[6, 2006.01]**

29/49 • • • Metal-insulator semiconductor electrodes **[6, 2006.01]**

29/51 • • • • Insulating materials associated therewith **[6, 2006.01]**

29/66 • Types of semiconductor device **[2, 2006.01]**

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, 2006.01]**

29/70 • • • Bipolar devices **[2, 2006.01]**

29/72 • • • • Transistor-type devices, i.e. able to continuously respond to applied control signals **[2, 2006.01]**

29/73 • • • • • Bipolar junction transistors **[5, 2006.01]**

29/732 • • • • • • Vertical transistors **[6, 2006.01]**

29/735 • • • • • • Lateral transistors **[6, 2006.01]**

29/737 • • • • • • Hetero-junction transistors **[6, 2006.01]**

29/739 • • • • • controlled by field effect **[6, 2006.01]**

29/74 • • • • Thyristor-type devices, e.g. having four-zone regenerative action **[2, 2006.01]**

29/744 • • • • • Gate-turn-off devices **[6, 2006.01]**

29/745 • • • • • • with turn-off by field effect **[6, 2006.01]**

29/747 • • • • • Bidirectional devices, e.g. triacs **[2, 2006.01]**

29/749 • • • • • with turn-on by field effect **[6, 2006.01]**

29/76 • • • Unipolar devices **[2, 2006.01]**

29/762 • • • • Charge transfer devices **[6, 2006.01]**

29/765 • • • • • Charge-coupled devices **[6, 2006.01]**

29/768 • • • • • • with field effect produced by an insulated gate **[6, 2006.01]**

29/772 • • • • Field-effect transistors **[6, 2006.01]**

29/775 • • • • • with one-dimensional charge carrier gas channel, e.g. quantum wire FET **[6, 2006.01]**

29/778 • • • • • with two-dimensional charge carrier gas channel, e.g. HEMT **[6, 2006.01]**

29/78 • • • • • with field effect produced by an insulated gate **[2, 2006.01]**

29/786 • • • • • • Thin-film transistors **[6, 2006.01]**

29/788 • • • • • • with floating gate **[5, 2006.01]**

29/792 • • • • • • with charge trapping gate insulator, e.g. MNOS-memory transistor **[5, 2006.01]**

29/80 • • • • • with field effect produced by a PN or other rectifying junction gate **[2, 2006.01]**

29/808 • • • • • • with a PN junction gate **[5, 2006.01]**

29/812 • • • • • • with a Schottky gate **[5, 2006.01]**

29/82 • • controllable by variation of the magnetic field applied to the device (H01L 29/96 takes precedence) **[2, 6, 2006.01]**

29/84 • • controllable by variation of applied mechanical force, e.g. of pressure (H01L 29/96 takes precedence) **[2, 6, 2006.01]**

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, 2006.01]**

29/8605 • • • Resistors with PN junction **[6, 2006.01]**

29/861 • • • Diodes **[6, 2006.01]**

29/862 • • • • Point contact diodes **[6, 2006.01]**

29/864 • • • • Transit-time diodes, e.g. IMPATT, TRAPATT diodes **[6, 2006.01]**
29/866 • • • • Zener diodes **[6, 2006.01]**
29/868 • • • • PIN diodes **[6, 2006.01]**
29/87 • • • • Thyristor diodes, e.g. Shockley diodes, break-over diodes **[6, 2006.01]**
29/872 • • • • Schottky diodes **[6, 2006.01]**
29/88 • • • • Tunnel-effect diodes **[2, 2006.01]**
29/885 • • • • • Esaki diodes **[6, 2006.01]**
29/92 • • • Capacitors with potential-jump barrier or surface barrier **[2, 2006.01]**
29/93 • • • • Variable-capacitance diodes, e.g. varactors **[2, 2006.01]**
29/94 • • • • Metal-insulator-semiconductors, e.g. MOS **[2, 2006.01]**
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, 2006.01]**

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, 2006.01]**

31/02 • Details **[2, 2006.01]**
31/0203 • • Containers; Encapsulations (for photovoltaic devices H01L 31/048; for organic photosensitive devices H01L 51/44) **[5, 2006.01, 2014.01]**
31/0216 • • Coatings (H01L 31/041 takes precedence) **[5, 2006.01, 2014.01]**
31/0224 • • Electrodes **[5, 2006.01]**
31/0232 • • Optical elements or arrangements associated with the device (H01L 31/0236 takes precedence; for photovoltaic cells H01L 31/054; for photovoltaic modules H02S 40/20) **[5, 2006.01, 2014.01]**
31/0236 • • Special surface textures **[5, 2006.01]**
31/024 • • Arrangements for cooling, heating, ventilating or temperature compensation (for photovoltaic devices H01L 31/052) **[5, 2006.01, 2014.01]**
31/0248 • characterised by their semiconductor bodies **[5, 2006.01]**
31/0256 • • characterised by the material **[5, 2006.01]**
31/0264 • • • Inorganic materials **[5, 2006.01]**
31/0272 • • • • Selenium or tellurium **[5, 2006.01]**
31/028 • • • • including, apart from doping material or other impurities, only elements of Group IV of the Periodic System **[5, 2006.01]**
31/0288 • • • • • characterised by the doping material **[5, 2006.01]**
31/0296 • • • • including, apart from doping material or other impurities, only $A_{II}B_{VI}$ compounds, e.g. CdS, ZnS, HgCdTe **[5, 2006.01]**
31/0304 • • • • including, apart from doping materials or other impurities, only $A_{III}B_{V}$ compounds **[5, 2006.01]**
31/0312 • • • • including, apart from doping materials or other impurities, only $A_{IV}B_{IV}$ compounds, e.g. SiC **[5, 2006.01]**
31/032 • • • • including, apart from doping materials or other impurities, only compounds not provided for in groups H01L 31/0272-H01L 31/0312 **[5, 2006.01]**
31/0328 • • • • including, apart from doping materials or other impurities, semiconductor materials provided for in two or more of groups H01L 31/0272-H01L 31/032 **[5, 2006.01]**
31/0336 • • • • • in different semiconductor regions, e.g. Cu_2X/CdX hetero-junctions, X being an element of Group VI of the Periodic System **[5, 2006.01]**
31/0352 • • characterised by their shape or by the shapes, relative sizes or disposition of the semiconductor regions **[5, 2006.01]**
31/036 • • characterised by their crystalline structure or particular orientation of the crystalline planes **[5, 2006.01]**
31/0368 • • • including polycrystalline semiconductors (H01L 31/0392 takes precedence) **[5, 2006.01]**
31/0376 • • • including amorphous semiconductors (H01L 31/0392 takes precedence) **[5, 2006.01]**
31/0384 • • • including other non-monocrystalline materials, e.g. semiconductor particles embedded in an insulating material (H01L 31/0392 takes precedence) **[5, 2006.01]**
31/0392 • • • including thin films deposited on metallic or insulating substrates **[5, 2006.01]**
31/04 • adapted as photovoltaic [PV] conversion devices (testing thereof during manufacture H01L 21/66; testing thereof after manufacture H02S 50/10) **[2, 2006.01, 2014.01]**
31/041 • • Provisions for preventing damage caused by corpuscular radiation, e.g. for space applications **[2014.01]**
31/042 • • PV modules or arrays of single PV cells (supporting structures for PV modules H02S 20/00) **[5, 2006.01, 2014.01]**
31/043 • • • Mechanically stacked PV cells **[2014.01]**
31/044 • • • including bypass diodes (bypass diodes in the junction box H02S 40/34) **[2014.01]**
31/0443 • • • • comprising bypass diodes integrated or directly associated with the devices, e.g. bypass diodes integrated or formed in or on the same substrate as the photovoltaic cells **[2014.01]**
31/0445 • • • including thin film solar cells, e.g. single thin film a-Si, CIS or CdTe solar cells **[2014.01]**
31/046 • • • • PV modules composed of a plurality of thin film solar cells deposited on the same substrate **[2014.01]**
31/0463 • • • • • characterised by special patterning methods to connect the PV cells in a module, e.g. laser cutting of the conductive or active layers **[2014.01]**
31/0465 • • • • • comprising particular structures for the electrical interconnection of adjacent PV cells in the module (H01L 31/0463 takes precedence) **[2014.01]**
31/0468 • • • • • comprising specific means for obtaining partial light transmission through the module, e.g. partially transparent thin film solar modules for windows **[2014.01]**
31/047 • • • PV cell arrays including PV cells having multiple vertical junctions or multiple V-groove junctions formed in a semiconductor substrate **[2014.01]**

31/0475 • • • PV cell arrays made by cells in a planar, e.g. repetitive, configuration on a single semiconductor substrate; PV cell microarrays (PV modules composed of a plurality of thin film solar cells deposited on the same substrate H01L 31/046) **[2014.01]**

31/048 • • • Encapsulation of modules **[5, 2006.01, 2014.01]**

31/049 • • • • Protective back sheets **[2014.01]**

31/05 • • • Electrical interconnection means between PV cells inside the PV module, e.g. series connection of PV cells (electrodes H01L 31/0224; electrical interconnection of thin film solar cells formed on a common substrate H01L 31/046; particular structures for electrical interconnecting of adjacent thin film solar cells in the module H01L 31/0465; electrical interconnection means specially adapted for electrically connecting two or more PV modules H02S 40/36) **[5, 2006.01, 2014.01]**

31/052 • • Cooling means directly associated or integrated with the PV cell, e.g. integrated Peltier elements for active cooling or heat sinks directly associated with the PV cells (cooling means in combination with the PV module H02S 40/42) **[5, 2006.01, 2014.01]**

31/0525 • • • including means to utilise heat energy directly associated with the PV cell, e.g. integrated Seebeck elements **[2014.01]**

31/053 • • Energy storage means directly associated or integrated with the PV cell, e.g. a capacitor integrated with a PV cell (energy storage means associated with the PV module H02S 40/38) **[2014.01]**

31/054 • • Optical elements directly associated or integrated with the PV cell, e.g. light-reflecting means or light-concentrating means **[2014.01]**

31/055 • • • where light is absorbed and re-emitted at a different wavelength by the optical element directly associated or integrated with the PV cell, e.g. by using luminescent material, fluorescent concentrators or up-conversion arrangements **[5, 2006.01, 2014.01]**

31/056 • • • the light-reflecting means being of the back surface reflector [BSR] type **[2014.01]**

31/06 • • characterised by at least one potential-jump barrier or surface barrier **[2, 2006.01, 2012.01]**

31/061 • • • the potential barriers being of the point-contact type (H01L 31/07 takes precedence) **[2012.01]**

31/062 • • • the potential barriers being only of the metal-insulator-semiconductor type **[5, 2006.01, 2012.01]**

31/065 • • • the potential barriers being only of the graded gap type **[5, 2006.01, 2012.01]**

31/068 • • • the potential barriers being only of the PN homojunction type, e.g. bulk silicon PN homojunction solar cells or thin film polycrystalline silicon PN homojunction solar cells **[5, 2006.01, 2012.01]**

31/0687 • • • • Multiple junction or tandem solar cells **[2012.01]**

31/0693 • • • • the devices including, apart from doping material or other impurities, only $A_{III}B_{V}$ compounds, e.g. GaAs or InP solar cells **[2012.01]**

31/07 • • • the potential barriers being only of the Schottky type **[5, 2006.01, 2012.01]**

31/072 • • • the potential barriers being only of the PN heterojunction type **[5, 2006.01, 2012.01]**

31/0725 • • • • Multiple junction or tandem solar cells **[2012.01]**

31/073 • • • • comprising only $A_{II}B_{VI}$ compound semiconductors, e.g. CdS/CdTe solar cells **[2012.01]**

31/0735 • • • • comprising only $A_{III}B_{V}$ compound semiconductors, e.g. GaAs/AlGaAs or InP/GaInAs solar cells **[2012.01]**

31/074 • • • • comprising a heterojunction with an element of Group IV of the Periodic System, e.g. ITO/Si, GaAs/Si or CdTe/Si solar cells **[2012.01]**

31/0745 • • • • comprising a $A_{IV}B_{IV}$ heterojunction, e.g. Si/Ge, SiGe/Si or Si/SiC solar cells **[2012.01]**

31/0747 • • • • • comprising a heterojunction of crystalline and amorphous materials, e.g. heterojunction with intrinsic thin layer or HIT® solar cells **[2012.01]**

31/0749 • • • • including a $A_{I}B_{III}C_{VI}$ compound, e.g. CdS/CuInSe2 [CIS] heterojunction solar cells **[2012.01]**

31/075 • • • the potential barriers being only of the PIN type, e.g. amorphous silicon PIN solar cells **[5, 2006.01, 2012.01]**

31/076 • • • • Multiple junction or tandem solar cells **[2012.01]**

31/077 • • • • the devices comprising monocrystalline or polycrystalline materials **[2012.01]**

31/078 • • • including different types of potential barriers provided for in two or more of groups H01L 31/061-H01L 31/075 **[5, 2006.01, 2012.01]**

31/08 • in which radiation controls flow of current through the device, e.g. photoresistors **[2, 2006.01]**

31/09 • • Devices sensitive to infra-red, visible or ultra-violet radiation (H01L 31/101 takes precedence) **[5, 2006.01]**

31/10 • • characterised by at least one potential-jump barrier or surface barrier, e.g. phototransistors **[2, 2006.01]**

31/101 • • • Devices sensitive to infra-red, visible or ultra-violet radiation **[5, 2006.01]**

31/102 • • • • characterised by only one potential barrier or surface barrier **[5, 2006.01]**

31/103 • • • • • the potential barrier being of the PN homojunction type **[5, 2006.01]**

31/105 • • • • • the potential barrier being of the PIN type **[5, 2006.01]**

31/107 • • • • • the potential barrier working in avalanche mode, e.g. avalanche photodiode **[5, 2006.01]**

31/108 • • • • • the potential barrier being of the Schottky type **[5, 2006.01]**

31/109 • • • • • the potential barrier being of the PN heterojunction type **[5, 2006.01]**

31/11 • • • • characterised by two potential barriers or surface barriers, e.g. bipolar phototransistor **[5, 2006.01]**

31/111 • • • • characterised by at least three potential barriers, e.g. photothyristor **[5, 2006.01]**

31/112 • • • • characterised by field-effect operation, e.g. junction field-effect photo-transistor **[5, 2006.01]**

31/113 • • • • • being of the conductor-insulator-semiconductor type, e.g. metal- insulator-semiconductor field-effect transistor **[5, 2006.01]**

31/115 • • • Devices sensitive to very short wavelength, e.g. X-rays, gamma-rays or corpuscular radiation **[5, 2006.01]**

31/117 • • • • of the bulk effect radiation detector type, e.g. Ge-Li compensated PIN gamma-ray detectors **[5, 2006.01]**

31/118 • • • • of the surface barrier or shallow PN junction detector type, e.g. surface barrier alpha-particle detectors **[5, 2006.01]**

31/119 • • • • characterised by field-effect operation, e.g. MIS type detectors **[5, 2006.01]**

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, 2006.01]**

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, 2006.01]**

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, 2006.01]**

31/153 • • • • formed in, or on, a common substrate **[5, 2006.01]**

31/16 • • the semiconductor device sensitive to radiation being controlled by the light source or sources **[2, 2006.01]**

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, 2006.01]**

31/173 • • • • formed in, or on, a common substrate **[5, 2006.01]**

31/18 • Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2, 2006.01]**

31/20 • • such devices or parts thereof comprising amorphous semiconductor material **[5, 2006.01]**

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, 2006.01, 2010.01]**

Note(s) [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.
2. In this group, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

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(s) [2010.01]

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.

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(s) [2010.01]

This group covers elements in intimate contact with the semiconductor body or integrated with the package.

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, 2006.01]**

35/02 • Details **[2, 2006.01]**

35/04 • • Structural details of the junction; Connections of leads **[2, 2006.01]**

35/06 • • • detachable, e.g. using a spring **[2, 2006.01]**

35/08 • • • non-detachable, e.g. cemented, sintered, soldered **[2, 2006.01]**

35/10 • • • Connections of leads **[2, 2006.01]**

35/12 • Selection of the material for the legs of the junction **[2, 2006.01]**

35/14 • • using inorganic compositions **[2, 2006.01]**

35/16 • • • comprising tellurium or selenium or sulfur **[2, 2006.01]**

35/18 • • • comprising arsenic or antimony or bismuth (H01L 35/16 takes precedence) **[2, 2006.01]**

35/20 • • • comprising metals only (H01L 35/16, H01L 35/18 take precedence) **[2, 2006.01]**

35/22 • • • comprising compounds containing boron, carbon, oxygen, or nitrogen **[2, 2006.01]**

35/24 • • using organic compositions **[2, 2006.01]**

35/26 • • using compositions changing continuously or discontinuously inside the material **[2, 2006.01]**

35/28 • operating with Peltier or Seebeck effect only **[2, 2006.01]**

35/30 • • characterised by the heat-exchanging means at the junction **[2, 2006.01]**

35/32 • • characterised by the structure or configuration of the cell or thermo-couple forming the device **[2, 2006.01]**

35/34 • Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2, 2006.01]**

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, 2006.01]**

37/02 • using thermal change of dielectric constant, e.g. working above and below the Curie point **[2, 2006.01]**

37/04 • using thermal change of magnetic permeability, e.g. working above and below the Curie point **[2, 2006.01]**

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, 2006.01]**

39/02 • Details **[2, 2006.01]**

39/04 • • Containers; Mountings **[2, 2006.01]**

39/06 • • characterised by the current path **[2, 2006.01]**

39/08 • • characterised by the shape of the element **[2, 2006.01]**

39/10 • • characterised by the means for switching **[2, 2006.01]**

39/12 • • characterised by the material **[2, 2006.01]**

39/14 • Permanent superconductor devices **[2, 2006.01]**

39/16 • Devices switchable between superconductive and normal states **[2, 2006.01]**

39/18 • • Cryotrons **[2, 2006.01]**

39/20 • • • Power cryotrons **[2, 2006.01]**

39/22 • Devices comprising a junction of dissimilar materials, e.g. Josephson-effect devices **[2, 2006.01]**

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, 2006.01]**

41/00 **Piezo-electric devices in general; Electrostrictive devices in general; Magnetostrictive devices 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, 2006.01, 2013.01]**

Note(s) [6]

1. This group does not cover adaptations for particular purposes, which are covered by the relevant places.
2. Attention is drawn to the following such places:

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, 2006.01]**

41/04 • • of piezo-electric or electrostrictive elements **[2, 2006.01]**

41/047 • • • Electrodes **[6, 2006.01]**

41/053 • • • Mounts, supports, enclosures or casings **[6, 2006.01]**

41/06 • • of magnetostrictive elements **[2, 2006.01]**

41/08 • Piezo-electric or electrostrictive elements **[2, 2006.01]**

41/083 • • having a stacked or multilayer structure **[6, 2006.01]**

41/087 • • formed as coaxial cables **[6, 2006.01]**

Note(s) [6]

Groups H01L 41/083 and H01L 41/087 take precedence over groups H01L 41/09-H01L 41/113.

41/09 • • with electrical input and mechanical output **[5, 2006.01]**

41/107 • • with electrical input and electrical output **[5, 2006.01]**

41/113 • • with mechanical input and electrical output **[5, 2006.01]**

41/12 • Magnetostrictive elements **[2, 2006.01]**

41/16 • Selection of materials **[2, 2006.01]**

41/18 • • for piezo-electric or electrostrictive elements **[2, 2006.01]**

41/187 • • • Ceramic compositions **[5, 2006.01]**

41/193 • • • Macromolecular compositions **[5, 2006.01]**

41/20 • • for magnetostrictive elements **[2, 2006.01]**

41/22 • Processes or apparatus specially adapted for the assembly, manufacture or treatment of piezo-electric or electrostrictive devices or of parts thereof **[2, 2006.01, 2013.01]**

41/23 • • Forming enclosures or casings **[2013.01]**

41/25 • • Assembling devices that include piezo-electric or electrostrictive parts **[2013.01]**

41/253 • • Treating devices or parts thereof to modify a piezo-electric or electrostrictive property, e.g. polarisation characteristics, vibration characteristics or mode tuning **[2013.01]**

41/257 • • • by polarising **[2013.01]**

41/27 • • Manufacturing multilayered piezo-electric or electrostrictive devices or parts thereof, e.g. by stacking piezo-electric bodies and electrodes **[2013.01]**

41/273 • • • by integrally sintering piezo-electric or electrostrictive bodies and electrodes **[2013.01]**

41/277 • • • by stacking bulk piezo-electric or electrostrictive bodies and electrodes **[2013.01]**

41/29 • • Forming electrodes, leads or terminal arrangements **[2013.01]**

Note(s) [2013.01]

The integral arrangement of individual layer electrodes and connection electrodes is classified in both groups H01L 41/293 and H01L 41/297.

41/293 • • • Connection electrodes of multilayered piezo-electric or electrostrictive parts **[2013.01]**

41/297 • • • Individual layer electrodes of multilayered piezo-electric or electrostrictive parts **[2013.01]**

41/31 • • Applying piezo-electric or electrostrictive parts or bodies onto an electrical element or another base **[2013.01]**

41/311 • • • Mounting of piezo-electric or electrostrictive parts together with semiconductor elements, or other circuit elements, on a common substrate **[2013.01]**

41/312 • • • by laminating or bonding of piezo-electric or electrostrictive bodies **[2013.01]**

41/313 • • • • by metal fusing or with adhesives **[2013.01]**

41/314 • • • by depositing piezo-electric or electrostrictive layers, e.g. aerosol or screen printing **[2013.01]**

41/316 • • • • by vapour phase deposition **[2013.01]**

41/317 • • • • by liquid phase deposition **[2013.01]**

41/318 • • • • • by sol-gel deposition **[2013.01]**

41/319 • • • • using intermediate layers, e.g. for growth control **[2013.01]**

41/33 • • Shaping or machining of piezo-electric or electrostrictive bodies **[2013.01]**

41/331 • • • by coating or depositing using masks, e.g. lift-off **[2013.01]**

41/332 • • • by etching, e.g. lithography **[2013.01]**

41/333 • • • by moulding or extrusion **[2013.01]**

41/335 • • • by machining **[2013.01]**

41/337 • • • • by polishing or grinding **[2013.01]**

41/338 • • • • by cutting or dicing **[2013.01]**

41/339 • • • • by punching **[2013.01]**

41/35 • • Forming piezo-electric or electrostrictive materials **[2013.01]**

41/37 • • • Composite materials **[2013.01]**

41/39 • • • Inorganic materials **[2013.01]**

41/41 • • • • by melting **[2013.01]**

41/43 • • • • by sintering **[2013.01]**

41/45 • • • Organic materials **[2013.01]**

41/47 • Processes or apparatus specially adapted for the assembly, manufacture or treatment of magnetostrictive devices or of parts thereof **[2013.01]**

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, 2006.01]**

43/02 • Details **[2, 2006.01]**

43/04 • • of Hall-effect devices **[2, 2006.01]**

43/06 • Hall-effect devices **[2, 2006.01]**

43/08 • Magnetic-field-controlled resistors **[2, 2006.01]**

43/10 • Selection of materials **[2, 2006.01]**

43/12 • Processes or apparatus specially adapted for the manufacture or treatment of these devices or of parts thereof **[2, 2006.01]**

43/14 • • for Hall-effect devices **[2, 2006.01]**

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, 2006.01]**

45/02 • Solid state travelling-wave devices **[2, 2006.01]**

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, 2006.01]**

47/02 • Gunn-effect devices **[2, 2006.01]**

49/00 Solid state devices not provided for in groups H01L 27/00-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, 2006.01]

49/02 • Thin-film or thick-film devices **[2, 2006.01]**

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, 2006.01]**

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 **[2006.01]**

51/10 • • Details of devices **[6, 2006.01]**

51/30 • • Selection of materials **[6, 2006.01]**

51/40 • • Processes or apparatus specially adapted for the manufacture or treatment of such devices or of parts thereof **[6, 2006.01]**

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 **[2006.01]**

51/44 • • Details of devices **[2006.01]**

51/46 • • Selection of materials **[2006.01]**

51/48 • • Processes or apparatus specially adapted for the manufacture or treatment of such devices or of parts thereof **[2006.01]**

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) **[2006.01]**

51/52 • • Details of devices **[2006.01]**

51/54 • • Selection of materials **[2006.01]**

51/56 • • Processes or apparatus specially adapted for the manufacture or treatment of such devices or of parts thereof **[2006.01]**

H01M **PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY [2]**

Note(s)

This subclass covers galvanic primary or secondary cells or batteries, fuel cells or stacks.

Subclass index

2/00 **Constructional details, or processes of manufacture, of the non-active parts [2, 2006.01]**

2/02 • Cases, jackets or wrappings **[2, 2006.01]**

2/04 • • Lids or covers **[2, 2006.01]**

2/06 • • Arrangements for introducing electric connectors into or through cases **[2, 2006.01]**

2/08 • • Sealing materials **[2, 2006.01]**

2/10 • Mountings; Suspension devices; Shock absorbers; Transport or carrying devices; Holders (structural combination of accumulators with charging apparatus H01M 10/46) **[2, 2006.01]**

2/12 • Vent plugs or other mechanical arrangements for facilitating escape of gases **[2, 2006.01]**

2/14 • Separators; Membranes; Diaphragms; Spacing elements **[2, 2006.01]**

2/16 • • characterised by the material **[2, 2006.01]**

2/18 • • characterised by the shape **[2, 2006.01]**

2/20 • Current-conducting connections for cells **[2, 2006.01]**

2/22 • • Fixed connections, i.e. not intended for disconnection **[2, 2006.01]**

2/24 • • • Intercell connections through partitions, e.g. in a battery case **[2, 2006.01]**

2/26 • • • Electrode connections **[2, 2006.01]**

2/28 • • • • for lead-acid accumulators **[2, 2006.01]**

2/30 • • Terminals **[2, 2006.01]**

2/32 • • Methods or arrangements for affording protection against corrosion; Selection of materials therefor **[2, 2006.01]**

2/34 • • with provision for preventing undesired use or discharge **[2, 2006.01]**

2/36 • Arrangements for filling, topping-up or emptying cases with or of liquid, e.g. for filling with electrolytes, for washing-out **[2, 2006.01]**

2/38 • Arrangements for moving electrolytes **[2, 2006.01]**

2/40 • • with external circulating path (H01M 8/04 takes precedence) **[2, 2006.01]**

4/00 **Electrodes [2, 2006.01]**

Note(s) [2]

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.

4/02 • Electrodes composed of, or comprising, active material **[2, 2006.01]**

4/04 • • Processes of manufacture in general **[2, 2006.01]**
4/06 • • Electrodes for primary cells **[2, 2006.01]**
4/08 • • • Processes of manufacture **[2, 2006.01]**
4/10 • • • • of pressed electrodes with central core, i.e. dollies **[2, 2006.01]**
4/12 • • • • of consumable metal or alloy electrodes (use of alloy compositions as active materials H01M 4/38) **[2, 2006.01]**
4/13 • • Electrodes for accumulators with non-aqueous electrolyte, e.g. for lithium-accumulators; Processes of manufacture thereof **[2010.01]**

Note(s) [2010.01]

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.

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, 2006.01]**
4/16 • • • Processes of manufacture **[2, 2006.01]**
4/18 • • • • of Plante electrodes **[2, 2006.01]**
4/20 • • • • of pasted electrodes **[2, 2006.01]**
4/21 • • • • • Drying of pasted electrodes **[2, 2006.01]**
4/22 • • • • Forming of electrodes **[2, 2006.01]**
4/23 • • • • • Drying or preserving electrodes after forming **[2, 2006.01]**
4/24 • • Electrodes for alkaline accumulators **[2, 2006.01]**
4/26 • • • Processes of manufacture **[2, 2006.01]**
4/28 • • • • Precipitating active material on the carrier **[2, 2006.01]**
4/29 • • • • • by electrochemical methods **[2, 2006.01]**
4/30 • • • • Pressing **[2, 2006.01]**
4/32 • • • Nickel oxide or hydroxide electrodes **[2, 2006.01]**
4/34 • • • Silver oxide or hydroxide electrodes **[2, 2006.01]**
4/36 • • Selection of substances as active materials, active masses, active liquids **[2, 2006.01]**
4/38 • • • of elements or alloys **[2, 2006.01]**
4/40 • • • • Alloys based on alkali metals **[2, 2006.01]**
4/42 • • • • Alloys based on zinc **[2, 2006.01]**
4/44 • • • • Alloys based on cadmium **[2, 2006.01]**
4/46 • • • • Alloys based on magnesium or aluminium **[2, 2006.01]**
4/48 • • • of inorganic oxides or hydroxides **[2, 2006.01, 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, 2006.01, 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, 2006.01, 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, 2006.01]**
4/56 • • • • of lead **[2, 2006.01]**
4/57 • • • • • of "grey lead", i.e. powders containing lead and lead oxide **[2, 2006.01]**
4/58 • • • of inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or $LiCoF_y$; of polyanionic structures, e.g. phosphates, silicates or borates **[2, 2006.01, 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, 2006.01]**
4/62 • • Selection of inactive substances as ingredients for active masses, e.g. binders, fillers **[2, 2006.01]**
4/64 • • Carriers or collectors **[2, 2006.01]**
4/66 • • • Selection of materials **[2, 2006.01]**
4/68 • • • • for use in lead-acid accumulators **[2, 2006.01]**
4/70 • • • characterised by shape or form **[2, 2006.01]**
4/72 • • • • Grids **[2, 2006.01]**
4/73 • • • • • for lead-acid accumulators, e.g. frame plates **[2, 2006.01]**
4/74 • • • • • Meshes or woven material; Expanded metal **[2, 2006.01]**
4/75 • • • • Wires, rods, or strips **[2, 2006.01]**
4/76 • • • • Containers for holding the active material, e.g. tubes, capsules **[2, 2006.01]**
4/78 • • • • Shapes other than plane or cylindrical, e.g. helical **[2, 2006.01]**
4/80 • • • • Porous plates, e.g. sintered carriers **[2, 2006.01]**
4/82 • • • Multi-step processes for manufacturing carriers for lead-acid accumulators **[2, 2006.01]**
4/84 • • • • involving casting **[2, 2006.01]**
4/86 • Inert electrodes with catalytic activity, e.g. for fuel cells **[2, 2006.01]**
4/88 • • Processes of manufacture **[2, 2006.01]**

4/90 • • Selection of catalytic material **[2, 2006.01]**
4/92 • • • Metals of platinum group (H01M 4/94 takes precedence) **[2, 2006.01]**
4/94 • • Non-porous diffusion electrodes, e.g. palladium membranes, ion exchange membranes **[2, 2006.01]**
4/96 • • Carbon-based electrodes **[2, 2006.01]**
4/98 • • Raney-type electrodes **[2, 2006.01]**

6/00 Primary cells; Manufacture thereof [2, 2006.01]

Note(s) [2]

In this group, primary cells are electrochemical generators in which the cell energy is present in chemical form and is not regenerated.

6/02 • Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2, 2006.01]**
6/04 • Cells with aqueous electrolyte **[2, 2006.01]**
6/06 • • Dry cells, i.e. cells wherein the electrolyte is rendered non-fluid **[2, 2006.01]**
6/08 • • • with cup-shaped electrodes **[2, 2006.01]**
6/10 • • • with wound or folded electrodes **[2, 2006.01]**
6/12 • • • with flat electrodes **[2, 2006.01]**
6/14 • Cells with non-aqueous electrolyte **[2, 2006.01]**
6/16 • • with organic electrolyte (H01M 6/18 takes precedence) **[2, 2006.01]**
6/18 • • with solid electrolyte **[2, 2006.01]**
6/20 • • • working at high temperature (deferred-action thermal cells H01M 6/36) **[2, 2006.01]**
6/22 • Immobilising of electrolyte **[2, 2006.01]**
6/24 • Cells comprising two different electrolytes **[2, 2006.01]**
6/26 • Cells without oxidising active material, e.g. Volta cells **[2, 2006.01]**
6/28 • Standard cells, e.g. Weston cells **[2, 2006.01]**
6/30 • Deferred-action cells **[2, 2006.01]**
6/32 • • activated through external addition of electrolyte or of electrolyte components **[2, 2006.01]**
6/34 • • • Immersion cells, e.g. sea-water cells **[2, 2006.01]**
6/36 • • containing electrolyte and made operational by physical means, e.g. thermal cells **[2, 2006.01]**
6/38 • • • by mechanical means **[2, 2006.01]**
6/40 • Printed batteries **[2, 2006.01]**
6/42 • Grouping of primary cells into batteries (H01M 6/40 takes precedence) **[2, 2006.01]**
6/44 • • of tubular or cup-shaped cells **[2, 2006.01]**
6/46 • • of flat cells **[2, 2006.01]**
6/48 • • • with bipolar electrodes **[2, 2006.01]**
6/50 • Methods or arrangements for servicing or maintenance, e.g. maintaining operating temperature **[2, 2006.01]**
6/52 • Reclaiming serviceable parts of waste cells or batteries **[2, 2006.01]**

8/00 Fuel cells; Manufacture thereof [2, 2006.01]

Note(s) [2]

In this group, fuel cells are electrochemical generators wherein the reactants are supplied from outside.

8/02 • Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2, 2006.01]**
8/04 • Auxiliary arrangements or processes, e.g. for control of pressure, for circulation of fluids **[2, 2006.01]**
8/06 • Combination of fuel cell with means for production of reactants or for treatment of residues (regenerative fuel cells H01M 8/18) **[2, 2006.01]**
8/08 • Fuel cells with aqueous electrolytes **[2, 2006.01]**
8/10 • Fuel cells with solid electrolytes **[2, 2006.01]**
8/12 • • operating at high temperature, e.g. with stabilised ZrO_2 electrolyte **[2, 2006.01]**
8/14 • Fuel cells with fused electrolytes **[2, 2006.01]**
8/16 • Biochemical fuel cells, i.e. cells in which micro-organisms function as catalysts **[2, 2006.01]**
8/18 • Regenerative fuel cells, e.g. redox flow batteries or secondary fuel cells **[2, 2006.01]**
8/20 • Indirect fuel cells, e.g. fuel cells with redox couple being irreversible (H01M 8/18 takes precedence) **[2, 2006.01]**
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, 2006.01]**
8/24 • Grouping of fuel cells into batteries, e.g. modules **[2, 2006.01]**

10/00 Secondary cells; Manufacture thereof [2, 2006.01]

Note(s) [2]

In this group, secondary cells are accumulators receiving and supplying electrical energy by means of reversible electrochemical reactions.

10/02 • Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2, 2006.01]**
10/04 • Construction or manufacture in general (H01M 10/058, H01M 10/12, H01M 10/28, H01M 10/38 take precedence) **[2, 2006.01]**
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 • • characterised 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, 2006.01]**
10/08 • • Selection of materials as electrolytes **[2, 2006.01]**
10/10 • • • Immobilising of electrolyte **[2, 2006.01]**
10/12 • • Construction or manufacture **[2, 2006.01]**
10/14 • • • Assembling a group of electrodes or separators **[2, 2006.01]**
10/16 • • • Suspending or supporting electrodes or groups of electrodes in the case **[2, 2006.01]**
10/18 • • with bipolar electrodes **[2, 2006.01]**
10/20 • Semi-lead accumulators, i.e. accumulators in which only one electrode contains lead **[2, 2006.01]**
10/22 • • Selection of materials as electrolytes **[2, 2006.01]**
10/24 • Alkaline accumulators **[2, 2006.01]**
10/26 • • Selection of materials as electrolytes **[2, 2006.01]**
10/28 • • Construction or manufacture **[2, 2006.01]**
10/30 • • Nickel accumulators (H01M 10/34 takes precedence) **[2, 2006.01]**
10/32 • • Silver accumulators (H01M 10/34 takes precedence) **[2, 2006.01]**
10/34 • Gastight accumulators **[2, 2006.01]**
10/36 • Accumulators not provided for in groups H01M 10/05-H01M 10/34 **[2, 2006.01, 2010.01]**
10/38 • • Construction or manufacture **[2, 2006.01]**
10/39 • • working at high temperature **[2, 2006.01]**
10/42 • Methods or arrangements for servicing or maintenance of secondary cells or secondary half-cells (H01M 10/60 takes precedence) **[2, 2006.01]**
10/44 • • Methods for charging or discharging (circuits for charging H02J 7/00) **[2, 2006.01]**
10/46 • • Accumulators structurally combined with charging apparatus (circuits for charging H02J 7/00) **[2, 2006.01]**
10/48 • • Accumulators combined with arrangements for measuring, testing or indicating condition, e.g. level or density of the electrolyte **[2, 2006.01]**
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, 2006.01]**
10/54 • Reclaiming serviceable parts of waste accumulators **[2, 2006.01]**
10/60 • Heating or cooling; Temperature control **[2014.01]**
10/61 • • Types of temperature control **[2014.01]**
10/613 • • • Cooling or keeping cold **[2014.01]**
10/615 • • • Heating or keeping warm **[2014.01]**
10/617 • • • for achieving uniformity or desired distribution of temperature **[2014.01]**
10/62 • • specially adapted for specific applications **[2014.01]**
10/623 • • • Portable devices, e.g. mobile telephones, cameras or pacemakers **[2014.01]**
10/6235 • • • • Power tools **[2014.01]**
10/625 • • • Vehicles **[2014.01]**
10/627 • • • Stationary installations, e.g. power plant buffering or backup power supplies **[2014.01]**
10/63 • • Control systems (measurement of temperature H01M 10/48; charging or discharging in response to temperature H01M 10/44) **[2014.01]**
10/633 • • • characterised by algorithms, flow charts, software details or the like **[2014.01]**
10/635 • • • based on ambient temperature **[2014.01]**
10/637 • • • characterised by the use of reversible temperature-sensitive devices, e.g. NTC, PTC or bimetal devices; characterised by control of the internal current flowing through the cells, e.g. by switching (H01M 2/34 takes precedence) **[2014.01]**
10/64 • • characterised by the shape of the cells **[2014.01]**
10/643 • • • Cylindrical cells **[2014.01]**
10/647 • • • Prismatic or flat cells, e.g. pouch cells **[2014.01]**
10/65 • • Means for temperature control structurally associated with the cells **[2014.01]**
10/651 • • • characterised by parameters specified by a numeric value or mathematical formula, e.g. ratios, sizes or concentrations **[2014.01]**
10/652 • • • • characterised by gradients (for achieving a desired temperature gradient H01M 10/617) **[2014.01]**
10/653 • • • characterised by electrically insulating or thermally conductive materials **[2014.01]**
10/654 • • • located inside the innermost case of the cells, e.g. mandrels, electrodes or electrolytes **[2014.01]**
10/655 • • • Solid structures for heat exchange or heat conduction **[2014.01]**
10/6551 • • • • Surfaces specially adapted for heat dissipation or radiation, e.g. fins or coatings **[2014.01]**
10/6552 • • • • Closed pipes transferring heat by thermal conductivity or phase transition, e.g. heat pipes **[2014.01]**
10/6553 • • • • Terminals or leads **[2014.01]**
10/6554 • • • • Rods or plates **[2014.01]**
10/6555 • • • • • arranged between the cells **[2014.01]**
10/6556 • • • • Solid parts with flow channel passages or pipes for heat exchange (closed pipes H01M 10/6552) **[2014.01]**
10/6557 • • • • • arranged between the cells **[2014.01]**
10/656 • • • characterised by the type of heat-exchange fluid **[2014.01]**
10/6561 • • • • Gases **[2014.01]**
10/6562 • • • • • with free flow by convection only **[2014.01]**
10/6563 • • • • • with forced flow, e.g. by blowers **[2014.01]**
10/6564 • • • • • • using compressed gas **[2014.01]**
10/6565 • • • • • • with recirculation or U-turn in the flow path, i.e. back and forth **[2014.01]**
10/6566 • • • • • Means within the gas flow to guide the flow around one or more cells, e.g. manifolds, baffles or other barriers (H01M 10/6565 takes precedence) **[2014.01]**
10/6567 • • • • Liquids **[2014.01]**
10/6568 • • • • • characterised by flow circuits, e.g. loops, located externally to the cells or cell casings **[2014.01]**
10/6569 • • • • Fluids undergoing a liquid-gas phase change or transition, e.g. evaporation or condensation (heat pipes H01M 10/6552) **[2014.01]**
10/657 • • • by electric or electromagnetic means **[2014.01]**
10/6571 • • • • Resistive heaters (arrangements for heating the battery by its resistance to the internal current H01M 10/637) **[2014.01]**
10/6572 • • • • Peltier elements or thermoelectric devices **[2014.01]**

10/658 • • • by thermal insulation or shielding **[2014.01]**
10/659 • • • by heat storage or buffering, e.g. heat capacity or liquid-solid phase changes or transition **[2014.01]**
10/6595 • • • by chemical reactions other than electrochemical reactions of the cells, e.g. catalytic heaters or burners **[2014.01]**
10/66 • • Heat-exchange relationships between the cells and other systems, e.g. central heating systems or fuel cells **[2014.01]**
10/663 • • • the system being an air-conditioner or an engine **[2014.01]**
10/667 • • • the system being an electronic component, e.g. a CPU, an inverter or a capacitor **[2014.01]**

12/00 Hybrid cells; Manufacture thereof (hybrid capacitors H01G 11/00) **[2, 2006.01]**

Note(s) [2, 2015.01]

1. *This group does not cover hybrid cells comprising capacitor electrodes and battery electrodes, which are covered by group H01G 11/00.*
2. *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.*

12/02 • Details (of non-active parts H01M 2/00, of electrodes H01M 4/00) **[2, 2006.01]**
12/04 • composed of a half-cell of the fuel-cell type and of a half-cell of the primary-cell type **[2, 2006.01]**
12/06 • • with one metallic and one gaseous electrode **[2, 2006.01]**
12/08 • composed of a half-cell of a fuel-cell type and a half-cell of the secondary-cell type **[2, 2006.01]**

14/00 Electrochemical current or voltage generators not provided for in groups H01M 6/00-H01M 12/00; Manufacture thereof [2, 2006.01]

Note(s) [2015.01]

This group does not cover solar cells, photocells, photoelectrochemical cells or photovoltaic cells, which are covered by the following groups:

- *semiconductor devices sensitive to light and adapted for the conversion of the energy of such radiation into electrical energy are covered by group H01L 31/00;*
- *solid-state devices using organic materials as active part specially adapted for sensing light and adapted for the conversion of the energy of such radiation into electrical energy are covered by group H01L 51/42;*
- *electrolytic light-sensitive devices, e.g. dye-sensitised solar cells, are covered by group H01G 9/20;*
- *photovoltaic modules structurally associated with energy storage means, e.g. batteries, are covered by group H02S 40/38.*

16/00 Structural combinations of different types of electrochemical generators [2, 2006.01]

H01P WAVEGUIDES; RESONATORS, LINES OR OTHER DEVICES OF THE WAVEGUIDE TYPE (operating at optical frequencies G02B)

Note(s)

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, 2006.01]**
1/02 • Bends; Corners; Twists **[1, 2006.01]**
1/04 • Fixed joints **[1, 2006.01]**
1/06 • Movable joints, e.g. rotating joints **[1, 2006.01]**
1/08 • Dielectric windows **[1, 2006.01]**
1/10 • for switching or interrupting **[1, 2006.01]**
1/11 • • by ferromagnetic devices **[3, 2006.01]**
1/12 • • by mechanical chopper **[1, 2006.01]**
1/14 • • by electric discharge devices (discharge devices H01J 17/64) **[1, 2006.01]**
1/15 • • by semiconductor devices **[2, 2006.01]**
1/16 • for mode selection, e.g. mode suppression or mode promotion; for mode conversion **[1, 3, 2006.01]**
1/161 • • sustaining two independent orthogonal modes, e.g. orthomode transducer **[3, 2006.01]**
1/162 • • absorbing spurious or unwanted modes of propagation **[3, 2006.01]**
1/163 • • specifically adapted for selection or promotion of the TE_{01} circular-electric mode **[3, 2006.01]**
1/165 • for rotating the plane of polarisation **[2, 2006.01]**
1/17 • • for producing a continuously rotating polarisation, e.g. circular polarisation **[2, 2006.01]**
1/175 • • using Faraday rotators **[3, 2006.01]**
1/18 • Phase-shifters (H01P 1/165 takes precedence) **[1, 2, 2006.01]**
1/185 • • using a diode or a gas filled discharge tube **[3, 2006.01]**
1/19 • • using a ferromagnetic device **[3, 2006.01]**
1/195 • • • having a toroidal shape **[3, 2006.01]**
1/20 • Frequency-selective devices, e.g. filters **[1, 2006.01]**

1/201 • • Filters for transverse electromagnetic waves (H01P 1/212, H01P 1/213, H01P 1/215, H01P 1/219 take precedence) **[3, 2006.01]**
1/202 • • • Coaxial filters (cascaded coaxial cavities H01P 1/205) **[3, 2006.01]**
1/203 • • • Strip line filters **[3, 2006.01]**
1/205 • • • Comb or interdigital filters; Cascaded coaxial cavities (H01P 1/203 takes precedence) **[3, 2006.01]**
1/207 • • Hollow waveguide filters (H01P 1/212, H01P 1/213, H01P 1/215, H01P 1/219 take precedence) **[3, 2006.01]**
1/208 • • • Cascaded cavities; Cascaded resonators inside a hollow waveguide structure (H01P 1/205 takes precedence) **[3, 2006.01]**
1/209 • • • comprising one or more branching arms or cavities wholly outside the main waveguide **[3, 2006.01]**
1/211 • • • Waffle-iron filters; Corrugated structures **[3, 2006.01]**
1/212 • • suppressing or attenuating harmonic frequencies (H01P 1/215 takes precedence) **[3, 2006.01]**
1/213 • • combining or separating two or more different frequencies (H01P 1/215 takes precedence) **[3, 2006.01]**
1/215 • • using ferromagnetic material **[3, 2006.01]**
1/217 • • • the ferromagnetic material acting as a tuning element in resonators **[3, 2006.01]**
1/218 • • • the ferromagnetic material acting as a frequency selective coupling element, e.g. YIG-filters **[3, 2006.01]**
1/219 • • Evanescent mode filters **[3, 2006.01]**
1/22 • Attenuating devices (dissipative terminating devices H01P 1/26) **[1, 2006.01]**
1/23 • • using ferromagnetic material **[3, 2006.01]**
1/24 • Terminating devices **[1, 2006.01]**
1/26 • • Dissipative terminations **[1, 2006.01]**
1/28 • • Short-circuiting plungers **[1, 2006.01]**
1/30 • for compensation of, or protection against, temperature or moisture effects **[1, 2006.01]**
1/32 • Non-reciprocal transmission devices (H01P 1/02-H01P 1/30 take precedence) **[1, 3, 2006.01]**
1/36 • • Isolators **[2, 3, 2006.01]**
1/365 • • • Resonance absorption isolators **[3, 2006.01]**
1/37 • • • Field displacement isolators **[3, 2006.01]**
1/375 • • • using Faraday rotators **[3, 2006.01]**
1/38 • • Circulators **[2, 3, 2006.01]**
1/383 • • • Junction circulators, e.g. Y-circulators **[3, 2006.01]**
1/387 • • • • Strip line circulators **[3, 2006.01]**
1/39 • • • • Hollow waveguide circulators **[3, 2006.01]**
1/393 • • • using Faraday rotators **[3, 2006.01]**
1/397 • • • using non-reciprocal phase shifters (H01P 1/393 takes precedence) **[3, 2006.01]**

3/00 Waveguides; Transmission lines of the waveguide type [1, 2006.01]

3/02 • with two longitudinal conductors **[1, 2006.01]**
3/04 • • Lines formed as Lecher wire pairs **[1, 2006.01]**
3/06 • • Coaxial lines **[1, 2006.01]**
3/08 • • Microstrips; Strip lines **[1, 2006.01]**
3/10 • Wire waveguides, i.e. with a single solid longitudinal conductor **[1, 2006.01]**
3/12 • Hollow waveguides (H01P 3/20 takes precedence) **[1, 2006.01]**
3/123 • • with a complex or stepped cross-section, e.g. ridged or grooved waveguides (H01P 3/14 takes precedence) **[3, 2006.01]**
3/127 • • with a circular, elliptic, or parabolic cross-section **[3, 2006.01]**
3/13 • • specially adapted for transmission of the TE_{01} circular-electric mode **[2, 2006.01]**
3/14 • • flexible **[1, 2006.01]**
3/16 • Dielectric waveguides, i.e. without a longitudinal conductor **[1, 2006.01]**
3/18 • built-up from several layers to increase operating surface, i.e. alternately conductive and dielectric layers **[1, 2006.01]**
3/20 • Quasi-optical arrangements for guiding a wave, e.g. focusing by dielectric lenses **[1, 2006.01]**

5/00 Coupling devices of the waveguide type [1, 2006.01]

5/02 • with invariable factor of coupling (H01P 5/12 takes precedence) **[1, 3, 2006.01]**
5/04 • with variable factor of coupling **[1, 2006.01]**
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) **[1, 3, 2006.01]**
5/10 • • for coupling balanced with unbalanced lines or devices **[1, 2006.01]**
5/103 • • • Hollow-waveguide/coaxial-line transitions **[3, 2006.01]**
5/107 • • • Hollow-waveguide/strip-line transitions **[3, 2006.01]**
5/12 • Coupling devices having more than two ports (H01P 5/04 takes precedence) **[1, 3, 2006.01]**
5/16 • • Conjugate devices, i.e. devices having at least one port decoupled from one other port **[2, 2006.01]**
5/18 • • • consisting of two coupled guides, e.g. directional couplers **[2, 2006.01]**
5/19 • • • of the junction type **[3, 2006.01]**
5/20 • • • • Magic-T junctions **[2, 3, 2006.01]**
5/22 • • • • Hybrid ring junctions **[2, 3, 2006.01]**

7/00 Resonators of the waveguide type [1, 2006.01]

7/02 • Lecher resonators **[1, 2006.01]**
7/04 • Coaxial resonators **[1, 2006.01]**
7/06 • Cavity resonators **[1, 2006.01]**
7/08 • Strip line resonators **[3, 2006.01]**
7/10 • Dielectric resonators **[3, 2006.01]**

9/00 Delay lines of the waveguide type [1, 2006.01]

9/02 • Helical lines **[1, 2006.01]**
9/04 • Interdigital lines **[1, 2006.01]**

11/00 Apparatus or processes specially adapted for manufacturing waveguides or resonators, lines, or other devices of the waveguide type [1, 2006.01]

H01P

H01Q AERIALS (radiators or aerials for microwave heating H05B 6/72)

Note(s) [3]

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.
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.

Subclass index

1/00 Details of, or arrangements associated with, aerials (arrangements for varying orientation of directional pattern H01Q 3/00) **[1, 2006.01]**

Note(s)

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, 2006.01]**

1/04 • Adaptation for subterranean or subaqueous use **[1, 2006.01]**

1/06 • Means for the lighting or illuminating of aerials, e.g. for purpose of warning **[1, 2006.01]**

1/08 • Means for collapsing aerials or parts thereof (collapsible loop aerials H01Q 7/02; means for collapsing H-aerials or Yagi aerials H01Q 19/04) **[1, 2006.01]**

1/10 • • Telescopic elements **[1, 2006.01]**

1/12 • Supports; Mounting means **[1, 2006.01]**

1/14 • • for wire or other non-rigid radiating elements **[1, 2006.01]**

1/16 • • • Strainers, spreaders, or spacers **[1, 2006.01]**

1/18 • • Means for stabilising aerials on an unstable platform **[1, 2006.01]**

1/20 • • Resilient mountings **[1, 2006.01]**

1/22 • • by structural association with other equipment or articles **[1, 2006.01]**

1/24 • • • with receiving set **[1, 2006.01]**

1/26 • • • with electric discharge tube **[1, 2006.01]**

1/27 • Adaptation for use in or on movable bodies (H01Q 1/08, H01Q 1/12, H01Q 1/18 take precedence) **[3, 2006.01]**

1/28 • • Adaptation for use in or on aircraft, missiles, satellites, or balloons **[1, 3, 2006.01]**

1/30 • • • Means for trailing aerials **[1, 3, 2006.01]**

1/32 • • Adaptation for use in or on road or rail vehicles **[1, 3, 2006.01]**

1/34 • • Adaptation for use in or on ships, submarines, buoys or torpedoes (for subaqueous use H01Q 1/04) **[1, 3, 2006.01]**

1/36 • Structural form of radiating elements, e.g. cone, spiral, umbrella (H01Q 1/08, H01Q 1/14 take precedence) **[1, 2006.01]**

1/38 • • formed by a conductive layer on an insulating support **[1, 2006.01]**

1/40 • Radiating elements coated with, or embedded in, protective material **[1, 2006.01]**

1/42 • Housings not intimately mechanically associated with radiating elements, e.g. radome **[1, 2006.01]**

1/44 • using equipment having another main function to serve additionally as an aerial (H01Q 1/27-H01Q 1/34 take precedence) **[1, 2006.01]**

1/46 • • Electric supply lines or communication lines **[1, 2006.01]**

1/48 • Earthing means; Earth screens; Counterpoises **[1, 2006.01]**

1/50 • Structural association of aerials with earthing switches, lead-in devices or lightning protectors **[1, 2006.01]**

1/52 • Means for reducing coupling between aerials; Means for reducing coupling between an aerial and another structure (absorbing means H01Q 17/00) **[1, 2006.01]**

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 [1, 2006.01]

3/01 • varying the shape of the aerial or aerial system **[3, 2006.01]**

3/02 • using mechanical movement of aerial or aerial system as a whole **[1, 2006.01]**

3/04 • • for varying one co-ordinate of the orientation **[1, 2006.01]**

3/06 • • • over a restricted angle **[1, 2006.01]**

3/08 • • for varying two co-ordinates of the orientation **[1, 2006.01]**

3/10 • • • to produce a conical or spiral scan **[1, 2006.01]**

3/12 • using mechanical relative movement between primary active elements and secondary devices of aerials or aerial systems **[1, 2006.01]**

3/14 • • for varying the relative position of primary active element and a refracting or diffracting device **[1, 2006.01]**

3/16 • • for varying relative position of primary active element and a reflecting device **[1, 2006.01]**

3/18 • • • wherein the primary active element is movable and the reflecting device is fixed **[1, 2006.01]**

3/20 • • • wherein the primary active element is fixed and the reflecting device is movable **[1, 2006.01]**

3/22 • varying the orientation in accordance with variation of frequency of radiated wave **[1, 2006.01]**

3/24 • varying the orientation by switching energy from one active radiating element to another, e.g. for beam switching **[1, 2006.01]**

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) **[1, 2006.01]**

3/28 • • varying the amplitude **[3, 2006.01]**

3/30 • • varying the phase **[3, 2006.01]**

3/32 • • • by mechanical means **[3, 2006.01]**

3/34 • • • by electrical means (active lenses or reflecting arrays H01Q 3/46) **[3, 2006.01]**

3/36 • • • • with variable phase-shifters **[3, 2006.01]**

3/38 • • • • • the phase-shifters being digital **[3, 2006.01]**

3/40 • • • • with phasing matrix **[3, 2006.01]**

3/42 • • • • using frequency-mixing **[3, 2006.01]**

3/44 • varying the electric or magnetic characteristics of reflecting, refracting, or diffracting devices associated with the radiating element **[3, 2006.01]**

3/46 • • Active lenses or reflecting arrays **[3, 2006.01]**

5/00 Arrangements for simultaneous operation of aerials on two or more different wavebands, e.g. dual-band or multi-band arrangements *(combinations of separate active aerial units operating in different wavebands and connected to a common feeder system H01Q 21/30)* ***[1, 3, 2006.01, 2015.01]***

*5/10 • Resonant aerials **[2015.01]***

*5/15 • • for operation of centre-fed aerials comprising one or more collinear, substantially straight or elongated active elements **[2015.01]***

*5/20 • characterised by the operating wavebands **[2015.01]***

*5/22 • • RF wavebands combined with non-RF wavebands, e.g. infrared or optical **[2015.01]***

*5/25 • • Ultra-wideband [UWB] systems, e.g. multiple resonance systems; Pulse systems **[2015.01]***

*5/28 • • Arrangements for establishing polarisation or beam width over two or more different wavebands **[2015.01]***

*5/30 • Arrangements for providing operation on different wavebands **[2015.01]***

*5/307 • • Individual or coupled radiating elements, each element being fed in an unspecified way **[2015.01]***

*5/314 • • • using frequency dependent circuits or components, e.g. trap circuits or capacitors **[2015.01]***

*5/321 • • • • within a radiating element or between connected radiating elements **[2015.01]***

*5/328 • • • • between a radiating element and ground **[2015.01]***

*5/335 • • • • at the feed, e.g. for impedance matching **[2015.01]***

*5/342 • • • for different propagation modes (H01Q 5/314 takes precedence) **[2015.01]***

*5/35 • • • • using two or more simultaneously fed points **[2015.01]***

*5/357 • • • • using a single feed point **[2015.01]***

*5/364 • • • • • Creating multiple current paths **[2015.01]***

*5/371 • • • • • • Branching current paths **[2015.01]***

*5/378 • • Combination of fed elements with parasitic elements **[2015.01]***

*5/385 • • • Two or more parasitic elements **[2015.01]***

*5/392 • • • the parasitic elements having dual-band or multi-band characteristics **[2015.01]***

*5/40 • Imbricated or interleaved structures; Combined or electromagnetically coupled arrangements, e.g. comprising two or more non-connected fed radiating elements **[2015.01]***

*5/42 • • using two or more imbricated arrays (H01Q 5/49 takes precedence) **[2015.01]***

*5/45 • • using two or more feeds in association with a common reflecting, diffracting or refracting device **[2015.01]***

*5/47 • • • with a coaxial arrangement of the feeds **[2015.01]***

*5/48 • • Combinations of two or more dipole type aerials **[2015.01]***

*5/49 • • • with parasitic elements used for purposes other than for dual-band or multi-band, e.g. imbricated Yagi aerials **[2015.01]***

*5/50 • Feeding or matching arrangements for broad-band or multi-band operation **[2015.01]***

*5/55 • • for horn or waveguide aerials **[2015.01]***

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 [1, 2006.01]

7/02 • Collapsible aerials; Retractable aerials **[1, 2006.01]**

7/04 • Screened aerials (H01Q 7/02, H01Q 7/06 take precedence) **[1, 2006.01]**

7/06 • with core of ferromagnetic material (H01Q 7/02 takes precedence) **[1, 2006.01]**

7/08 • • Ferrite rod or like elongated core **[1, 2006.01]**

9/00 Electrically-short aerials having dimensions not more than twice the operating wavelength and consisting of conductive active radiating elements [1, 2006.01]

9/02 • Non-resonant aerials **[1, 2006.01]**

9/04 • Resonant aerials **[1, 2006.01]**

9/06 • • Details **[1, 2006.01]**

9/08 • • • Junction boxes specially adapted for supporting adjacent ends of collinear rigid elements **[1, 2006.01]**

9/10 • • • Junction boxes specially adapted for supporting adjacent ends of divergent elements **[1, 2006.01]**

9/12 • • • • adapted for adjustment of angle between elements **[1, 2006.01]**

9/14 • • • Length of element or elements adjustable (telescopic elements H01Q 1/10) **[1, 2006.01]**

9/16 • • with feed intermediate between the extremities of the aerial, e.g. centre-fed dipole (H01Q 9/44 takes precedence) **[1, 2006.01]**

9/18 • • • Vertical disposition of the aerial **[1, 2006.01]**

9/20 • • • Two collinear substantially straight active elements; Substantially straight single active elements (H01Q 9/28 takes precedence) **[1, 2006.01]**

9/22 • • • • Rigid rod or equivalent tubular element or elements **[1, 2006.01]**

9/24 • • • • Shunt feed arrangements to single active elements, e.g. for delta matching **[1, 2006.01]**

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) **[1, 2006.01]**

9/27 • • • • Spiral aerials **[3, 2006.01]**

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 (waveguide horns or mouths H01Q 13/00; slot aerials H01Q 13/00) **[1, 2006.01]**

9/30 • • with feed to end of elongated active element, e.g. unipole (H01Q 9/44 takes precedence) **[1, 2006.01]**

9/32 • • • Vertical arrangement of element (H01Q 9/40 takes precedence) **[1, 2006.01]**

9/34 • • • • Mast, tower, or like self-supporting or stay-supported aerials **[1, 2006.01]**

9/36 • • • • with top loading **[1, 2006.01]**

9/38 • • • • with counterpoise (with counterpoise comprising elongated elements coplanar with the active element H01Q 9/44) **[1, 2006.01]**

9/40 • • • Element having extended radiating surface **[1, 2006.01]**

9/42 • • • with folded element, the folded parts being spaced apart a small fraction of the operating wavelength **[1, 2006.01]**

9/43 • • • • Scimitar aerials **[3, 2006.01]**

9/44 • • with plurality of divergent straight elements, e.g. V-dipole, X-aerial; with plurality of elements having mutually inclined substantially straight portions (combinations of two or more active elements H01Q 21/00; turnstile aerials H01Q 21/26) **[1, 2006.01]**

9/46 • • • with rigid elements diverging from single point **[1, 2006.01]**

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) **[1, 2006.01]**

11/02 • Non-resonant aerials, e.g. travelling-wave aerial (Yagi aerials H01Q 19/30) **[1, 2006.01]**

11/04 • • with parts bent, folded, shaped, screened or electrically loaded to obtain desired phase relation of radiation from selected sections of the aerial (H01Q 11/06-H01Q 11/10 take precedence) **[1, 2006.01]**

11/06 • • Rhombic aerials; V-aerials **[1, 2006.01]**

11/08 • • Helical aerials **[1, 2006.01]**

11/10 • • Log-periodic aerials (H01Q 11/08 takes precedence) **[1, 3, 2006.01]**

11/12 • Resonant aerials **[1, 2006.01]**

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 (H01Q 11/20 takes precedence) **[1, 2006.01]**

11/16 • • • in which the selected sections are collinear **[1, 2006.01]**

11/18 • • • in which the selected sections are parallelly spaced **[1, 3, 2006.01]**

11/20 • • V-aerials **[1, 2006.01]**

13/00 Waveguide horns or mouths; Slot aerials; Leaky-waveguide aerials; Equivalent structures causing radiation along the transmission path of a guided wave [1, 2006.01]

13/02 • Waveguide horns **[1, 2006.01]**

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) **[1, 2006.01]**

13/06 • Waveguide mouths (horns H01Q 13/02) **[1, 2006.01]**

13/08 • Radiating ends of two-conductor microwave transmission lines, e.g. of coaxial lines, of microstrip lines **[1, 2006.01]**

13/10 • Resonant slot aerials **[1, 2006.01]**

13/12 • • Longitudinally slotted cylinder aerials; Equivalent structures **[1, 2006.01]**

13/14 • • • Skeleton cylinder aerials **[1, 2006.01]**

13/16 • • Folded slot aerials **[1, 2006.01]**

13/18 • • the slot being backed by, or formed in boundary wall of, a resonant cavity (longitudinally slotted cylinder H01Q 13/12) **[1, 2006.01]**

13/20 • Non-resonant leaky-waveguide or transmission-line aerials; Equivalent structures causing radiation along the transmission path of a guided wave **[1, 2006.01]**

13/22 • • Longitudinal slot in boundary wall of waveguide or transmission line **[1, 2006.01]**

13/24 • • constituted by a dielectric or ferromagnetic rod or pipe (H01Q 13/28 takes precedence) **[1, 2006.01]**

13/26 • • Surface waveguide constituted by a single conductor, e.g. strip conductor **[1, 2006.01]**

13/28 • • comprising elements constituting electric discontinuities and spaced in direction of wave propagation, e.g. dielectric elements or conductive elements forming artificial dielectric **[1, 2006.01]**

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) **[1, 2006.01]**

15/02 • Refracting or diffracting devices, e.g. lens, prism **[1, 2006.01]**

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 **[1, 2006.01]**

15/06 • • comprising plurality of wave-guiding channels of different length **[1, 2006.01]**

15/08 • • formed of solid dielectric material **[1, 2006.01]**

15/10 • • comprising three-dimensional array of impedance discontinuities, e.g. holes in conductive surfaces or conductive discs forming artificial dielectric **[1, 2006.01]**

15/12 • • functioning also as polarisation filter **[1, 2006.01]**

15/14 • Reflecting surfaces; Equivalent structures **[1, 2006.01]**

15/16 • • curved in two dimensions, e.g. paraboloidal **[1, 2006.01]**

15/18 • • comprising plurality of mutually inclined plane surfaces, e.g. corner reflector **[1, 2006.01]**

15/20 • • • Collapsible reflectors **[1, 2006.01]**

15/22 • • functioning also as polarisation filter **[1, 2006.01]**

15/23 • Combinations of reflecting surfaces with refracting or diffracting devices **[3, 2006.01]**

15/24 • Polarising devices; Polarisation filters (H01Q 15/12, H01Q 15/22 take precedence) **[1, 2006.01]**

17/00 Devices for absorbing waves radiated from an aerial; Combinations of such devices with active aerial elements or systems [1, 2006.01]

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 [1, 2006.01]

19/02 • Details **[1, 2006.01]**

19/04 • • Means for collapsing H-aerials or Yagi aerials **[1, 2006.01]**

19/06 • using refracting or diffracting devices, e.g. lens **[1, 2006.01]**

19/08 • • for modifying the radiation pattern of a radiating horn in which it is located **[1, 2006.01]**

19/09 • • wherein the primary active element is coated with or embedded in a dielectric or magnetic material (protective material H01Q 1/40; varying the elecric or magnetic characteristics of refracting or diffracting devices H01Q 3/44) **[3, 2006.01]**

19/10 • using reflecting surfaces **[1, 2006.01]**

19/12 • • wherein the surfaces are concave (H01Q 19/18 takes precedence) **[1, 3, 2006.01]**

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, 2006.01]**

19/15 • • • the primary radiating source being a line source, e.g. leaky waveguide aerials **[3, 2006.01]**

19/17 • • • the primary radiating source comprising two or more radiating elements (H01Q 19/15, H01Q 25/00 take precedence) **[3, 2006.01]**

19/18 • • having two or more spaced reflecting surfaces (H01Q 19/20 takes precedence) **[1, 2006.01]**

19/185 • • • wherein the surfaces are plane **[3, 2006.01]**

19/19 • • • comprising one main concave reflecting surface associated with an auxiliary reflecting surface **[3, 2006.01]**

19/195 • • • • wherein a reflecting surface acts also as a polarisation filter or a polarising device **[3, 2006.01]**

19/20 • Producing pencil beam by two cylindrical focusing devices with their focal lines orthogonally disposed **[1, 2006.01]**

19/22 • using a secondary device in the form of a single substantially straight conductive element **[1, 2006.01]**

19/24 • • the primary active element being centre-fed and substantially straight, e.g. H-aerial **[1, 2006.01]**

19/26 • • the primary active element being end-fed and elongated **[1, 2006.01]**

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) **[1, 2006.01]**

19/30 • • the primary active element being centre-fed and substantially straight, e.g. Yagi aerial **[1, 2006.01]**

19/32 • • the primary active element being end-fed and elongated **[1, 2006.01]**

21/00 Aerial arrays or systems (arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system H01Q 3/00) **[1, 2006.01]**

21/06 • Arrays of individually energised aerial units similarly polarised and spaced apart **[1, 2006.01]**

21/08 • • the units being spaced along, or adjacent to, a rectilinear path **[1, 2006.01]**

21/10 • • • Collinear arrangements of substantially straight elongated conductive units **[1, 2006.01]**

21/12 • • • Parallel arrangements of substantially straight elongated conductive units (travelling-wave aerials comprising transmission line loaded with transverse elements H01Q 11/02; Yagi aerials H01Q 19/30) **[1, 2006.01]**

21/14 • • • • Adcock aerials **[1, 2006.01]**

21/16 • • • • • U-type **[1, 2006.01]**

21/18 • • • • • H-type **[1, 2006.01]**

21/20 • • the units being spaced along, or adjacent to, a curvilinear path **[1, 2006.01]**

21/22 • • Aerial units of the array energised non-uniformly in amplitude or phase, e.g. tapered array, binomial array **[1, 2006.01]**

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 **[1, 2006.01]**

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 **[1, 2006.01]**

21/28 • Combinations of substantially independent non-interacting aerial units or systems **[1, 2006.01]**

21/29 • Combinations of different interacting aerial units for giving a desired directional characteristic (H01Q 25/00 takes precedence) **[3, 2006.01]**

21/30 • Combinations of separate aerial units operating in different wavebands and connected to a common feeder system **[1, 2006.01]**

23/00 Aerials with active circuits or circuit elements integrated within them or attached to them [3, 2006.01]

Note(s) [3]

1. This group covers only such combinations in which the type of aerial or aerial element is immaterial.
2. Combinations with a particular type of aerial are classified in the group appropriate to that type.

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, 2006.01]**

25/02 • providing sum and difference patterns (H01Q 25/04 takes precedence) **[3, 2006.01]**

25/04 • Multimode aerials **[3, 2006.01]**

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)

Note(s) [7]

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:
   - "pin" is a rigid or flexible conductor for engagement with an appropriately shaped socket to establish contact therewith;
   - "socket" is a rigid or flexible conductor for receiving an appropriate pin to establish electrical contact therewith;
   - "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.
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 [1, 2006.01]**

3/08 • for making connection to a liquid (electrodes for batteries or accumulators H01M) **[1, 2006.01]**

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-H01R 33/00; flexible or turnable line connectors H01R 35/00 non-rotary current collectors H01R 41/00) **[3, 2006.01]**

4/01 • Connections using shape memory materials, e.g. shape memory metal **[7, 2006.01]**

4/02 • Soldered or welded connections (H01R 4/62, H01R 12/59, H01R 12/65 take precedence) **[3, 7, 2006.01]**
4/04 • using electrically conductive adhesives **[3, 2006.01]**
4/06 • Riveted connections (by explosion H01R 4/08) **[3, 2006.01]**
4/08 • effected by an explosion **[3, 2006.01]**
4/10 • effected solely by twisting, wrapping, bending, crimping, or other permanent deformation **[3, 2006.01]**
4/12 • • by twisting **[3, 2006.01]**
4/14 • • by wrapping **[3, 2006.01]**
4/16 • • by bending **[3, 2006.01]**
4/18 • • by crimping (H01R 4/01, H01R 4/24 take precedence) **[3, 7, 2006.01]**
4/20 • • • using a crimping sleeve **[3, 2006.01]**
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, 2006.01]**
4/24 • Connections using needle-point, slotted-plate, or analogous contact members penetrating insulation or cable strands **[3, 2006.01]**
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, 2006.01]**
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, 2006.01]**
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, 2006.01]**
4/32 • • • Conductive members located in slot or hole in screw **[3, 2006.01]**
4/34 • • • Conductive members located under head of screw **[3, 2006.01]**
4/36 • • • Conductive members located under tip of screw **[3, 2006.01]**
4/38 • • using a clamping member acted on by screw or nut (H01R 4/50 takes precedence) **[3, 2006.01]**
4/40 • • • Pivotable clamping member **[3, 2006.01]**
4/42 • • • Clamping area to one side of screw only **[3, 2006.01]**
4/44 • • • Clamping areas on both sides of screw **[3, 2006.01]**
4/46 • • • Clamping area between two screws placed side by side **[3, 2006.01]**
4/48 • • using a spring, clip or other resilient member (H01R 4/52 takes precedence) **[3, 2006.01]**
4/50 • • using a cam, wedge, cone or ball **[3, 2006.01]**
4/52 • • • which is spring loaded **[3, 2006.01]**
4/56 • one conductor screwing into another **[3, 2006.01]**
4/58 • characterised by the form or material of the contacting members (H01R 4/01 takes precedence) **[3, 7, 2006.01]**
4/60 • • Connections between or with tubular conductors (H01R 4/56 takes precedence) **[3, 2006.01]**
4/62 • • Connections between conductors of different materials; Connections between or with aluminium or steel-core aluminium conductors (H01R 4/68 takes precedence) **[3, 2006.01]**
4/64 • • Connections between or with conductive parts having primarily a non-electric function, e.g. frame, casing, rail **[3, 2006.01]**
4/66 • • Connections with the terrestrial mass, e.g. earth plate, earth pin **[3, 2006.01]**
4/68 • • Connections to or between superconductive conductors **[3, 2006.01]**
4/70 • Insulation of connections (end caps H01R 4/22) **[3, 2006.01]**
4/72 • • using a heat shrinking insulating sleeve **[4, 2006.01]**

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-H01R 33/00; flexible or turnable line connectors H01R 35/00) **[1, 3, 2006.01]**
9/03 • Connectors arranged to contact a plurality of the conductors of a multiconductor cable **[3, 2006.01]**
9/05 • • for coaxial cables **[3, 2006.01]**
9/053 • • • using contact members penetrating insulation **[7, 2006.01]**
9/11 • End pieces for multiconductor cables supported by the cable and for facilitating connections to other conductive members **[3, 2006.01]**
9/15 • Connectors for wire wrapping **[3, 2006.01]**
9/16 • Fastening of connecting parts to base or case; Insulating connecting parts from base or case (lead-through insulators H01B 17/26) **[1, 3, 2006.01]**
9/18 • • Fastening by means of screw or nut **[1, 3, 2006.01]**
9/20 • • Fastening by means of rivet or eyelet **[1, 3, 2006.01]**
9/22 • Bases, e.g. strip, block, panel **[1, 3, 2006.01]**
9/24 • • Terminal blocks **[3, 2006.01]**
9/26 • • • Clip-on terminal blocks for side-by-side rail or strip-mounting **[3, 2006.01]**
9/28 • • Terminal boards **[3, 2006.01]**

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-H01R 29/00, H01R 33/00; flexible or turnable line connectors H01R 35/00) **[1, 3, 2006.01]**
11/01 • characterised by the form or arrangement of the conductive interconnection between their connecting locations **[3, 2006.01]**
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, 2006.01]**
11/05 • • the connecting locations having different types of direct connections **[3, 2006.01]**

11/07 • • the connecting locations being of the same type but different sizes **[3, 2006.01]**

11/09 • • the connecting locations being identical **[3, 2006.01]**

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, 2006.01]**

11/12 • • End pieces terminating in an eye, hook, or fork **[1, 3, 2006.01]**

11/14 • • • the hook being adapted for hanging on overhead or other suspended lines, e.g. hot line clamp **[1, 3, 2006.01]**

11/15 • • • • Hook in the form of a screw clamp **[3, 2006.01]**

11/16 • • End pieces terminating in a soldering tip or socket **[1, 3, 2006.01]**

11/18 • • End pieces terminating in a probe **[1, 3, 2006.01]**

11/20 • • End pieces terminating in a needle point or analogous contact for penetrating insulation or cable strands **[1, 3, 2006.01]**

11/22 • • End pieces terminating in a spring clip **[1, 3, 2006.01]**

11/24 • • • with gripping jaws, e.g. crocodile clip **[1, 3, 2006.01]**

11/26 • • End pieces terminating in a screw clamp, screw or nut **[1, 3, 2006.01]**

11/28 • • End pieces consisting of a ferrule or sleeve **[1, 3, 2006.01]**

11/30 • • End pieces held in contact by a magnet **[1, 3, 2006.01]**

11/32 • • End pieces with two or more terminations **[1, 3, 2006.01]**

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, 2006.01]**

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-H01R 33/00 [1, 7, 2006.01]

13/02 • Contact members **[1, 2006.01]**

13/03 • • characterised by the material, e.g. plating or coating materials **[4, 2006.01]**

13/04 • • Pins or blades for co-operation with sockets **[1, 2006.01]**

13/05 • • • Resilient pins or blades (carrying separate resilient parts H01R 13/15) **[3, 2006.01]**

13/08 • • • Resiliently-mounted rigid pins or blades **[1, 2006.01]**

13/10 • • Sockets for co-operation with pins or blades **[1, 2006.01]**

13/11 • • • Resilient sockets (carrying separate resilient parts H01R 13/15) **[3, 2006.01]**

13/115 • • • • U-shaped sockets having inwardly-bent legs **[3, 2006.01]**

13/14 • • • Resiliently-mounted rigid sockets **[1, 2006.01]**

13/15 • • Pins, blades or sockets having separate spring member for producing or increasing contact pressure **[3, 2006.01]**

13/17 • • • the spring member being on the pin **[3, 2006.01]**

13/18 • • • with the spring member surrounding the socket **[1, 2006.01]**

13/187 • • • the spring member being in the socket **[3, 2006.01]**

13/193 • • Means for increasing contact pressure at the end of engagement of coupling part **[3, 2006.01]**

13/20 • • Pins, blades, or sockets shaped, or provided with separate member, to retain co-operating parts together **[1, 2006.01]**
13/207 • • • by screw-in connection **[3, 2006.01]**
13/213 • • • by bayonet connection **[3, 2006.01]**
13/22 • • Contacts for co-operating by abutting **[1, 2006.01]**
13/24 • • • resilient; resiliently mounted **[1, 2006.01]**
13/26 • • Pin or blade contacts for sliding co-operation on one side only **[1, 2006.01]**
13/28 • • Contacts for sliding co-operation with identically-shaped contact, e.g. for hermaphroditic coupling devices **[1, 2006.01]**
13/33 • • Contact members made of resilient wire **[3, 2006.01]**
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, 2006.01]**
13/40 • Securing contact members in or to a base or case; Insulating of contact members **[1, 2006.01]**
13/405 • • Securing in non-demountable manner, e.g. moulding, riveting **[3, 2006.01]**
13/41 • • • by frictional grip in grommet, panel or base **[3, 2006.01]**
13/415 • • • by permanent deformation of contact member **[3, 2006.01]**
13/42 • • Securing in a demountable manner **[1, 2006.01]**
13/422 • • • in resilient one-piece base or case; One-piece base or case formed with resilient locking means **[3, 2006.01]**
13/424 • • • in base or case composed of a plurality of insulating parts having at least one resilient insulating part **[3, 2006.01]**
13/426 • • • by separate resilient retaining piece supported by base or case, e.g. collar **[3, 2006.01]**
13/428 • • • by resilient locking means on the contact members; by locking means on resilient contact members **[3, 2006.01]**
13/432 • • • • by stamped-out resilient tongue snapping behind shoulder in base or case **[3, 2006.01]**
13/434 • • • • by separate resilient locking means on contact member, e.g. retainer collar or ring around contact member **[3, 2006.01]**
13/436 • • • Securing a plurality of contact members by one locking piece **[3, 2006.01]**
13/44 • Means for preventing access to live contacts **[1, 2006.01]**
13/443 • • Dummy plugs **[7, 2006.01]**
13/447 • • Shutter or cover plate **[3, 2006.01]**
13/453 • • • Shutter or cover plate opened by engagement of counterpart **[3, 2006.01]**
13/46 • Bases; Cases **[1, 2006.01]**
13/50 • • formed as an integral body (H01R 13/514 takes precedence) **[1, 3, 2006.01]**
13/502 • • composed of different pieces (H01R 13/514 takes precedence) **[3, 2006.01]**
13/504 • • • different pieces being moulded, cemented, welded, e.g. ultrasonic, or swaged together **[3, 2006.01]**
13/506 • • • assembled by snap action of the parts **[3, 2006.01]**
13/508 • • • assembled by clip or spring **[3, 2006.01]**
13/512 • • • assembled by screw or screws **[3, 2006.01]**
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, 2006.01]**
13/516 • • Means for holding or embracing insulating body, e.g. casing **[3, 2006.01]**
13/518 • • • for holding or embracing several coupling parts, e.g. frames **[3, 2006.01]**
13/52 • • Dustproof, splashproof, drip-proof, waterproof, or flameproof cases **[1, 2006.01]**
13/523 • • • for use under water **[3, 2006.01]**
13/527 • • • Flameproof cases (H01R 13/70 takes precedence) **[3, 2006.01]**
13/53 • • Bases or cases for heavy duty; Bases or cases with means for preventing corona or arcing **[3, 2006.01]**
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, 2006.01]**
13/56 • Means for preventing chafing or fracture of flexible leads at outlet from coupling part **[1, 2006.01]**
13/58 • Means for relieving strain on wire connection, e.g. cord grip **[1, 2006.01]**
13/585 • • Grip increasing with strain force **[3, 2006.01]**
13/59 • • Threaded ferrule or bolt operating in a direction parallel to the cable or wire **[3, 2006.01]**
13/595 • • Bolts operating in a direction transverse to the cable or wire **[3, 2006.01]**
13/60 • Means for supporting coupling part when not engaged **[1, 2006.01]**
13/62 • Means for facilitating engagement or disengagement of coupling parts or for holding them in engagement **[1, 3, 2006.01]**
13/621 • • Bolt, set screw or screw clamp **[3, 5, 2006.01]**
13/622 • • Screw-ring or screw-casing (H01R 13/623 takes precedence) **[5, 2006.01]**
13/623 • • Casing or ring with helicoidal groove **[3, 5, 2006.01]**
13/625 • • Casing or ring with bayonet engagement **[3, 5, 2006.01]**
13/627 • • Snap-action fastening **[3, 2006.01]**
13/629 • • Additional means for facilitating engagement or disengagement of coupling parts, e.g. aligning or guiding means, levers, gas pressure **[3, 2006.01]**
13/631 • • • for engagement only **[3, 2006.01]**
13/633 • • • for disengagement only **[3, 2006.01]**
13/635 • • • • by mechanical pressure, e.g. spring force **[3, 2006.01]**
13/637 • • • • by fluid pressure, e.g. explosion **[3, 2006.01]**
13/639 • • Additional means for holding or locking coupling parts together after engagement **[3, 2006.01]**
13/64 • Means for preventing, inhibiting or avoiding incorrect coupling **[1, 2006.01]**
13/641 • • by indicating incorrect coupling; by indicating correct or full engagement **[7, 2006.01]**
13/642 • • by position or shape of contact members **[3, 2006.01]**
13/645 • • by exchangeable elements on case or base **[3, 2006.01]**
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-H01R 13/6599; coaxed connectors specifically adapted for high frequency H01R 24/40-H01R 24/56) **[7, 2006.01, 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, 2006.01]**
13/652 • • with earth pin, blade or socket **[3, 2006.01]**
13/655 • • with earth brace **[3, 2006.01]**
13/658 • • High frequency shielding arrangements, e.g. against EMI [Electro-Magnetic Interference] or EMP [Electro-Magnetic Pulse] **[3, 2006.01, 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-H01R 24/56) **[1, 2006.01]**
13/68 • • with built-in fuse **[1, 2006.01, 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 **[1, 2006.01]**
13/703 • • • operated by engagement or disengagement of coupling parts (H01R 13/71 takes precedence) **[3, 2006.01]**
13/707 • • • interlocked with contact members or counterpart **[3, 2006.01]**
13/71 • • • Contact members of coupling parts operating as switch **[3, 2006.01]**
13/713 • • • the switch being a safety switch **[3, 2006.01]**
13/717 • • with built-in light source **[3, 2006.01]**
13/719 • • specially adapted for high frequency, e.g. with filters **[4, 2006.01, 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 **[1, 2006.01]**
13/73 • Means for mounting coupling parts to apparatus or structures, e.g. to a wall **[4, 2006.01]**
13/74 • • for mounting coupling parts in openings of a panel **[3, 2006.01]**

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, 2006.01, 2011.01]**

Note(s)

In this group, it is desirable to add the indexing codes of groups H01R 101/00-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) **[1, 2006.01]**

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, 2006.01]**

25/16 • Rails or bus-bars provided with a plurality of discrete connecting locations for counterparts (installations of bus-bars H02G 5/00) **[3, 2006.01]**

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) **[1, 2006.01]**

27/02 • for simultaneous co-operation with two or more counterparts **[1, 2006.01]**

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 [1, 2006.01]

31/00 Coupling parts supported only by co-operation with counterpart [1, 2006.01]

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) **[1, 2006.01]**

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) **[1, 4, 2006.01]**

31/08 • Short-circuiting members for bridging contacts in a counterpart (insulating members inserted between normally-closed contacts H01H 27/04) **[1, 2006.01]**

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) **[1, 2006.01]**

33/02 • Single-pole devices, e.g. holder for supporting one end of a tubular incandescent or neon lamp **[1, 2006.01]**

33/05 • Two-pole devices **[4, 2006.01]**

33/06 • • with two current-carrying pins, blades, or analogous contacts, having their axes parallel to each other **[1, 4, 2006.01]**

33/08 • • • for supporting tubular fluorescent lamp **[1, 4, 2006.01]**

33/09 • • • for baseless lamp bulb **[4, 2006.01]**

33/18 • • having only abutting contacts **[1, 2006.01]**

33/20 • • having concentrically or coaxially arranged contacts **[1, 2006.01]**

33/22 • • for screw type base, e.g. for lamp **[1, 4, 2006.01]**

33/46 • • for bayonet type base **[1, 4, 2006.01]**

33/72 • Three-pole devices **[1, 2006.01]**

33/74 • Devices having four or more poles **[1, 2006.01]**

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 **[1, 2006.01]**

33/88 • adapted for simultaneous co-operation with two or more identical counterparts **[1, 2006.01]**

33/90 • adapted for co-operation with two or more dissimilar counterparts **[1, 2006.01]**

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 **[1, 2006.01]**

33/94 • Holders formed as intermediate parts for linking a counter-part to a coupling part **[1, 2006.01]**

33/945 • Holders with built-in electrical component **[4, 2006.01]**

33/95 • • with fuse; with thermal switch **[4, 2006.01]**

33/955 • • with switch operated manually and independent of engagement or disengagement of coupling **[4, 2006.01]**

33/96 • • with switch operated by engagement or disengagement of coupling **[4, 2006.01]**

33/965 • Dustproof, splashproof, drip-proof, waterproof, or flameproof holders **[4, 2006.01]**

33/97 • Holders with separate means to prevent loosening of the coupling or unauthorised removal of apparatus held **[4, 2006.01]**

33/975 • Holders with resilient means for protecting apparatus against vibrations or shocks **[4, 2006.01]**

35/00 Flexible or turnable line connectors (rotary current collectors, distributors H01R 39/00) **[1, 2006.01]**

35/02 • Flexible line connectors **[4, 2006.01]**

35/04 • Turnable line connectors with limited rotation angle **[4, 2006.01]**

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) **[1, 2006.01]**

39/02 • Details **[1, 2006.01]**

39/04 • • Commutators (wherein the segments are formed by extensions of dynamo-electric machine winding H02K) **[1, 2006.01]**

39/06 • • • other than with external cylindrical contact surface, e.g. flat commutators **[1, 2006.01]**

39/08 • • Slip-rings **[1, 2006.01]**

39/10 • • • other than with external cylindrical contact surface, e.g. flat slip-rings **[1, 2006.01]**

39/12 • • • using bearing or shaft surface as contact surface **[1, 2006.01]**

39/14 • • Fastenings of commutators or slip-rings to shafts **[1, 2006.01]**

39/16 • • • by means of moulded or cast material applied during or after assembly **[1, 2006.01]**

39/18 • • Contacts for co-operation with commutator or slip-ring, e.g. contact brush **[1, 2006.01]**

39/20 • • • characterised by the material thereof **[1, 2006.01]**

39/22 • • • • incorporating lubricating or polishing ingredient **[1, 2006.01]**

39/24 • • • Laminated contacts; Wire contacts, e.g. metallic brush, carbon fibres **[1, 2006.01]**

39/26 • • • Solid sliding contacts, e.g. carbon brush **[1, 2006.01]**

39/27 • • • • End caps on carbon brushes to transmit spring pressure **[1, 2006.01]**

39/28 • • • Roller contacts; Ball contacts **[1, 2006.01]**

39/30 • • • Liquid contacts **[1, 2006.01]**

39/32 • • Connections of conductor to commutator segment **[1, 2006.01]**

39/34 • • Connections of conductor to slip-ring **[1, 2006.01]**

39/36 • • Connections of cable or wire to brush **[1, 2006.01]**

39/38 • • Brush holders **[1, 2006.01]**

39/39 • • • wherein the brush is fixedly mounted in the holder **[1, 2006.01]**

39/40 • • • enabling brush movement within holder during current collection **[1, 2006.01]**

39/41 • • • cartridge type **[1, 2006.01]**

39/415 • • • • with self-recoiling spring **[4, 2006.01]**

39/42 • • Devices for lifting brushes **[1, 2006.01]**

39/44 • • Devices for shifting brushes **[1, 2006.01]**

39/46 • • Auxiliary means for improving current transfer, or for reducing or preventing sparking or arcing **[1, 2006.01]**

39/48 • • • by air blast; by surrounding collector with non-conducting liquid or gas **[1, 2006.01]**

39/50 • • • Barriers placed between brushes **[1, 2006.01]**

39/52 • • • by use of magnets **[1, 2006.01]**

39/54 • • • by use of impedance between brushes or segments **[1, 2006.01]**

39/56 • • Devices for lubricating or polishing slip-rings or commutators during operation of the collector **[1, 2006.01]**

39/58 • • Means structurally associated with the current collector for indicating condition thereof, e.g. for indicating brush wear **[1, 2006.01]**

39/59 • • Means structurally associated with the brushes for interrupting current (H01R 39/58 takes precedence) **[4, 2006.01]**

39/60 • Devices for interrupted current collection, e.g. commutating device, distributor, interrupter (self-interrupters H01H, e.g. H01H 51/34) **[1, 2006.01]**

39/62 • • with more than one brush co-operating with the same set of segments **[1, 2006.01]**

39/64 • Devices for uninterrupted current collection **[1, 2006.01]**

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) **[1, 2006.01]**

41/02 • Devices for interrupted current collection, e.g. distributor (electrically-operated selector switches H01H 67/00) **[1, 2006.01]**

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) **[1, 2006.01]**

43/01 • for connecting unstripped conductors to contact members having insulation cutting edges **[4, 2006.01]**

43/02 • for soldered or welded connections (soldering or welding in general B23K) **[1, 2006.01]**

43/027 • for connecting conductors by clips **[4, 2006.01]**

43/033 • for wrapping or unwrapping wire connections **[4, 2006.01]**

43/04 • for forming connections by deformation, e.g. crimping tool **[1, 2006.01]**

43/042 • • Hand tools for crimping **[4, 2006.01]**

43/045 • • • with contact member feeding mechanism **[4, 2006.01]**

43/048 • • Crimping apparatus or processes (H01R 43/042 takes precedence) **[4, 2006.01]**

43/05 • • • with wire-insulation stripping **[4, 2006.01]**

43/052 • • • with wire-feeding mechanism **[4, 2006.01]**

43/055 • • • with contact member feeding mechanism **[4, 2006.01]**

43/058 • • Crimping mandrels **[4, 2006.01]**

43/06 • Manufacture of commutators **[1, 2006.01]**

43/08 • • in which segments are not separated until after assembly **[1, 2006.01]**

43/10 • Manufacture of slip-rings **[1, 2006.01]**

43/12 • Manufacture of brushes **[1, 2006.01]**

43/14 • Maintenance of current collectors, e.g. reshaping of brushes, cleaning of commutators **[1, 2006.01]**

43/16 • for manufacturing contact members, e.g. by punching and by bending **[4, 2006.01]**

43/18 • for manufacturing bases or cases for contact members **[4, 2006.01]**

43/20 • for assembling or disassembling contact members with insulating base, case or sleeve **[4, 2006.01]**

43/22 • • Hand tools **[4, 2006.01]**

43/24 • • Assembling by moulding on contact members **[4, 2006.01]**

43/26 • for engaging or disengaging the two parts of a coupling device (structural association with coupling device H01R 13/629) **[4, 2006.01]**

43/28 • for wire processing before connecting to contact members (H01R 43/02-H01R 43/26 take precedence) **[4, 2006.01]**

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, 2006.01]

103/00 Two poles [7, 2006.01]

105/00 Three poles [7, 2006.01]

107/00 Four or more poles [7, 2006.01]

H01S DEVICES USING STIMULATED EMISSION

Note(s) [2]

This subclass covers:

- devices for the generation or amplification, by using stimulated emission, of coherent electromagnetic waves or other forms of wave energy;
- such functions as modulating, demodulating, controlling, or stabilising such waves.

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, 2006.01]

1/02 • solid **[1, 2006.01]**

1/04 • liquid **[1, 2006.01]**

1/06 • gaseous **[1, 2006.01]**

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) **[1, 2006.01]**

3/02 • Constructional details **[1, 2006.01]**

3/03 • • of gas laser discharge tubes **[2, 2006.01]**

3/032 • • • for confinement of the discharge, e.g. by special features of the discharge constricting tube **[5, 2006.01]**

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, 2006.01]**

3/036 • • • Means for obtaining or maintaining the desired gas pressure within the tube, e.g. by gettering or replenishing; Means for circulating the gas, e.g. for equalising the pressure within the tube **[5, 2006.01]**

3/038 • • • Electrodes, e.g. special shape, configuration or composition **[5, 2006.01]**

3/04 • • Cooling arrangements **[1, 2006.01]**

3/041 • • • for gas lasers **[5, 2006.01]**

3/042 • • • for solid state lasers **[5, 2006.01]**

3/05 • Construction or shape of optical resonators; Accommodation of active medium therein; Shape of active medium **[1, 2006.01]**

3/06 • • Construction or shape of active medium **[1, 2006.01]**

3/063 • • • Waveguide lasers, e.g. laser amplifiers **[7, 2006.01]**

3/067 • • • • Fibre lasers **[7, 2006.01]**

3/07 • • • consisting of a plurality of parts, e.g. segments (H01S 3/067 takes precedence) **[2, 7, 2006.01]**

3/08 • • Construction or shape of optical resonators or components thereof **[1, 2, 2006.01]**

3/081 • • • comprising more than two reflectors **[2, 2006.01]**

3/082 • • • • defining a plurality of resonators, e.g. for mode selection **[2, 2006.01]**

3/083 • • • • Ring lasers **[2, 2006.01]**

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, 2006.01]**

3/09 • Processes or apparatus for excitation, e.g. pumping **[1, 2006.01]**

3/091 • • using optical pumping **[2, 2006.01]**

3/0915 • • • by incoherent light **[5, 2006.01]**

3/092 • • • • of flash lamp (H01S 3/0937 takes precedence) **[2, 5, 2006.01]**

3/093 • • • • • focusing or directing the excitation energy into the active medium **[2, 5, 2006.01]**

3/0933 • • • • of a semiconductor, e.g. light emitting diode **[5, 2006.01]**

3/0937 • • • • produced by exploding or combustible material **[5, 2006.01]**

3/094 • • • by coherent light **[2, 2006.01]**

3/0941 • • • • of a semiconductor laser, e.g. of a laser diode **[6, 2006.01]**

3/0943 • • • • of a gas laser **[5, 2006.01]**

3/0947 • • • • of an organic dye laser **[5, 2006.01]**

3/095 • • using chemical or thermal pumping **[2, 2006.01]**

3/0951 • • • by increasing the pressure in the laser gas medium **[5, 2006.01]**

3/0953 • • • • Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds **[5, 2006.01]**

3/0955 • • using pumping by high energy particles **[5, 2006.01]**

3/0957 • • • by high energy nuclear particles **[5, 2006.01]**

3/0959 • • • by an electron beam **[5, 2006.01]**

3/097 • • by gas discharge of a gas laser **[2, 2006.01]**

3/0971 • • • transversely excited (H01S 3/0975 takes precedence) **[5, 2006.01]**

3/0973 • • • • having a travelling wave passing through the active medium **[5, 2006.01]**

3/0975 • • • using inductive or capacitive excitation **[5, 2006.01]**

3/0977 • • • having auxiliary ionisation means **[5, 2006.01]**

3/0979 • • • Gas dynamic lasers, i.e. with expansion of the laser gas medium to supersonic flow speeds **[5, 2006.01]**

3/098 • Mode locking; Mode suppression (mode suppression using a plurality of resonators H01S 3/082) **[2, 2006.01]**

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) **[1, 2, 2006.01]**

3/101 • • Lasers provided with means to change the location from which, or the direction in which, laser radiation is emitted **[2, 2006.01]**

3/102 • • by controlling the active medium, e.g. by controlling the processes or apparatus for excitation (H01S 3/13 takes precedence) **[4, 2006.01]**

3/104 • • • in gas lasers **[4, 2006.01]**

3/105 • • by controlling the mutual position or the reflecting properties of the reflectors of the cavity (H01S 3/13 takes precedence) **[4, 2006.01]**

3/1055 • • • one of the reflectors being constituted by a diffraction grating **[4, 2006.01]**

3/106 • • by controlling a device placed within the cavity (H01S 3/13 takes precedence) **[4, 2006.01]**

3/107 • • • using an electro-optical device, e.g. exhibiting Pockels- or Kerr-effect **[4, 2006.01]**

3/108 • • • using a non-linear optical device, e.g. exhibiting Brillouin- or Raman-scattering **[4, 2006.01]**

3/109 • • • • Frequency multiplying, e.g. harmonic generation **[4, 2006.01]**

3/11 • • in which the quality factor of the optical resonator is rapidly changed, i.e. giant-pulse technique **[1, 2006.01]**

3/113 • • • using bleachable or solarising media **[2, 2006.01]**

3/115 • • • using an electro-optical device **[4, 2006.01]**

3/117 • • • using an acousto-optical device **[4, 2006.01]**

3/121 • • • using a mechanical device **[4, 2006.01]**

3/123 • • • • Rotating mirror **[4, 2006.01]**

3/125 • • • • Rotating prism **[4, 2006.01]**

3/127 • • • Plural Q-switches **[4, 2006.01]**

3/13 • • Stabilisation of laser output parameters, e.g. frequency, amplitude **[2, 2006.01]**

3/131 • • • by controlling the active medium, e.g. by controlling the processes or apparatus for excitation **[4, 2006.01]**

3/134 • • • • in gas lasers **[4, 2006.01]**

3/136 • • • by controlling a device placed within the cavity **[4, 2006.01]**

3/137 • • • • for stabilising of frequency **[4, 2006.01]**

3/139 • • • by controlling the mutual position or the reflecting properties of the reflectors of the cavity **[4, 2006.01]**

3/14 • characterised by the material used as the active medium **[1, 2006.01]**

3/16 • • Solid materials **[1, 2006.01]**

3/17 • • • amorphous, e.g. glass **[2, 2006.01]**

3/20 • • Liquids **[1, 2006.01]**

3/207 • • • including a chelate **[5, 2006.01]**

3/213 • • • including an organic dye **[5, 2006.01]**

3/22 • • Gases **[1, 2006.01]**

3/223 • • • the active gas being polyatomic, i.e. containing more than one atom (H01S 3/227 takes precedence) **[2, 5, 2006.01]**

3/225 • • • • comprising an excimer or exciplex **[5, 2006.01]**

3/227 • • • Metal vapour **[5, 2006.01]**

3/23 • Arrangement of two or more lasers not provided for in groups H01S 3/02-H01S 3/14, e.g. tandem arrangement of separate active media (involving only semiconductor lasers H01S 5/40) **[2, 7, 2006.01]**

3/30 • using scattering effects, e.g. stimulated Brillouin or Raman effects **[2, 2006.01]**

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 [1, 2006.01]

5/00 Semiconductor lasers [7, 2006.01]

Note(s) [2010.01]

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. In this group, the Periodic System used is the 8 group system indicated by Roman numerals in the Periodic Table thereunder.

5/02 • Structural details or components not essential to laser action **[7, 2006.01]**

5/022 • • Mountings; Housings **[7, 2006.01]**

5/024 • • Cooling arrangements **[7, 2006.01]**

5/026 • • Monolithically integrated components, e.g. waveguides, monitoring photo-detectors or drivers (stabilisation of output H01S 5/06) **[7, 2006.01]**

5/028 • • Coatings **[7, 2006.01]**

5/04 • Processes or apparatus for excitation, e.g. pumping (H01S 5/06 takes precedence) **[7, 2006.01]**

5/042 • • Electrical excitation **[7, 2006.01]**

5/06 • Arrangements for controlling the laser output parameters, e.g. by operating on the active medium **[7, 2006.01]**

5/062 • • by varying the potential of the electrodes (H01S 5/065 takes precedence) **[7, 2006.01]**

5/0625 • • • in multi-section lasers **[7, 2006.01]**

5/065 • • Mode locking; Mode suppression; Mode selection **[7, 2006.01]**

5/068 • • Stabilisation of laser output parameters (H01S 5/0625 takes precedence) **[7, 2006.01]**

5/0683 • • • by monitoring the optical output parameters **[7, 2006.01]**

5/0687 • • • • Stabilising the frequency of the laser **[7, 2006.01]**

5/10 • Construction or shape of the optical resonator **[7, 2006.01]**

5/12 • • the resonator having a periodic structure, e.g. in distributed feed-back [DFB] lasers (H01S 5/18 takes precedence) **[7, 2006.01]**

5/125 • • • Distributed Bragg reflector [DBR] lasers **[7, 2006.01]**

5/14 • • External cavity lasers (H01S 5/18 takes precedence; mode locking H01S 5/065) **[7, 2006.01]**

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, 2006.01]**

5/18 • • Surface-emitting [SE] lasers **[7, 2006.01]**

5/183 • • • having a vertical cavity [VCSE-lasers] **[7, 2006.01]**

5/187 • • • using a distributed Bragg reflector [SE-DBR-lasers] (H01S 5/183 takes precedence) **[7, 2006.01]**

5/20 • Structure or shape of the semiconductor body to guide the optical wave **[7, 2006.01]**

5/22 • • having a ridge or a stripe structure **[7, 2006.01]**
5/223 • • • Buried stripe structure (H01S 5/227 takes precedence) **[7, 2006.01]**
5/227 • • • Buried mesa structure **[7, 2006.01]**
5/24 • • having a grooved structure, e.g. V-grooved **[7, 2006.01]**
5/30 • Structure or shape of the active region; Materials used for the active region **[7, 2006.01]**
5/32 • • comprising PN junctions, e.g. hetero- or double-hetero-structures (H01S 5/34, H01S 5/36 take precedence) **[7, 2006.01]**
5/323 • • • in $A_{III}B_{V}$ compounds, e.g. AlGaAs-laser **[7, 2006.01]**
5/327 • • • in $A_{II}B_{VI}$ compounds, e.g. ZnCdSe-laser **[7, 2006.01]**
5/34 • • comprising quantum well or superlattice structures, e.g. single quantum well lasers [SQW-lasers], multiple quantum well lasers [MQW-lasers] or graded index separate confinement heterostructure lasers [GRINSCH-lasers] (H01S 5/36 takes precedence) **[7, 2006.01]**
5/343 • • • in $A_{III}B_{V}$ compounds, e.g. AlGaAs-laser **[7, 2006.01]**
5/347 • • • in $A_{II}B_{VI}$ compounds, e.g. ZnCdSe-laser **[7, 2006.01]**
5/36 • • comprising organic materials **[2006.01]**
5/40 • Arrangement of two or more semiconductor lasers, not provided for in groups H01S 5/02-H01S 5/30 (H01S 5/50 takes precedence) **[7, 2006.01]**
5/42 • • Arrays of surface emitting lasers **[7, 2006.01]**
5/50 • Amplifier structures not provided for in groups H01S 5/02-H01S 5/30 **[7, 2006.01]**

H01T SPARK GAPS; OVERVOLTAGE ARRESTERS USING SPARK GAPS; SPARKING PLUGS; CORONA DEVICES; GENERATING IONS TO BE INTRODUCED INTO NON-ENCLOSED GASES (overvoltage protection circuits H02H)

Note(s) [4]

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.

Subclass index

1/00 Details of spark gaps [1, 2006.01]
1/02 • Means for extinguishing arc **[1, 2006.01]**
1/04 • • using magnetic blow-out **[1, 2006.01]**
1/06 • • • with permanent magnet **[1, 2006.01]**
1/08 • • using flow of arc-extinguishing fluid **[1, 2006.01]**
1/10 • • • with extinguishing fluid evolved from solid material by heat of arc **[1, 2006.01]**
1/12 • Means structurally associated with spark gap for recording operation thereof **[1, 2006.01]**
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; emergency protective circuit arrangements for spark gap arresters H02H 7/24) **[1, 4, 2006.01]**
1/15 • for protection against excessive pressure **[4, 2006.01]**
1/16 • Series resistor structurally associated with spark gap **[1, 2006.01]**
1/18 • Electrolytic device structurally associated with spark gap **[1, 2006.01]**
1/20 • Means for starting arc or facilitating ignition of spark gap **[3, 2006.01]**
1/22 • • by the shape or the composition of the electrodes **[4, 2006.01]**
1/24 • Selection of materials for electrodes (H01T 1/22 takes precedence) **[4, 2006.01]**

2/00 Spark gaps comprising auxiliary triggering means (triggering circuits H01T 15/00) **[4, 2006.01]**
2/02 • comprising a trigger electrode or an auxiliary spark gap **[4, 2006.01]**

4/00 Overvoltage arresters using spark gaps (H01T 2/00 takes precedence; overvoltage protection circuits using spark gaps H02H 9/06) **[4, 2006.01]**
4/02 • Details **[4, 2006.01]**
4/04 • Housings (H01T 4/06 takes precedence) **[4, 2006.01]**
4/06 • Mounting arrangements for a plurality of overvoltage arresters **[4, 2006.01]**
4/08 • structurally associated with protected apparatus (with switches H01H 9/14; with fuses H01H 85/44) **[4, 2006.01]**
4/10 • having a single gap or a plurality of gaps in parallel **[4, 2006.01]**
4/12 • • hermetically sealed **[4, 2006.01]**

4/14 • • Arcing horns (associated with insulators H01B 17/46) **[4, 2006.01]**
4/16 • having a plurality of gaps arranged in series **[4, 2006.01]**
4/18 • • Arrangements for reducing height of stacked spark gaps **[4, 2006.01]**
4/20 • • Arrangements for improving potential distribution **[4, 2006.01]**

7/00 Rotary spark gaps, i.e. devices having one or more rotating electrodes [1, 2006.01]

9/00 Spark gaps specially adapted for generating oscillations [1, 2006.01]

11/00 Spark gaps specially adapted as rectifiers [1, 2006.01]

13/00 Sparking plugs [1, 2006.01]
13/02 • Details **[1, 2006.01]**
13/04 • • Means providing electrical connection to sparking plug (electric connections in general H01R) **[1, 2006.01]**
13/05 • • • combined with interference suppressing or shielding means **[4, 2006.01]**
13/06 • • Covers forming a part of the plug and protecting it against adverse environment **[1, 2006.01]**
13/08 • • Mounting, fixing, or sealing of sparking plugs, e.g. in combustion chamber **[1, 2006.01]**
13/10 • • • by bayonet-type connection **[1, 2006.01]**
13/12 • • Means on sparking plugs for facilitating engagement by tool or by hand **[1, 2006.01]**
13/14 • • Means for self-cleaning **[1, 2006.01]**
13/16 • • Means for dissipating heat **[1, 2006.01]**
13/18 • • Means for heating, e.g. for drying **[1, 2006.01]**
13/20 • characterised by features of the electrodes or insulation **[1, 2006.01]**
13/22 • • having two or more electrodes embedded in insulation (for two or more sparks H01T 13/46) **[1, 2006.01]**
13/24 • • having movable electrodes (H01T 13/28 takes precedence) **[1, 2006.01]**
13/26 • • • for adjusting spark gap otherwise than by bending of electrode **[1, 2006.01]**
13/28 • • having spherically shaped electrodes, e.g. ball-shaped **[1, 2006.01]**
13/30 • • • mounted so as to permit free movement **[1, 2006.01]**
13/32 • • characterised by features of the earthed electrode **[1, 2006.01]**
13/34 • • characterised by the mounting of electrodes in insulation, e.g. by embedding **[1, 2006.01]**
13/36 • • characterised by the joint between insulation and body, e.g. using cement **[1, 2006.01]**
13/38 • • Selection of materials for insulation **[1, 2006.01]**
13/39 • • Selection of materials for electrodes **[4, 2006.01]**
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) **[1, 2006.01]**
13/41 • • with interference suppressing or shielding means **[4, 2006.01]**
13/42 • • with magnetic spark generators **[1, 2006.01]**
13/44 • • with transformers, e.g. for high-frequency ignition **[1, 2006.01]**
13/46 • having two or more spark gaps **[1, 2006.01]**
13/48 • having means for rendering sparks visible **[1, 2006.01]**
13/50 • having means for ionisation of gap (H01T 13/52 takes precedence) **[1, 4, 2006.01]**
13/52 • characterised by a discharge along a surface **[1, 2006.01]**
13/54 • having electrodes arranged in a partly-enclosed ignition chamber **[1, 2006.01]**
13/56 • characterised by having component parts which are easily assembled or disassembled **[1, 2006.01]**
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-H01T 13/00 (devices providing for corona discharge H01T 19/00) **[4, 2006.01]**

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) **[1, 4, 2006.01]**

19/00 Devices providing for corona discharge (for charging electrographic elements G03G 15/02) **[1, 4, 2006.01]**
19/02 • Corona rings **[1, 2006.01]**
19/04 • having pointed electrodes **[1, 2006.01]**

21/00 Apparatus or processes specially adapted for the manufacture or maintenance of spark gaps or sparking plugs [1, 2006.01]
21/02 • of sparking plugs **[1, 2006.01]**
21/04 • • Cleaning (means for self-cleaning H01T 13/14; abrasive blasting devices for cleaning sparking plugs B24C 3/34) **[1, 2006.01]**
21/06 • Adjustment of spark gaps (sparking plugs having movable electrodes for adjusting the gap H01T 13/26) **[4, 2006.01]**

23/00 Apparatus for generating ions to be introduced into non-enclosed gases, e.g. into the atmosphere [4, 2006.01]