SECTION H — ELECTRICITY

H01 BASIC ELECTRIC ELEMENTS

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

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.

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

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

Note(s)

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

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

1/04 • • • • metals or alloys **[6]**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1/14 • • • • metals or alloys **[6]**

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

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

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

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

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

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

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

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

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

1/33 • • • • mixtures of metallic and non-metallic particles; metallic particles having oxide skin **[6]**
1/34 • • • • non-metallic substances, e.g. ferrites **[6]**
1/36 • • • • • in the form of particles **[6]**
1/37 • • • • • • in a bonding agent **[6]**
1/375 • • • • • • • Flexible bodies **[6]**
1/38 • • • • • amorphous, e.g. amorphous oxides **[6]**
1/40 • • of magnetic semiconductor materials, e.g. $CdCr_2S_4$ **[6]**
1/42 • of organic or organo-metallic materials (H01F 1/44 takes precedence) **[6]**
1/44 • of magnetic liquids, e.g. ferrofluids **[6]**

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

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

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

7/00 Magnets (superconducting magnets H01F 6/00)
7/02 • Permanent magnets
7/04 • • Means for releasing the attractive force
7/06 • Electromagnets; Actuators including electromagnets **[6]**
7/08 • • with armatures
7/10 • • • specially adapted for ac
7/11 • • • • reducing or eliminating the effects of eddy currents **[6]**
7/12 • • • • having anti-chattering arrangements
7/121 • • • Guiding or setting position of armatures, e.g. retaining armatures in their end position **[6]**
7/122 • • • • by permanent magnet **[6]**
7/123 • • • • by ancillary coil **[6]**
7/124 • • • • by mechanical latch, e.g. detent **[6]**
7/126 • • • Supporting or mounting **[6]**
7/127 • • • Assembling **[6]**
7/128 • • • Encapsulating, encasing or sealing **[6]**
7/129 • • • • of armatures **[6]**
7/13 • • • characterised by pulling-force characteristic
7/14 • • • Pivoting armatures (H01F 7/17 takes precedence) **[6]**
7/16 • • • Rectilinearly-movable armatures (H01F 7/17 takes precedence) **[6]**
7/17 • • • Pivoting and rectilinearly-movable armatures **[6]**
7/18 • • • Circuit arrangements for obtaining desired operating characteristics, e.g. for slow operation, for sequential energisation of windings, for high-speed energisation of windings
7/20 • • without armatures

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

13/00 Apparatus or processes for magnetising or demagnetising

Note(s)

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
17/02 • without magnetic core
17/03 • • with ceramic former
17/04 • with magnetic core
17/06 • • with core substantially closed in itself, e.g. toroid
17/08 • • • Loading coils for telecommunication circuits

19/00 Fixed transformers or mutual inductances of the signal type (H01F 36/00 takes precedence) **[3]**
19/02 • Audio-frequency transformers or mutual inductances, i.e. not suitable for handling frequencies considerably beyond the audio range
19/04 • Transformers or mutual inductances suitable for handling frequencies considerably beyond the audio range
19/06 • • Broad-band transformers, e.g. suitable for handling frequencies well down into the audio range
19/08 • • Transformers having magnetic bias, e.g. for handling pulses

21/00 Variable inductances or transformers of the signal type (H01F 36/00 takes precedence) **[3]**
21/02 • continuously variable, e.g. variometers
21/04 • • by relative movement of turns or parts of windings
21/06 • • by movement of core or part of core relative to the windings as a whole
21/08 • • by varying the permeability of the core, e.g. by varying magnetic bias
21/10 • • by means of a movable shield
21/12 • discontinuously variable, e.g. tapped

27/00 Details of transformers or inductances, in general [6]
27/02 • Casings
27/04 • • Leading of conductors or axles through casings, e.g. for tap-changing arrangements
27/06 • Mounting, supporting, or suspending transformers, reactors, or choke coils
27/08 • Cooling; Ventilating
27/10 • • Liquid cooling
27/12 • • • Oil cooling
27/14 • • • • Expansion chambers; Oil conservators; Gas cushions; Arrangements for purifying, drying, or filling
27/16 • • • Water cooling
27/18 • • • by evaporating liquids
27/20 • • Cooling by special gases or non-ambient air
27/22 • • Cooling by heat conduction through solid or powdered fillings
27/23 • Corrosion protection **[6]**
27/24 • Magnetic cores
27/245 • • made from sheets, e.g. grain-oriented (H01F 27/26 takes precedence) **[5]**
27/25 • • made from strips or ribbons (H01F 27/26 takes precedence) **[5]**
27/255 • • made from particles (H01F 27/26 takes precedence) **[5]**
27/26 • • Fastening parts of the core together; Fastening or mounting the core on casing or support
27/28 • Coils; Windings; Conductive connections
27/29 • • Terminals; Tapping arrangements **[6]**
27/30 • • Fastening or clamping coils, windings, or parts thereof together; Fastening or mounting coils or windings on core, casing, or other support
27/32 • • Insulating of coils, windings, or parts thereof
27/33 • Arrangements for noise damping
27/34 • Special means for preventing or reducing unwanted electric or magnetic effects, e.g. no-load losses, reactive currents, harmonics, oscillations, leakage fields
27/36 • • Electric or magnetic shields or screens (movable for varying inductance H01F 21/10) **[6]**
27/38 • • Auxiliary core members; Auxiliary coils or windings
27/40 • Structural association with built-in electric component, e.g. fuse
27/42 • Circuits specially adapted for the purpose of modifying, or compensating for, electric characteristics of transformers, reactors or choke coils **[6]**

29/00 Variable transformers or inductances not covered by group H01F 21/00
29/02 • with tappings on coil or winding; with provision for rearrangement or interconnection of windings
29/04 • • having provision for tap-changing without interrupting the load current
29/06 • with current collector gliding or rolling on or along winding
29/08 • with core, coil, winding, or shield movable to offset variation of voltage or phase shift, e.g. induction regulators
29/10 • • having movable part of magnetic circuit
29/12 • • having movable coil, winding, or part thereof; having movable shield
29/14 • with variable magnetic bias

30/00 Fixed transformers not covered by group H01F 19/00 [6]
30/02 • Auto-transformers **[6]**
30/04 • having two or more secondary windings, each supplying a separate load, e.g. for radio set power supplies **[6]**
30/06 • characterised by the structure **[6]**
30/08 • • without magnetic core **[6]**
30/10 • • Single-phase transformers (H01F 30/16 takes precedence) **[6]**
30/12 • • Two-phase, three-phase or polyphase transformers **[6]**
30/14 • • • for changing the number of phases **[6]**
30/16 • • Toroidal transformers **[6]**

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

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

38/00 Adaptations of transformers or inductances for specific applications or functions [6]
38/02 • for non-linear operation **[6]**
38/04 • • for frequency changing **[6]**
38/06 • • for changing the wave shape **[6]**
38/08 • High-leakage transformers or inductances **[6]**
38/10 • • Ballasts, e.g. for discharge lamps **[6]**
38/12 • Ignition, e.g. for IC engines **[6]**
38/14 • Inductive couplings **[6]**
38/16 • Cascade transformers, e.g. for use with extra high tension **[6]**
38/18 • Rotary transformers **[6]**
38/20 • Instrument transformers **[6]**
38/22 • • for single phase ac **[6]**
38/24 • • • Voltage transformers **[6]**
38/26 • • • • Constructions **[6]**
38/28 • • • Current transformers **[6]**
38/30 • • • • Constructions **[6]**
38/32 • • • • Circuit arrangements **[6]**
38/34 • • • Combined voltage and current transformers **[6]**
38/36 • • • • Constructions **[6]**
38/38 • • for polyphase ac **[6]**
38/40 • • for dc **[6]**
38/42 • Flyback transformers **[6]**

41/00 Apparatus or processes specially adapted for manufacturing or assembling the devices covered by this subclass
41/02 • for manufacturing cores, coils or magnets (H01F 41/14 takes precedence) **[3]**
41/04 • • for manufacturing coils
41/06 • • • Winding
41/08 • • • • Winding conductors on to or threading conductors through cores or formers which are closed in themselves, e.g. toroids

41/10 • • • Connecting leads to windings
41/12 • • • Insulating of windings
41/14 • for applying magnetic films to substrates **[3]**

Note(s)

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