H01F MAGNETS; INDUCTANCES; TRANSFORMERS; SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES (ceramics based on ferrites C04B 35/26; alloys C22C; construction of loading coils H01B; thermomagnetic devices H01L 37/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R)

NOTE
In this subclass, inductances and transformers are regarded as being "for power supply" if they are intended for this purpose even in systems operating at frequencies above 60 cycles/sec.

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

1/009 . [Antiferromagnetic materials, i.e. materials exhibiting a Neéel transition temperature (H01F 1/0036 takes precedence)]

WARNING
This group is not complete pending the completion of reclassification; see provisionally also H01F 1/00 - H01F 1/447

1/0018 . [Diamagnetic or paramagnetic materials, i.e. materials with low susceptibility and no hysteresis (H01F 1/0036 takes precedence)]

1/0027 . [Thick magnetic films (forming thick magnetic films H01F 41/16; magnetic record carriers G11B 5/70)]

NOTE
Group H01F 1/0036 takes precedence over groups H01F 1/09, H01F 1/11, H01F 1/20, H01F 1/33 and H01F 1/36

1/0036 . [showing low dimensional magnetism, i.e. spin rearrangements due to a restriction of dimensions, e.g. showing giant magnetoresistivity, (H01F 1/153, H01F 1/42 and H01F 10/00 take precedence; magnetoresistive sensors G01D 5/16, G01R 33/06; magnetoresistive recording G11B 5/39; magnetic-field-controlled resistors H01L 43/08)]

1/0045 . [Zero dimensional, e.g. nanoparticles, soft nanoparticles for medical/biological use (preparation of fullerenes in general C01B 32/15)]

1/0054 . [Coated nanoparticles, e.g. nanoparticles coated with organic surfactant]

1/0063 . [in a non-magnetic matrix, e.g. granular solids (granular films H01F 10/007)]

1/0072 . [one dimensional, i.e. linear or dendritic nanostructures]

1/0081 . [in a non-magnetic matrix, e.g. Fe-nanowires in a nanoporous membrane]
particles; metallic particles having oxide skin
mixtures of metallic and non-metallic
 carriers G11B 5/70605
(H01F 1/047 takes precedence)

Taking precedence {; record carriers G11B 5/70626)

{with a non-magnetic core}

{with a skin (H01F 1/113 takes precedence)}

in a bonding agent

Flexible bodies

of soft-magnetic materials

metals or alloys

in the form of wires (H01F 1/147 takes precedence)

Alloys characterised by their composition
((treatment therefor of enhancing their electromagnetic properties C21D 8/12))

NOTE

In groups H01F 1/14708 - H01F 1/15391, an alloy is classified in the last appropriate place

[Fe-Ni based alloys (pure Fe or Ni H01F 1/14, H01F 1/16 or H01F 1/20)]

{in the form of sheets}

{with insulating coating}

{in the form of particles}

{pressed, sintered or bonded together}

{the particles being insulated}

(by macromolecular organic substances)

[Fe-Si based alloys]

{in the form of sheets}

{with insulating coating}

[Fe-Si-Al based alloys, e.g. Sendust]

Amorphous metallic alloys, e.g. glassy metals ((making ferrous amorphous alloys C22C 33/003))

(based on Fe/Ni (H01F 1/15325 takes precedence))

(based on Fe/Ni (H01F 1/15325 takes precedence))

(based on Co (H01F 1/15325 takes precedence))

(containing rare earths)

(containing nanocrystallites, e.g. obtained by annealing)

(Preparation processes therefor)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)

(sintered)

(by powder metallurgy, e.g. spark erosion)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)

(sintered)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)

(sintered)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)

(sintered)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)

(sintered)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)

(sintered)

(by powder metallurgy, e.g. spark erosion)

(Making agglomerates therefrom, e.g. by pressing)

(using a binder)

(using polymers)

(Applying coatings thereon (H01F 1/15366 takes precedence))

(Elongated structures, e.g. wires)

in the form of sheets (H01F 1/147 takes precedence)

with insulating coating

in the form of particles, e.g. powder

(bonded together)
... the particles being insulated

by macromolecular or organic substances

dispersed or suspended in a bonding agent

mixtures of metallic and non-metallic particles; metallic particles having oxide skin

non-metallic substances, e.g. ferrites

{Oxides \( \text{H01F 1/36 and H01F 1/38 take precedence} \)}

{Ferrites, e.g. having a cubic spinel structure \( (X2+O)\)\(Y23+O3 \), e.g. magnetite \( \text{Fe}_3\text{O}_4 \)}

\{[(\text{TO4}) 3] \) with T= Si, Al, Fe, Ga \( \text{(H01F 10/24 takes precedence; Faraday rotators G02F 1/09)} \}

{Hexaferrites with decreased hardness or anisotropy, i.e. with increased permeability in the microwave \( (\text{GHz}) \) range, e.g. having a hexagonal crystallographic structure \}

in the form of particles \{ \( \text{H01F 1/34, H01F 1/348 and H01F 1/38 take precedence} \) \}

in a bonding agent

Flexible bodies

amorphous, e.g. amorphous oxides

of magnetic semiconductor materials, e.g. \( \text{CdCr}_2\text{S}_4 \) (devices using galvano-magnetic or similar effects \( \text{H01L 43/00} \))

\{diluted\}

\textbf{NOTE}

In group \( \text{H01F 1/401} \), a diluted magnetic semiconductor (DMS) is classified in the last appropriate place

\text{[of II-VI type, e.g. Zn}\(\text{1-x Cr}_x\text{Se} \}]

\text{[of III-V type, e.g. In}\(\text{1-x Mnx As} \}]

\text{[of IV type, e.g. Ge}\(\text{1-x Mnx} \}]

\{Diluted non-magnetic ions in a magnetic cation-sublattice, e.g. perovskites, La\(\text{1-x (Ba,Sn)x} \text{MnO3} \}]

\{half-metallic, i.e. having only one electronic spin direction at the Fermi level, e.g. \( \text{CrO}_2 \), Heusler alloys \( \text{H01F 10/1936 takes precedence} \)\}

of organic or organo-metallic materials \{, e.g. graphene\} \( \text{H01F 1/44 takes precedence} \)

of magnetic liquids, e.g. ferrofluids \{particles in a bonding agent \( \text{H01F 1/28, H01F 1/36, H01F 1/371} \)\}

\{the magnetic component being a metal or alloy, e.g. Fe \( \text{H01F 1/447 takes precedence} \)\}

\{the magnetic component being a compound, e.g. \( \text{Fe}_3\text{O}_4 \) \( \text{H01F 1/447 takes precedence} \)\}

\{characterised by magnetoviscosity, e.g. magnetoreheological, magnetothixotropic, magnetodilatant liquids (electrorheological fluids \( \text{Cl0M 17/001} \)\}

Cores, Yokes, or armatures \{magnetic materials \( \text{H01F 1/00; permanent magnets \text{H01F 7/02}} \)\}
7/00 Magnets (superconducting magnets H01F 6/00; for separation of solid materials or fluids B03C 1/00; for bench or like work-holders B23B 31/28, B23Q 3/00; work-holding devices B25B 11/00; lifting magnets B66C 1/00; [operating or controlling locks using permanent magnets E05B 47/0038; devices for holding a wing, e.g. door or window, by magnetic or electromagnetic attraction E05C 19/16; relieving load or bearings using magnetic means F16C 39/06]; for electric meters G01R; for relays H01H; [for electric discharge tubes H01J, e.g. H01J 3/24, H01J 23/10, H01J 29/68]; for dynamo-electric machines H02K)

7/02 . Permanent magnets [PM]

7/0205 . . [Magnetic circuits with PM in general]

7/021 . . . [Construction of PM (H01F 7/0278 takes precedence; PM compositions H01F 1/032)]

7/0215 . . . . [Flexible forms, sheets]

7/0221 . . . . [Mounting means for PM, supporting, coating, encapsulating PM]

7/0226 . . . . . [PM with variable field strength (H01F 7/0284 takes precedence)]

7/0231 . . . . . [Magnetic circuits with PM for power or force generation]

7/0236 . . . . . [Magnetic suspension or levitation (for vehicles B60L 13/04; magnetic bearings F16C 39/063)]

7/0242 . . . . . [Magnetic drives, magnetic coupling devices]

7/0247 . . . . . [Orientating, locating, transporting arrangements]

7/0252 . . . . . . [PM holding devices (H01F 7/021, H01F 7/0215, H01F 7/0226 take precedence)]

7/0257 . . . . . [Lifting, pick-up magnetic objects]

7/0263 . . . . . . [Closures, bags, bands, engagement devices with male and female parts]

7/0268 . . . . . . [Magnetic cylinders]

7/0273 . . . . . . [Magnetic circuits with PM for magnetic field generation]

7/0278 . . . . . [for generating uniform fields, focusing, deflecting electrically charged particles (for magnetic separation by Lorentz force B03C 1/023; specially adapted for NMR applications G01R 33/383)]

7/0284 . . . . . . [using a trimmable or adjustable magnetic circuit, e.g. for a symmetric dipole or quadrupole magnetic field]

7/0289 . . . . . . [Transducers, loudspeakers, moving coil arrangements]

7/0294 . . . . . [Detection, inspection, magnetic treatment]

7/04 . . . . . Means for releasing the attractive force

7/06 . . . . . Electromagnets; Actuators including electromagnets (electric coils H01F 5/00; devices for holding workpieces using electric force B23O 3/15; load-engaging elements for lifting articles electromagnetically B66C 1/00; electromagnetic couplings F16D 27/00; magnetic brakes F16D 63/002; electromagnetically operated valves F16K 11/24, F16K 31/00; analysing materials by magnetic means G01N 27/72, G01N 27/80); electromagnets for winding mechanical clocks G04C 1/07; electromagnetic relays H01H 51/00; windings for salient poles of dynamo-electric machines H02K 3/18; electromagnets for telegraphic communication H04L; for arc lamps H05B 31/28)]

2007/062 . . . . . . [Details of terminals or connectors for electromagnets]

7/064 . . . . . Circuit arrangements for actuating electromagnets (circuit arrangements for obtaining special operating characteristics H01F 7/18; driving circuits for electromagnets making use of a switching regulator H01H 47/325)]

7/066 . . . . . [Electromagnets with movable winding]

2007/068 . . . . . . [using printed circuit coils]

7/08 . . . . . . . with armatures

7/081 . . . . . . . . . [Magnetic constructions]

2007/083 . . . . . . . . . [External yoke surrounding the coil bobbin, e.g. made of bent magnetic sheet]

2007/085 . . . . . . . . . [Yoke or polar piece between coil bobbin and armature having a gap, e.g. filled with nonmagnetic material]

2007/086 . . . . . . . . . [Structural details of the armature]

7/088 . . . . . . . . . . [provided with means for absorbing shocks]

7/10 . . . . . . . . . . . . . . specially adapted for alternating current

7/11 . . . . . . . . . . . . . . reducing or eliminating the effects of eddy currents

7/12 . . . . . . . . . . . . . . having anti-chattering arrangements

7/1205 . . . . . . . . . . . . . . [having short-circuited conductors (electromagnetic relays provided with short-circuited conducting sleeves H01H 47/00)]

7/121 . . . . . . . . . . . . . . Guiding or setting position of armatures, e.g. retaining armatures in their end position

7/122 . . . . . . . . . . . . . . by permanent magnets ([H01F 7/1615, H01F 7/1646 take precedence])

7/123 . . . . . . . . . . . . . . by ancillary coil

7/124 . . . . . . . . . . . . . . by mechanical latch, e.g. detent

7/126 . . . . . . . . . . . . . . Supporting or mounting

7/127 . . . . . . . . . . . . . . Assembling

7/128 . . . . . . . . . . . . . . Encapsulating, encasing or sealing

7/129 . . . . . . . . . . . . . . of armatures

7/13 . . . . . . . . . . . . . . characterised by pulling-force characteristics

7/14 . . . . . . . . . . . . . . Pivoting armatures (H01F 7/17 takes precedence)

7/145 . . . . . . . . . . . . . . [Rotary electromagnets with variable gap (with fixed gap or torque motors H02K 26/00)]

7/16 . . . . . . . . . . . . . . Rectilinearly-movable armatures (H01F 7/17 takes precedence)

7/1607 . . . . . . . . . . . . . . Armatures entering the winding

7/1615 . . . . . . . . . . . . . . Armatures or stationary parts of magnetic circuit having permanent magnet

7/1623 . . . . . . . . . . . . . . Armatures having T-form
adapted for NMR applications G01R 33/381
forces B21D 26/14
H01F 5/00
; electromagnets specially without armatures (cores H01F 3/00
; {shaping metal by applying magnetic coils
operation, for sequential energisation of operating characteristics, e.g. for slow Circuit arrangements for obtaining desired Pivoting and rectilinearly-movable armatures
Circuit arrangements for holding the operation of electromagnets or for holding the armature in attracted position with reduced energising current (for holding relay armature in attracted position with reduced energising current H01H 47/04: quick energising of electro-dynamic machines H02P 9/08; for quickly de-energising of dynamo-electric generators H02P 9/123)"
7/1805 . . . . [Circuit arrangements for holding the operation of electromagnets or for holding the armature in attracted position with reduced energising current (for holding relay armature in attracted position with reduced energising current H01H 47/04: quick energising of electro-dynamic machines H02P 9/08; for quickly de-energising of dynamo-electric generators H02P 9/123)]
7/1811 . . . . [demagnetising upon switching off, removing residual remagnetism]
7/1816 . . . . [making use of an energy accumulator (for relays H01H 47/043)]
2007/1822 . . . . [using a capacitor to produce a boost voltage]
7/1827 . . . . [by changing number of serially-connected turns or windings (for relays H01H 47/06)]
7/1833 . . . . [by changing number of parallel-connected turns or windings (for relays H01H 47/08)]
7/1838 . . . . [by switching-in or -out impedance (for relays H01H 47/10)]
7/1844 . . . . [Monitoring or fail-safe circuits (for relays H01H 47/002)]
2007/185 . . . . [with armature position measurement]
2007/1855 . . . . [using a stored table to deduce one variable from another]
2007/1861 . . . . [using derivative of measured variable]
2007/1866 . . . . [with regulation loop]
7/1872 . . . . [Bistable or bidirectional current devices (relays H01H 47/226)]
7/1877 . . . . [controlling a plurality of loads]
7/1883 . . . . [by steepening leading and trailing edges of magnetisation pulse, e.g. printer drivers]
2007/1888 . . . . [using pulse width modulation]
2007/1894 . . . . [minimizing impact energy on closure of magnetic circuit]
7/20 . . . . without armatures (cores H01F 3/00; coils H01F 5/00; {shaping metal by applying magnetic forces B21D 26/14; electromagnets specially adapted for NMR applications G01R 33/381})
7/202 . . . . [Electromagnets for high magnetic field strength (for superconducting electromagnets H01F 6/00; for transformers or inductances without a magnetic core H01F 30/08)]
7/204 . . . . [Circuits for energising or de-energising]
7/206 . . . . [Electromagnets for lifting, handling or transporting of magnetic pieces or material (electromagnets for guidance of vehicles, workpieces B65G 21/2009; for magnetic suspension or levitation H02N 15/00)]
2007/208 . . . . [combined with permanent magnets]

10/00 Thin magnetic films, e.g. of one-domain structure (magnetic record carriers G11B 5/00; thin-film magnetic stores G11C)
10/002 . . . . [Antiferromagnetic thin films, i.e. films exhibiting a Néel transition temperature (H01F 10/3218 and H01F 10/3268 take precedence)]

WARNING This groups is not complete pending the completion of reclassification; see provisionally also H01F 10/00 - H01F 10/30
10/005 . . . . [organic or organo-metallic films, e.g. monomolecular films obtained by Langmuir-Blodgett technique, graphene]
10/007 . . . . [ultrathin or granular films (H01F 10/005 and H01F 10/3227 take precedence; applying ultrathin or granular layers to substrates H01F 41/301)]
10/06 . . . . characterised by the composition
10/10 . . . . being metals or alloys (intermetallic compounds H01F 10/18)
10/12 . . . . [having a L10 crystallographic structure, e.g. [Co,Fe][Pt,Pd] thin films]

WARNING This groups is not complete pending the completion of reclassification; see provisionally also H01F 10/16
10/126 . . . . [containing rare earth metals (H01F 10/133 takes precedence)]
10/13 . . . . Amorphous metallic alloys, e.g. glassy metals ([H01F 10/3204 takes precedence])

NOTE In this group, amorphous metallic alloys are classified in the last appropriate place
10/131 . . . . [containing iron or nickel]
10/132 . . . . [containing cobalt]
10/133 . . . . [containing rare earth metals]
10/135 . . . . [containing transition metals]
10/136 . . . . . . . . [containing iron]
10/137 . . . . . . . . [containing cobalt]
10/138 . . . . . . . . [containing nanocrystallites, e.g. obtained by annealing]
exchange-coupled multilayers to substrates nanostructured superlattices { (applying spin-
Spin-exchange-coupled multilayers, e.g. CoPt/Co or NiFe/CoSm (nanocomposite spring
magnets H01F 1/0579)}

Exchange coupling via one or more magnetisable ultrathin or granular films]

{via a non-magnetic spacer]

{made of a noble metal, e.g.(Co/Pt) n multilayers having perpendicular anisotropy
(H01F 10/3286 takes precedence)}

{Exchange coupling of magnetic film pairs via a very thin non-magnetic spacer, e.g. by exchange
with conduction electrons of the spacer}

{the spacer being superconductive]

{the spacer being noble metal]

{the spacer being semiconducting or insulating, e.g. for spin tunnel junction [STJ]}

{Spin-exchange-coupled multilayers comprising at least a nanoxide layer [NOL], e.g. with a NOL spacer]

{the exchange coupling being symmetric, e.g. for dual spin valve, e.g. NiO/Co/Cu/Co/Cu/ NiO]

{the exchange coupling being asymmetric, e.g. by use of additional pinning, by using antiferromagnetic or ferromagnetic coupling interface, i.e. so-called spin-valve [SV] structure, e.g. NiFe/Cu/NiFe/FeMn]

{by use of anti-parallel coupled [APC] ferromagnetic layers, e.g. artificial ferrimagnets [AFI], artificial [AAF] or synthetic [SAF] anti-ferrimagnets]

{by use of artificial ferrimagnets [AFI] only]

{only by use of asymmetry of the magnetic film pair itself, i.e. so-called pseudospin valve [PSV] structure, e.g. NiFe/Cu/Co]

{Spin-exchange coupled multilayers having at least one layer with perpendicular magnetic anisotropy}

{Spin-exchange coupled multilayers wherein the magnetisation of the free layer is switched by a spin-polarised current, e.g. spin torque effect}

{Spin-exchange coupled multilayers wherein the magnetic pinned or free layers are laminated without anti-parallel coupling within the pinned and free layers]

{Apparatus or processes for magnetising or demagnetising }{devices for holding workpieces using magnetic or electric force acting directly on the workpieces B23Q 3/15} ; for degaussing ships B63G 9/06; for clocks or watches G04D 9/00; {recording or erasing of information on magnetic record carriers G11B 5/00} ; demagnetising arrangements for colour television H04N 9/29

{Methods and devices for magnetising permanent magnets (permanent magnets H01F 7/02)}
19/08 . . . Transformers having magnetic bias, e.g. for handling pulses
2019/085 . . . [Transformer for galvanic isolation]

21/00 Variable inductances or transformers of the signal type (H01F 36/00 takes precedence)
21/005 . . . (Inductances without magnetic core)
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
21/065 . . . [Measures for obtaining a desired relation between the position of the core and the inductance]
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

2021/125 . . . [Printed variable inductor with taps, e.g. for VCO]

27/00 Details of transformers or inductances, in general
27/002 . . . (Arrangements provided on the transformer facilitating its transport)
27/004 . . . [Arrangements for interchanging inductances, transformers or coils thereof]
27/006 . . . [with special arrangement or spacing of turns of the winding(s), e.g. to produce desired self-resonance]
27/008 . . . [with temperature compensation]
27/02 . . . Casings
27/022 . . . [Encapsulation]
27/025 . . . [Constructional details relating to cooling]
27/027 . . . [specially adapted for combination of signal type inductors or transformers with electronic circuits, e.g. mounting on printed circuit boards]
27/04 . . . Leading of conductors or axes through casings, e.g. for tap-changing arrangements
27/06 . . . Mounting, supporting or suspending transformers, reactors or choke coils {not being of the signal type}
2027/065 . . . [Mounting on printed circuit boards]
27/08 . . . Cooling (heat-transfer elements F28E); Ventilating (structural details of casings H01F 27/02)
27/085 . . . [Cooling by ambient air]
27/10 . . . Liquid cooling
27/105 . . . [Cooling by special liquid or by liquid of particular composition]
27/12 . . . Oil cooling
27/125 . . . [Cooling by synthetic insulating and incombustible liquid]
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
27/24 . . . Magnetic cores
27/245 . . . made from sheets, e.g. grain-oriented (H01F 27/26 takes precedence)
27/2455 . . . [using bent laminations]
H01F

27/25 . . . made from strips or ribbons \(\text{H01F 27/26}\) takes precedence
27/255 . . . made from particles \(\text{H01F 27/26}\) takes precedence
27/26 . . . Fastening parts of the core together; Fastening or mounting the core on casing or support (on coil \text{H01F 27/30})
27/263 . . .\{Fastening parts of the core together\}
27/266 . . .\{Fastening or mounting the core on casing or support (on coil \text{H01F 27/30})\}
27/28 . . . Coils; Windings; Conductive connections
27/2804 . . .\{Printed windings\}
2027/2809 . . .\{on stacked layers\}
2027/2814 . . .\{with only part of the coil or of the winding in the printed circuit board, e.g. the remaining coil or winding sections can be made of wires or sheets\}
2027/2819 . . .\{Planar transformers with printed windings, e.g. surrounded by two cores and to be mounted on printed circuit\}
27/2823 . . .\{Wires (\text{H01F 27/2866} takes precedence)\}
27/2828 . . .\{Construction of conductive connections, of leads\}
2027/2833 . . .\{using coaxial cable as wire\}
2027/2838 . . .\{using transposed wires\}
2027/2842 . . .\{Wire coils wound in conical zigzag to reduce voltage between winding turns\}
27/2847 . . .\{Sheets; Strips (\text{H01F 27/2866} takes precedence)\}
27/2852 . . .\{Construction of conductive connections, of leads\}
2027/2857 . . .\{Coil formed from wound foil conductor\}
2027/2861 . . .\{Coil formed by folding a blank\}
27/2866 . . .\{Combination of wires and sheets\}
27/2871 . . .\{Pancake coils\}
27/2876 . . .\{Cooling (cooling transformers and inductances in general \text{H01F 27/08})\}
27/288 . . .\{Shielding\}
27/2885 . . .\{with shields or electrodes (shields or electrodes for pancake coils \text{H01F 27/2871}; construction of electric or magnetic shields or screens \text{H01F 27/36})\}
27/289 . . .\{with auxiliary windings (for pancake coils \text{H01F 27/2871})\}
27/2895 . . .\{Windings disposed upon ring cores\}
27/29 . . .\{Terminals; Tapping arrangements (for signal inductances)\}
27/292 . . .\{Surface mounted devices\}
2027/295 . . .\{with flexible terminals\}
2027/297 . . .\{with pin-like terminal to be inserted in hole of printed path\}
27/30 . . .\{Fastening or clamping coils, windings, or parts thereof together; Fastening or mounting coils or windings on core, casing, or other support\}
27/303 . . .\{Clamping coils, windings or parts thereof together\}
27/306 . . .\{Fastening or mounting coils or windings on core, casing or other support\}
27/32 . . .\{Insulating of coils, windings, or parts thereof\}
27/321 . . .\{using a fluid for insulating purposes only\}
27/322 . . .\{the insulation forming channels for circulation of the fluid\}
27/323 . . .\{Insulation between winding turns, between winding layers\}
27/324 . . .\{Insulation between coil and core, between different winding sections, around the coil; Other insulation structures\}
27/325 . . .\{Coil bobbins (formers for coils in general \text{H01F 5/02})\}
27/326 . . .\{specifically adapted for discharge lamp ballasts\}
27/327 . . .\{Encapsulating or impregnating (encapsulating coil and core \text{H01F 27/023})\}
2027/328 . . .\{Dry-type transformer with encapsulated foil winding, e.g. windings coaxially arranged on core legs with spacers for cooling and with three phases\}
2027/329 . . .\{Insulation with semiconducting layer, e.g. to reduce corona effect\}
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\}
27/341 . . .\{Preventing or reducing no-load losses or reactive currents\}
27/343 . . .\{Preventing or reducing surge voltages; oscillations\}
27/345 . . .\{[using auxiliary conductors]\}
27/346 . . .\{[Preventing or reducing leakage fields (using magnetic shields \text{H01F 27/365}; using auxiliary windings \text{H01F 27/38})]\}
2027/348 . . .\{[Preventing eddy currents]\}
27/36 . . .\{Electric or magnetic shields or screens (movable for varying inductance \text{H01F 21/10})\}
27/362 . . .\{[Electric shields or screens]\}
27/365 . . .\{[Magnetic shields or screens]\}
27/367 . . .\{[using non-magnetic screens]\}
27/38 . . .\{Auxiliary core members; Auxiliary coils or windings\}
27/385 . . .\{[for reducing harmonics]\}
27/40 . . .\{Structural association with built-in electric component, e.g. fuse\}
27/402 . . .\{[Association of measuring or protective means]\}
2027/404 . . .\{[Protective devices specially adapted for fluid filled transformers]\}
2027/406 . . .\{[Temperature sensor or protection]\}
27/408 . . .\{[Association with diode or rectifier]\}
27/42 . . .\{Circuits especially adapted for the purpose of modifying, or compensating for, electric characteristics of transformers, reactors, or choke coils (circuits for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output \text{H02P 13/00}; impedance networks \text{H03H})\}
27/422 . . .\{[for instrument transformers]\}
27/425 . . .\{[for voltage transformers]\}
27/427 . . .\{[for current transformers]\}
29/00 Variable transformers or inductances not covered by group \text{H01F 21/00} (\{tap change devices \text{H01H 9/0005}\})
29/02 . . .\{with tappings on coil or winding; with provision for rearrangement or interconnection of windings\}
29/025 . . .\{[Constructional details of transformers or reactors with tapping on coil or windings]\}
29/04 . . .\{having provision for tap-changing without interrupting the load current\}
of sheets H01F 1/16)
38/02 Adaptations of transformers or inductances for specific applications or functions
38/03/003 [High frequency transformer for microwave oven]
38/03/006 [matrix transformer consisting of several interconnected individual transformers working as a whole]
38/02 . for non-linear operation
38/02/06 . [non-linear inductive arrangements for converters, e.g. with additional windings]
38/04 . for frequency changing
38/06 . for changing the wave shape
38/08 . High-leakage transformers or inductances
38/08/05 . [Welding transformers]
38/10 . Ballasts, e.g. for discharge lamps
38/12 . Ignition, e.g. for IC engines
38/12/002 [with rod-shaped core]
38/12/005 [with oil insulation]
38/12/007 [with magnetic circuit including permanent magnet]
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 (high leakage transformers H01F 38/08; dynamo-electric machines with movable part of magnetic circuit H02K 23/44, H02K 23/48)
29/12 . having movable coil, winding, or part thereof; having movable shield
29/14 . with variable magnetic bias ([amplitude modulation by means of variable impedance element H03C 1/08] ; magnetic amplifiers H03F; circuits for automatic telephonic communication H04M 3/00))
2029/143 . . [with control winding for generating magnetic bias]
29/146 . . {Constructional details}
30/00 Fixed transformers not covered by group H01F 19/00
30/02 . Auto-transformers
30/04 . having two or more secondary windings, each supplying a separate load, e.g. for radio set power supplies
30/06 . characterised by the structure
30/08 . . without magnetic core
30/10 . . Single-phase transformers (H01F 30/16 takes precedence)
30/12 . . Two-phase, three-phase or polyphase transformers
30/14 . . for changing the number of phases
30/16 . . Toroidal transformers
36/00 Transformers with superconductive windings or with windings operating at cryogenic temperature (superconducting magnets or superconducting coils H01F 6/00)
37/00 Fixed inductances not covered by group H01F 17/00
37/00/005 { without magnetic core }
38/00 Adaptaions of transformers or inductances for specific applications or functions
2038/003 [High frequency transformer for microwave oven]
2038/006 [matrix transformer consisting of several interconnected individual transformers working as a whole]
38/02 . for non-linear operation
38/02/06 . [non-linear inductive arrangements for converters, e.g. with additional windings]
38/04 . for frequency changing
38/06 . for changing the wave shape
38/08 . High-leakage transformers or inductances
38/08/05 . [Welding transformers]
38/10 . Ballasts, e.g. for discharge lamps
38/12 . Ignition, e.g. for IC engines
2038/122 . [with rod-shaped core]
2038/125 . [with oil insulation]
2038/127 . [with magnetic circuit including permanent magnet]
38/14 . Inductive couplings [(for charging batteries from ac mains by converters H02J 7/025)]
2038/143 . . [for signals]
2038/146 . . [in combination with capacitive coupling]
38/16 . Cascade transformers, e.g. for use with extra high tension
38/18 . Rotary transformers
38/20 . Instruments transformers
38/22 . for single phase ac
38/24 . . . Voltage transformers
38/26 . . . . Constructions
38/28 . . . . Current transformers
38/30 . . . . Constructions
2038/305 . . . . [with toroidal magnetic core]
38/32 . . Circuit arrangements
38/34 . . Combined voltage and current transformers
38/36 . . . Constructions
38/38 . . . for polyphase ac
38/40 . . . for dc
38/42 . . Flyback transformers
2038/423 . . . [with adjusting potentiometers]
2038/426 . . . [with gap in transformer core]
41/00 Apparatus or processes specially adapted for manufacturing or assembling magnets, inductances or transformers; Apparatus or processes specially adapted for manufacturing materials characterised by their magnetic properties
41/00/005 {Impregnating or encapsulating (insulating of windings H01F 41/12)}
41/02 . for manufacturing cores, coils, or magnets (H01F 41/14 takes precedence; for dynamo-electric machines H02K 15/00)
41/02/06 . . [Manufacturing of magnetic cores by mechanical means (magnetic cores per se H01F 27/24)]
41/02/13 . . . [Manufacturing of magnetic circuits made from strip(s) or ribbon(s) (magnetic cores made by winding a ribbon H01F 27/25)]
41/02/22 . . . [by winding the strips or ribbons around a coil]
41/02/26 . . . [from amorphous ribbons]
41/02/33 . . . [Manufacturing of magnetic circuits made from sheets (magnetic cores made from sheets H01F 27/245; soft magnetic alloys in the form of sheets H01F 1/16)]
41/02/4 . . . [Manufacturing of magnetic circuits made from deformed sheets (magnetic cores made from deformed sheets H01F 27/2455)]
41/02/46 . . . [Manufacturing of magnetic circuits by moulding or by pressing powder (magnetic cores made by moulding or by pressing powder H01F 27/2455; soft magnetic particles H01F 1/20; H01F 1/36)]
41/02/53 . . . [for manufacturing permanent magnets]
41/02/6 . . . [protecting methods against environmental influences, e.g. oxygen, by surface treatment (magnetic particles with skin H01F 1/061, H01F 1/09, H01F 1/24, H01F 1/33 and G11B 5/706)]
41/02/66 . . . [Moulding; Pressing (H01F 41/0273 takes precedence; hard magnetic particles H01F 1/06, H01F 1/11)]
H01F

41/0273 . . . [Imparting anisotropy (methods and devices for magnetising permanent magnets H01F 13/003)]
41/028 . . . [Radial anisotropy (for rotor or stator bodies H02K 15/02)]
41/0286 . . . [Trimming]
41/0293 . . . [diffusion of rare earth elements, e.g. Tb, Dy or Ho, into permanent magnets]
41/04 . . . for manufacturing coils (coils for transformer or inductances H01F 27/28)
41/041 . . . [Printed circuit coils (apparatus or processes for manufacturing printed circuits in general H05K 3/00)]
41/042 . . . [by thin film techniques]
41/043 . . . [by thick film techniques]
41/045 . . . [Trimming]
41/046 . . . [structurally combined with ferromagnetic material]
41/047 . . . [structurally combined with superconductive material]
41/048 . . . [Superconductive coils]
41/06 . . . Coil winding
41/061 . . . Winding flat conductive wires or sheets
41/063 . . . with insulation
41/064 . . . Winding non-flat conductive wires, e.g. rods, cables or cords
41/066 . . . with insulation
41/068 . . . in the form of strip material
41/069 . . . Winding two or more wires, e.g. bifilar winding
41/07 . . . . . . Twisting
41/071 . . . . . . Winding coils of special form (winding conductors onto closed formers or cores H01F 41/08)

2041/0711 . . . . . . . . . (Winding saddle or deflection coils)
41/073 . . . . . . . . . Winding onto elongate formers
41/074 . . . . . . . . . Winding flat coils
41/076 . . . . . . . . . Forming taps or terminals while winding, e.g. by wrapping or soldering the wire onto pins, or by directly forming terminals from the wire
41/077 . . . . . . . . . Deforming the cross section or shape of the winding material while winding
41/079 . . . . . . . . . Measuring electrical characteristics while winding
41/08 . . . . . . . . . Winding conductors onto closed formers or cores, e.g. threading conductors through toroidal cores
41/082 . . . . . . . . . Devices for guiding or positioning the winding material on the former
41/084 . . . . . . . . . for forming pancake coils
41/086 . . . . . . . . . in a special configuration on the former, e.g. orthocyclic coils or open mesh coils
41/088 . . . . . . . . . using revolving flyers
41/09 . . . . . . . . . Winding machines having two or more work holders or formers
41/092 . . . . . . . . . Turrets; Turntables
41/094 . . . . . . . . . Tensioning or braking devices
41/096 . . . . . . . . . Dispensing or feeding devices
41/098 . . . . . . . . . Mandrels; Formers
41/10 . . . . . . . . . Connecting leads to windings (making electric connections in general H01R 43/00)
41/12 . . . . . . . . . Insulating of windings (impregnating or encapsulating of transformers H01F 41/005; of conductors in general H01B 13/06)
41/122 . . . . . . . . . [Insulating between turns or between winding layers]
41/125 . . . . . . . . . [Other insulating structures; Insulating between coil and core, between different winding sections, around the coil]
41/127 . . . . . . . . . [Encapsulating or impregnating (encapsulating coil and core H01F 41/005)]
41/14 . . . . . . . . . for applying magnetic films to substrates (covering metals, or materials with metals, in general C23C; manufacturing record carriers G11B 5/84)

NOTE
Group H01F 41/30 takes precedence over groups H01F 41/16 - H01F 41/24, and over group H01F 41/32

41/16 . . . the magnetic material being applied in the form of particles, e.g. by serigraphy (, i.e. forming thick magnetic films and precursors therefor, e.g. magnetisable pastes, inks, glass frits (H01F 41/18 - H01F 41/24 take precedence; thick magnetic films H01F 1/0027))
41/18 . . . by cathode sputtering
41/183 . . . [Sputtering targets therefor]
41/186 . . . [for applying a magnetic garnet film (magnetic garnet materials H01F 1/346; magnetic garnet films H01F 10/24)]
41/20 . . . by evaporation
41/205 . . . [by laser ablation, e.g. pulsed laser deposition (PLD)]
41/22 . . . Heat treatment; Thermal decomposition; Chemical vapour deposition
41/24 . . . . . . . from liquids
41/26 . . . . . . . using electric currents (, e.g. electroplating)
41/28 . . . . . . . by liquid phase epitaxy
41/30 . . . . . . . for applying nanostructures, e.g. by molecular beam epitaxy [MBE]
41/301 . . . . . . . [for applying ultrathin or granular layers (ultrathin or granular layers H01F 10/007)]
41/302 . . . . . . . [for applying spin-exchange-coupled multilayers, e.g. nanostructured superlattices (spin-exchange-coupled multilayers H01F 10/32)]
41/303 . . . . . . . [with exchange coupling adjustment of magnetic film pairs, e.g. interface modifications by reduction, oxidation]
41/304 . . . . . . . [using temporary decoupling, e.g. involving blocking, Néel or Curie temperature transitions by heat treatment in presence/absence of a magnetic field]
41/305 . . . . . . . [applying the spacer or adjusting its interface, e.g. in order to enable particular effect different from exchange coupling]
41/306 . . . . . . . [conductive spacer]
41/307 . . . . . . . [insulating or semiconductive spacer]
41/308 . . . . . . . [lift-off processes, e.g. ion milling, for trimming or patterning]
41/309 . . . . . . . [electroless or electrodeposition processes from plating solution]
41/32 . . . . . . . for applying conductive, insulating or magnetic material on a magnetic film (, specially adapted for a thin magnetic film)
WARNING

This groups is not complete pending the completion of reclassification; see provisionally also H01F 41/32

41/325 . .  {applying a noble metal capping on a spin-exchange-coupled multilayer, e.g. spin filter deposition}

41/34 . .  in patterns, e.g. by lithography