

# CPC COOPERATIVE PATENT CLASSIFICATION

## H ELECTRICITY

(NOTE omitted)

## H01 BASIC ELECTRIC ELEMENTS

(NOTE omitted)

## 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.

### WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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

- 1/0009 . {Antiferromagnetic materials, i.e. materials exhibiting a Néel transition temperature ([H01F 1/0036](#) takes precedence)}
- 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](#))}
- NOTE**  
{In groups [H01F 1/09](#), [H01F 1/11](#), [H01F 1/20](#), [H01F 1/33](#), and [H01F 1/36](#), the group [H01F 1/0036](#) takes precedence}
- 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}
- 1/009 . . {bidimensional, e.g. nanoscale period nanomagnet arrays ([H01F 10/007](#) takes precedence)}
- 1/01 . of inorganic materials ([H01F 1/44](#) takes precedence)

- 1/012 . . {adapted for magnetic entropy change by magnetocaloric effect, e.g. used as magnetic refrigerating material (refrigeration systems using magnetic effects [F25B 21/00](#))}
- 1/015 . . . {Metals or alloys}
- 1/017 . . . {Compounds}
- 1/03 . . characterised by their coercivity {([H01F 1/40](#) takes precedence)}
- 1/0302 . . . {characterised by unspecified or heterogeneous hardness or specially adapted for magnetic hardness transitions}
- 1/0304 . . . . {adapted for large Barkhausen jumps or domain wall rotations, e.g. WIEGAND or MATTEUCCI effect ([H01F 1/143](#) and [H01F 1/15391](#) take precedence)}
- 1/0306 . . . . {Metals or alloys, e.g. LAVES phase alloys of the MgCu<sub>2</sub>-type ([H01F 1/0304](#) takes precedence)}
- 1/0308 . . . . . {with magnetic shape memory [MSM], i.e. with lattice transformations driven by a magnetic field, e.g. Heusler alloys}
- 1/0311 . . . . . {Compounds ([H01F 1/0304](#) takes precedence)}
- 1/0313 . . . . . {Oxidic compounds}
- 1/0315 . . . . . {Ferrites}
- 1/0317 . . . . . {Manganites}
- 1/032 . . . of hard-magnetic materials
- 1/04 . . . . metals or alloys
- 1/047 . . . . . Alloys characterised by their composition

### NOTE

In groups [H01F 1/053](#) - [H01F 1/059](#), an alloy is classified in the last appropriate place

- 1/053 . . . . . containing rare earth metals
- 1/0533 . . . . . {in a bonding agent}
- 1/0536 . . . . . {sintered}

1/055	. . . . . and magnetic transition metals, e.g. $\text{SmCo}_5$	1/113	. . . . . in a bonding agent
1/0551	. . . . . {in the form of particles, e.g. rapid quenched powders or ribbon flakes}	1/117	. . . . . Flexible bodies
1/0552	. . . . . {with a protective layer}	1/12	. . . of soft-magnetic materials
1/0553	. . . . . {obtained by reduction or by hydrogen decrepitation or embrittlement}	1/14	. . . . . metals or alloys
1/0555	. . . . . {pressed, sintered or bonded together}	1/143	. . . . . {in the form of wires ( <a href="#">H01F 1/147</a> takes precedence)}
1/0556	. . . . . {pressed}	1/147	. . . . . Alloys characterised by their composition {(treatment thereof for enhancing their electromagnetic properties <a href="#">C21D 8/12</a> )}
1/0557	. . . . . {sintered}	<b>NOTE</b>	
1/0558	. . . . . {bonded together}	In groups	
1/057	. . . . . and IIIa elements, e.g. $\text{Nd}_2\text{Fe}_{14}\text{B}$	<a href="#">H01F 1/14708</a> - <a href="#">H01F 1/15391</a> , an alloy is classified in the last appropriate place	
1/0571	. . . . . {in the form of particles, e.g. rapid quenched powders or ribbon flakes}	1/14708	. . . . . {Fe-Ni based alloys (pure Fe or Ni <a href="#">H01F 1/14</a> , <a href="#">H01F 1/16</a> or <a href="#">H01F 1/20</a> )}
1/0572	. . . . . {with a protective layer}	1/14716	. . . . . {in the form of sheets}
1/0573	. . . . . {obtained by reduction or by hydrogen decrepitation or embrittlement}	1/14725	. . . . . {with insulating coating}
1/0574	. . . . . {obtained by liquid dynamic compaction}	1/14733	. . . . . {in the form of particles}
1/0575	. . . . . {pressed, sintered or bonded together}	1/14741	. . . . . {pressed, sintered or bonded together}
1/0576	. . . . . {pressed, e.g. hot working}	1/1475	. . . . . {the particles being insulated}
1/0577	. . . . . {sintered}	1/14758	. . . . . {by macromolecular organic substances}
1/0578	. . . . . {bonded together}	1/14766	. . . . . {Fe-Si based alloys}
1/0579	. . . . . {with exchange spin coupling between hard and soft nanophases, e.g. nanocomposite spring magnets}	1/14775	. . . . . {in the form of sheets}
1/058	. . . . . and IVa elements, e.g. $\text{Gd}_2\text{Fe}_{14}\text{C}$	1/14783	. . . . . {with insulating coating}
1/059	. . . . . and Va elements, e.g. $\text{Sm}_2\text{Fe}_{17}\text{N}_2$	1/14791	. . . . . {Fe-Si-Al based alloys, e.g. Sendust}
1/0593	. . . . . {of tetragonal $\text{ThMn}_{12}$ -structure}	1/153	. . . . . Amorphous metallic alloys, e.g. glassy metals {(making ferrous amorphous alloys <a href="#">C22C 33/003</a> )}
1/0596	. . . . . {of rhombic or rhombohedral $\text{Th}_2\text{Zn}_{17}$ structure or hexagonal $\text{Th}_2\text{Ni}_{17}$ structure}	1/15308	. . . . . {based on Fe/Ni ( <a href="#">H01F 1/15325</a> takes precedence)}
1/06	. . . . . in the form of particles, e.g. powder ( <a href="#">H01F 1/047</a> takes precedence {; record carriers <a href="#">G11B 5/70605</a> })	1/15316	. . . . . {based on Co ( <a href="#">H01F 1/15325</a> takes precedence)}
1/061	. . . . . {with a protective layer}	1/15325	. . . . . {containing rare earths}
1/063	. . . . . {with a non magnetic core}	1/15333	. . . . . {containing nanocrystallites, e.g. obtained by annealing}
1/065	. . . . . {obtained by a reduction}	1/15341	. . . . . {Preparation processes therefor}
1/066	. . . . . {obtained by liquid dynamic compaction}	1/1535	. . . . . {by powder metallurgy, e.g. spark erosion}
1/068	. . . . . {having a L10 crystallographic structure, e.g. [Co,Fe][Pt,Pd] (nano)particles}	1/15358	. . . . . {Making agglomerates therefrom, e.g. by pressing}
1/08	. . . . . pressed, sintered, or bound together	1/15366	. . . . . {using a binder}
1/083	. . . . . {in a bonding agent}	1/15375	. . . . . {using polymers}
1/086	. . . . . {sintered}	1/15383	. . . . . {Applying coatings thereon ( <a href="#">H01F 1/15366</a> takes precedence)}
1/09	. . . . . mixtures of metallic and non-metallic particles; metallic particles having oxide skin	1/15391	. . . . . {Elongated structures, e.g. wires}
1/10	. . . . . non-metallic substances, e.g. ferrites {, e.g. $[(\text{Ba,Sr})\text{O}(\text{Fe}_2\text{O}_3)_6]$ ferrites with hexagonal structure}	1/16	. . . . . in the form of sheets ( <a href="#">H01F 1/147</a> takes precedence)
1/11	. . . . . in the form of particles {(for magnetic record carriers <a href="#">G11B 5/70626</a> )}	1/18	. . . . . with insulating coating
1/111	. . . . . {with a non-magnetic core}	1/20	. . . . . in the form of particles, e.g. powder ( <a href="#">H01F 1/147</a> takes precedence)
1/112	. . . . . {with a skin ( <a href="#">H01F 1/113</a> takes precedence)}	1/22	. . . . . pressed, sintered, or bound together
		1/24	. . . . . the particles being insulated
		1/26	. . . . . by macromolecular organic substances
		1/28	. . . . . dispersed or suspended in a bonding agent
		1/33	. . . . . mixtures of metallic and non-metallic particles; metallic particles having oxide skin
		1/34	. . . . . non-metallic substances, e.g. ferrites

1/342	. . . . . {Oxides ( <a href="#">H01F 1/36</a> and <a href="#">H01F 1/38</a> take precedence)}	2003/103	. . {Magnetic circuits with permanent magnets}
1/344	. . . . . {Ferrites, e.g. having a cubic spinel structure (X <sub>2</sub> +O)(Y <sub>2</sub> +O <sub>3</sub> ), e.g. magnetite Fe <sub>3</sub> O <sub>4</sub> }	2003/106	. . {Magnetic circuits using combinations of different magnetic materials}
1/346	. . . . . {[(TO <sub>4</sub> ) <sub>3</sub> ] with T= Si, Al, Fe, Ga ( <a href="#">H01F 10/24</a> takes precedence; Faraday rotators <a href="#">G02F 1/09</a> )}	3/12	. . Magnetic shunt paths
1/348	. . . . . {Hexaferrites with decreased hardness or anisotropy, i.e. with increased permeability in the microwave (GHz) range, e.g. having a hexagonal crystallographic structure}	3/14	. . Constrictions; Gaps, e.g. air-gaps ( <a href="#">in magnetic shunt paths H01F 3/12</a> )
1/36	. . . . . in the form of particles ( <a href="#">H01F 1/346</a> , <a href="#">H01F 1/348</a> and <a href="#">H01F 1/38</a> take precedence)}	5/00	<b>Coils</b> (superconducting coils <a href="#">H01F 6/06</a> ; fixed inductances of the signal type <a href="#">H01F 17/00</a> )
1/37	. . . . . in a bonding agent	5/003	. {Printed circuit coils}
1/375	. . . . . Flexible bodies	2005/006	. {with conical spiral form}
1/38	. . . . . amorphous, e.g. amorphous oxides	5/02	. wound on non-magnetic supports, e.g. formers
1/40	. . of magnetic semiconductor materials, e.g. CdCr <sub>2</sub> S <sub>4</sub> (devices using galvanomagnetic or similar effects <a href="#">H01L 43/00</a> )	2005/022	. . {wound on formers with several winding chambers separated by flanges, e.g. for high voltage applications}
1/401	. . . {diluted}	2005/025	. . {wound on coaxial arrangement of two or more formers}
	<b>NOTE</b> In group <a href="#">H01F 1/401</a> , a diluted magnetic semiconductor (DMS) is classified in the last appropriate place	2005/027	. . {wound on formers for receiving several coils with perpendicular winding axes, e.g. for antennae or inductive power transfer}
1/402	. . . . {of II-VI type, e.g. Zn <sub>1-x</sub> Cr <sub>x</sub> Se}	5/04	. Arrangements of electric connections to coils, e.g. leads
1/404	. . . . {of III-V type, e.g. In <sub>1-x</sub> Mn <sub>x</sub> As}	2005/043	. . {having multiple pin terminals, e.g. arranged in two parallel lines at both sides of the coil}
1/405	. . . . {of IV type, e.g. Ge <sub>1-x</sub> Mn <sub>x</sub> }	2005/046	. . {Details of formers and pin terminals related to mounting on printed circuits}
1/407	. . . . {Diluted non-magnetic ions in a magnetic cation-sublattice, e.g. perovskites, La <sub>1-x</sub> (Ba,Sr) <sub>x</sub> MnO <sub>3</sub> }	5/06	. Insulation of windings
1/408	. . . {half-metallic, i.e. having only one electronic spin direction at the Fermi level, e.g. CrO <sub>2</sub> , Heusler alloys ( <a href="#">H01F 10/1936</a> takes precedence)}	6/00	<b>Superconducting magnets; Superconducting coils</b> {(magnetic resonance assemblies using superconducting coil systems <a href="#">G01R 33/3815</a> )}
1/42	. of organic or organo-metallic materials {, e.g. graphene} ( <a href="#">H01F 1/44</a> takes precedence)	2006/001	. {Constructive details of inductive current limiters}
1/44	. of magnetic liquids, e.g. ferrofluids (particles in a bonding agent <a href="#">H01F 1/28</a> , <a href="#">H01F 1/36</a> , <a href="#">H01F 1/37</a> )	6/003	. {Methods and means for discharging superconductive storage (superconducting alloys <a href="#">C22C</a> ; static memories with superconducting elements <a href="#">G11C 11/44</a> ; superconducting circuit breakers with contacts <a href="#">H01H 33/004</a> ; superconducting material <a href="#">H01L 39/00</a> ; power cryotons <a href="#">H01L 39/20</a> ; superconducting switches for low power <a href="#">H03K 17/92</a> )}
1/442	. . {the magnetic component being a metal or alloy, e.g. Fe ( <a href="#">H01F 1/447</a> takes precedence)}	6/005	. {Methods and means for increasing the stored energy in superconductive coils by increments (flux pumps)}
1/445	. . {the magnetic component being a compound, e.g. Fe <sub>3</sub> O <sub>4</sub> ( <a href="#">H01F 1/447</a> takes precedence)}	6/006	. {Supplying energising or de-energising current; Flux pumps}
1/447	. . {characterised by magnetoviscosity, e.g. magnetorheological, magnetorheototropic, magnetodilatant liquids (electrorheological fluids <a href="#">C10M 171/001</a> )}	6/008	. . {Electric circuit arrangements for energising superconductive electromagnets}
3/00	<b>Cores, Yokes, or armatures</b> (magnetic materials <a href="#">H01F 1/00</a> ; permanent magnets <a href="#">H01F 7/02</a> )	6/02	. Quenching; Protection arrangements during quenching {(protection circuits <a href="#">H02H 7/001</a> )}
2003/005	. {Magnetic cores for receiving several windings with perpendicular axes, e.g. for antennae or inductive power transfer}	6/04	. Cooling
3/02	. made from sheets	6/06	. Coils, e.g. winding, insulating, terminating or casing arrangements therefor
3/04	. made from strips or ribbons	6/065	. . {Feed-through bushings, terminals and joints (leading of conductors or axles through casings of transformers <a href="#">H01F 27/04</a> )}
3/06	. made from wires		
3/08	. made from powder (powder coatings on sheets <a href="#">H01F 3/02</a> ; on strips or ribbons <a href="#">H01F 3/04</a> ; on wires <a href="#">H01F 3/06</a> )		
3/10	. Composite arrangements of magnetic circuits		

- 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 [B23Q 3/15](#); load-engaging elements for lifting articles electromagnetically [B66C 1/06](#); 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 1/02](#); 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}
  - 2007/163 . . . . . {with axial bearing}
  - 7/1638 . . . . . {Armatures not entering the winding}
  - 7/1646 . . . . . {Armatures or stationary parts of magnetic circuit having permanent magnet}
  - 7/1653 . . . . . {Magnetic circuit having axially spaced pole-pieces}
  - 2007/1661 . . . . . {Electromagnets or actuators with anti-stick disc}
  - 2007/1669 . . . . . {Armatures actuated by current pulse, e.g. bistable actuators}
  - 2007/1676 . . . . . {Means for avoiding or reducing eddy currents in the magnetic circuit, e.g. radial slots}
  - 2007/1684 . . . . . {Armature position measurement using coils}



2007/1692	. . . . {Electromagnets or actuators with two coils}	10/002	. {Antiferromagnetic thin films, i.e. films exhibiting a Néel transition temperature ( <a href="#">H01F 10/3218</a> and <a href="#">H01F 10/3268</a> take precedence)}
7/17	. . . Pivoting and rectilinearly-movable armatures	10/005	. {organic or organo-metallic films, e.g. monomolecular films obtained by Langmuir-Blodgett technique, graphene}
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	10/007	. {ultrathin or granular films ( <a href="#">H01F 10/005</a> and <a href="#">H01F 10/3227</a> take precedence; applying ultrathin or granular layers to substrates <a href="#">H01F 41/301</a> )}
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 <a href="#">H01H 47/04</a> ; quick energising of electro-dynamic machines <a href="#">H02P 9/08</a> ; for quickly de-energising of dynamo-electric generators <a href="#">H02P 9/123</a> )}	10/06	. characterised by the coupling or physical contact with connecting or interacting conductors
7/1811	. . . . . {demagnetising upon switching off, removing residual magnetism}	10/08	. characterised by magnetic layers ({ <a href="#">H01F 10/32</a> takes precedence } ; applying thin magnetic films to substrates <a href="#">H01F 41/14</a> )
7/1816	. . . . . {making use of an energy accumulator (for relays <a href="#">H01H 47/043</a> )}	10/10	. . characterised by the composition
2007/1822	. . . . . {using a capacitor to produce a boost voltage}	10/12	. . . being metals or alloys (intermetallic compounds <a href="#">H01F 10/18</a> )
7/1827	. . . . . {by changing number of serially-connected turns or windings (for relays <a href="#">H01H 47/06</a> )}	10/123	. . . . {having a L10 crystallographic structure, e.g. [Co,Fe][Pt,Pd] thin films}
7/1833	. . . . . {by changing number of parallel-connected turns or windings (for relays <a href="#">H01H 47/08</a> )}	10/126	. . . . {containing rare earth metals ( <a href="#">H01F 10/133</a> takes precedence)}
7/1838	. . . . . {by switching-in or -out impedance (for relays <a href="#">H01H 47/10</a> )}	10/13	. . . . Amorphous metallic alloys, e.g. glassy metals {( <a href="#">H01F 10/3204</a> takes precedence)}
7/1844	. . . . {Monitoring or fail-safe circuits (for relays <a href="#">H01H 47/002</a> )}	<b>NOTE</b> In this group, amorphous metallic alloys are classified in the last appropriate place	
2007/185	. . . . . {with armature position measurement}	10/131	. . . . . {containing iron or nickel}
2007/1855	. . . . . {using a stored table to deduce one variable from another}	10/132	. . . . . {containing cobalt}
2007/1861	. . . . . {using derivative of measured variable}	10/133	. . . . . {containing rare earth metals}
2007/1866	. . . . . {with regulation loop}	10/135	. . . . . {containing transition metals}
7/1872	. . . . {Bistable or bidirectional current devices (relays <a href="#">H01H 47/226</a> )}	10/136	. . . . . {containing iron}
7/1877	. . . . {controlling a plurality of loads}	10/137	. . . . . {containing cobalt}
7/1883	. . . . {by steepening leading and trailing edges of magnetisation pulse, e.g. printer drivers}	10/138	. . . . . {containing nanocrystallites, e.g. obtained by annealing}
2007/1888	. . . . {using pulse width modulation}	10/14	. . . . containing iron or nickel ({ <a href="#">H01F 10/126</a> , <a href="#">H01F 10/13</a> , <a href="#">H01F 10/16</a> take precedence)
2007/1894	. . . . {minimizing impact energy on closure of magnetic circuit}	<b>NOTE</b> In this group, alloys containing iron or nickel are classified in the last appropriate place	
7/20	. . without armatures (cores <a href="#">H01F 3/00</a> ; coils <a href="#">H01F 5/00</a> {; shaping metal by applying magnetic forces <a href="#">B21D 26/14</a> ; electromagnets specially adapted for NMR applications <a href="#">G01R 33/381</a> )}	10/142	. . . . . {containing Si}
7/202	. . . {Electromagnets for high magnetic field strength (for superconducting electromagnets <a href="#">H01F 6/00</a> ; for transformers or inductances without a magnetic core <a href="#">H01F 30/08</a> )}	10/145	. . . . . {containing Al, e.g. SENDUST}
7/204	. . . . {Circuits for energising or de-energising}	10/147	. . . . . {with lattice under strain, e.g. expanded by interstitial nitrogen ( <a href="#">H01F 10/26</a> - <a href="#">H01F 10/30</a> take precedence)}
7/206	. . . {Electromagnets for lifting, handling or transporting of magnetic pieces or material (electromagnets for guidance of vehicles, workpieces <a href="#">B65G 21/2009</a> ; for magnetic suspension or levitation <a href="#">H02N 15/00</a> )}	10/16	. . . . containing cobalt ({ <a href="#">H01F 10/126</a> , <a href="#">H01F 10/13</a> take precedence)
2007/208	. . . . {combined with permanent magnets}	10/18	. . . being compounds
10/00	<b>Thin magnetic films, e.g. of one-domain structure (magnetic record carriers <a href="#">G11B 5/00</a>; thin-film magnetic stores <a href="#">G11C</a>)</b>	10/187	. . . . Amorphous compounds ({ <a href="#">H01F 10/3204</a> takes precedence)}
		10/193	. . . . Magnetic semiconductor compounds { (in general <a href="#">H01F 1/40</a> ; multilayers, e.g. superlattices <a href="#">H01F 10/3213</a> )}
		10/1933	. . . . . {Perovskites}
		10/1936	. . . . . {Half-metallic, e.g. epitaxial CrO <sub>2</sub> or NiMnSb films}
		10/20	. . . . Ferrites
		10/205	. . . . . {Hexagonal ferrites}
		10/22	. . . . . Orthoferrites {, e.g. RFeO <sub>3</sub> (R= rare earth element) with orthorhombic structure}

- 10/24 . . . . . Garnets { (in general [H01F 1/346](#); multilayers, e.g. superlattices [H01F 10/3209](#); applying magnetic garnet films to substrates by sputtering [H01F 41/186](#)) }
- 10/245 . . . . . { Modifications for enhancing interaction with electromagnetic wave energy }
- 10/26 . characterised by the substrate or intermediate layers { ([H01F 10/06](#) and [H01F 10/32](#) take precedence) }
- 10/265 . . { Magnetic multilayers non exchange-coupled ([H01F 10/32](#) takes precedence) }
- 10/28 . . characterised by the composition of the substrate
- 10/30 . . characterised by the composition of the intermediate layers {, e.g. seed, buffer, template, diffusion preventing, cap layers ([H01F 10/06](#) and [H01F 10/32](#) take precedence) }
- 10/32 . Spin-exchange-coupled multilayers, e.g. nanostructured superlattices { (applying spin-exchange-coupled multilayers to substrates [H01F 41/302](#)) }
- 10/3204 . . { Exchange coupling of amorphous multilayers }
- 10/3209 . . { Exchange coupling of garnet multilayers }
- 10/3213 . . { Exchange coupling of magnetic semiconductor multilayers, e.g. MnSe/ZnSe superlattices (semiconductor materials for use in semiconductor devices [H01L 29/12](#)) }
- 10/3218 . . { Exchange coupling of magnetic films via an antiferromagnetic interface ([H01F 10/3268](#) takes precedence) }
- 10/3222 . . { Exchange coupled hard/soft multilayers, e.g. CoPt/Co or NiFe/CoSm (nanocomposite spring magnets [H01F 1/0579](#)) }
- 10/3227 . . { Exchange coupling via one or more magnetisable ultrathin or granular films }
- 10/3231 . . . { via a non-magnetic spacer }
- 10/3236 . . . . { made of a noble metal, e.g. (Co/Pt) n multilayers having perpendicular anisotropy ([H01F 10/3286](#) takes precedence) }
- 10/324 . . { Exchange coupling of magnetic film pairs via a very thin non-magnetic spacer, e.g. by exchange with conduction electrons of the spacer }
- 10/3245 . . . { the spacer being superconductive }
- 10/325 . . . { the spacer being noble metal }
- 10/3254 . . . { the spacer being semiconducting or insulating, e.g. for spin tunnel junction [STJ] }
- 10/3259 . . . . { Spin-exchange-coupled multilayers comprising at least a nanooxide layer [NOL], e.g. with a NOL spacer }
- 10/3263 . . . { the exchange coupling being symmetric, e.g. for dual spin valve, e.g. NiO/Co/Cu/Co/Cu/Co/NiO }
- 10/3268 . . . { 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 }
- 10/3272 . . . . { by use of anti-parallel coupled [APC] ferromagnetic layers, e.g. artificial ferrimagnets [AFI], artificial [AAF] or synthetic [SAF] anti-ferromagnets }
- 10/3277 . . . . . { by use of artificial ferrimagnets [AFI] only }
- 10/3281 . . . . { only by use of asymmetry of the magnetic film pair itself, i.e. so-called pseudospin valve [PSV] structure, e.g. NiFe/Cu/Co }
- 10/3286 . . . { Spin-exchange coupled multilayers having at least one layer with perpendicular magnetic anisotropy }
- 10/329 . . . { Spin-exchange coupled multilayers wherein the magnetisation of the free layer is switched by a spin-polarised current, e.g. spin torque effect }
- 10/3295 . . . { Spin-exchange coupled multilayers wherein the magnetic pinned or free layers are laminated without anti-parallel coupling within the pinned and free layers }
- 13/00 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](#)) }
- 13/003 . { Methods and devices for magnetising permanent magnets (permanent magnets [H01F 7/02](#)) }
- 13/006 . { Methods and devices for demagnetising of magnetic bodies, e.g. workpieces, sheet material (for erasing of information on magnetic record carriers [G11B 5/00](#)) }
- 17/00 Fixed inductances of the signal type** (coils in general [H01F 5/00](#) (inductors without a potential-jump or surface barrier specially adapted for integrated circuits, details thereof and multistep manufacturing processes therefor [H01L 28/10](#)) )
- 17/0006 . { Printed inductances (printed coils for dynamo-electric machines [H02K 3/26](#); printed circuits [H05K](#)) }
- 17/0013 . . { with stacked layers }
- 2017/002 . . . { Details of via holes for interconnecting the layers }
- 2017/0026 . . . { Multilayer LC-filter }
- 17/0033 . . { with the coil helically wound around a magnetic core }
- 2017/004 . . { with the coil helically wound around an axis without a core }
- 2017/0046 . . { with a conductive path having a bridge }
- 2017/0053 . . { with means to reduce eddy currents }
- 2017/006 . . { flexible printed inductors }
- 2017/0066 . . { with a magnetic layer }
- 2017/0073 . . { with a special conductive pattern, e.g. flat spiral }
- 2017/008 . . { Electric or magnetic shielding of printed inductances }
- 2017/0086 . . { on semiconductor substrate (inductors for integrated circuits [H01L 28/10](#)) }
- 2017/0093 . { Common mode choke coil }
- 17/02 . without magnetic core
- 17/03 . . with ceramic former
- 17/04 . with magnetic core
- 17/041 . . { Means for preventing rotation or displacement of the core }
- 17/043 . . { with two, usually identical or nearly identical parts enclosing completely the coil (pot cores) }
- 17/045 . . { with core of cylindric geometry and coil wound along its longitudinal axis, i.e. rod or drum core }

2017/046	. . . {helical coil made of flat wire, e.g. with smaller extension of wire cross section in the direction of the longitudinal axis}	2027/065	. . . {Mounting on printed circuit boards}
2017/048	. . . {with encapsulating core, e.g. made of resin and magnetic powder}	27/08	. . . Cooling ( <a href="#">heat-transfer elements F28F</a> ); Ventilating ( <a href="#">structural details of casings H01F 27/02</a> )
17/06	. . . with core substantially closed in itself, e.g. toroid	27/085	. . . {Cooling by ambient air}
17/062	. . . {Toroidal core with turns of coil around it}	27/10	. . . Liquid cooling
2017/065	. . . {Core mounted around conductor to absorb noise, e.g. EMI filter}	27/105	. . . {Cooling by special liquid or by liquid of particular composition}
2017/067	. . . {Core with two or more holes to lead through conductor}	27/12	. . . Oil cooling
17/08	. . . Loading coils for telecommunication circuits	27/125	. . . . {Cooling by synthetic insulating and incombustible liquid}
<b>19/00</b>	<b>Fixed transformers or mutual inductances of the signal type (<a href="#">H01F 36/00 takes precedence</a>)</b>	27/14	. . . . Expansion chambers; Oil conservators; Gas cushions; Arrangements for purifying, drying, or filling
19/02	. . . Audio-frequency transformers or mutual inductances, i.e. not suitable for handling frequencies considerably beyond the audio range	27/16	. . . Water cooling
19/04	. . . Transformers or mutual inductances suitable for handling frequencies considerably beyond the audio range ( <a href="#">resonant circuits H03H</a> )	27/18	. . . by evaporating liquids
19/06	. . . Broad-band transformers, e.g. suitable for handling frequencies well down into the audio range	27/20	. . . Cooling by special gases or non-ambient air
19/08	. . . Transformers having magnetic bias, e.g. for handling pulses	27/22	. . . Cooling by heat conduction through solid or powdered fillings
2019/085	. . . {Transformer for galvanic isolation}	27/23	. . . Corrosion protection
<b>21/00</b>	<b>Variable inductances or transformers of the signal type (<a href="#">H01F 36/00 takes precedence</a>)</b>	27/24	. . . Magnetic cores
21/005	. . . {Inductances without magnetic core}	27/245	. . . made from sheets, e.g. grain-oriented ( <a href="#">H01F 27/26 takes precedence</a> )
21/02	. . . continuously variable, e.g. variometers	27/2455	. . . {using bent laminations}
21/04	. . . by relative movement of turns or parts of windings	27/25	. . . made from strips or ribbons ( <a href="#">H01F 27/26 takes precedence</a> )
21/06	. . . by movement of core or part of core relative to the windings as a whole	27/255	. . . made from particles ( <a href="#">H01F 27/26 takes precedence</a> )
21/065	. . . {Measures for obtaining a desired relation between the position of the core and the inductance}	27/26	. . . Fastening parts of the core together; Fastening or mounting the core on casing or support ( <a href="#">on coil H01F 27/30</a> )
21/08	. . . by varying the permeability of the core, e.g. by varying magnetic bias	27/263	. . . {Fastening parts of the core together}
21/10	. . . by means of a movable shield	27/266	. . . {Fastening or mounting the core on casing or support ( <a href="#">on coil H01F 27/30</a> )}
21/12	. . . discontinuously variable, e.g. tapped	27/28	. . . Coils; Windings; Conductive connections
2021/125	. . . {Printed variable inductor with taps, e.g. for VCO}	27/2804	. . . {Printed windings}
<b>27/00</b>	<b>Details of transformers or inductances, in general</b>	2027/2809	. . . {on stacked layers}
27/002	. . . {Arrangements provided on the transformer facilitating its transport}	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}
27/004	. . . {Arrangements for interchanging inductances, transformers or coils thereof}	2027/2819	. . . {Planar transformers with printed windings, e.g. surrounded by two cores and to be mounted on printed circuit}
27/006	. . . {with special arrangement or spacing of turns of the winding(s), e.g. to produce desired self-resonance}	27/2823	. . . {Wires ( <a href="#">H01F 27/2866 takes precedence</a> )}
27/008	. . . {with temperature compensation}	27/2828	. . . {Construction of conductive connections, of leads}
27/02	. . . Casings	2027/2833	. . . {using coaxial cable as wire}
27/022	. . . {Encapsulation}	2027/2838	. . . {using transposed wires}
27/025	. . . {Constructional details relating to cooling}	2027/2842	. . . {Wire coils wound in conical zigzag to reduce voltage between winding turns}
27/027	. . . {specially adapted for combination of signal type inductors or transformers with electronic circuits, e.g. mounting on printed circuit boards}	27/2847	. . . {Sheets; Strips ( <a href="#">H01F 27/2866 takes precedence</a> )}
27/04	. . . Leading of conductors or axles through casings, e.g. for tap-changing arrangements	27/2852	. . . {Construction of conductive connections, of leads}
27/06	. . . Mounting, supporting or suspending transformers, reactors or choke coils {not being of the signal type}	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 ( <a href="#">cooling transformers and inductances in general H01F 27/08</a> )}
		27/288	. . . {Shielding}

27/2885	. . . {with shields or electrodes (shields or electrodes for pancake coils <a href="#">H01F 27/2871</a> ; construction of electric or magnetic shields or screens <a href="#">H01F 27/36</a> )}	27/36	. . Electric or magnetic shields or screens (movable for varying inductance <a href="#">H01F 21/10</a> )
27/289	. . . {with auxiliary windings (for pancake coils <a href="#">H01F 27/2871</a> )}		<b>WARNING</b>
27/2895	. . {Windings disposed upon ring cores}		Group <a href="#">H01F 27/36</a> is impacted by reclassification into groups <a href="#">H01F 27/361</a> , <a href="#">H01F 27/363</a> and <a href="#">H01F 27/366</a> .
27/29	. . Terminals; Tapping arrangements {for signal inductances}		All subgroups listed in this Warning should be considered in order to perform a complete search.
27/292	. . . {Surface mounted devices}		
2027/295	. . . . {with flexible terminals}	27/361	. . . {made of combinations of electrically conductive material and ferromagnetic material}
2027/297	. . . {with pin-like terminal to be inserted in hole of printed path}		<b>WARNING</b>
27/30	. . Fastening or clamping coils, windings, or parts thereof together; Fastening or mounting coils or windings on core, casing, or other support		Group <a href="#">H01F 27/361</a> is incomplete pending reclassification of documents from group <a href="#">H01F 27/36</a> .
27/303	. . . {Clamping coils, windings or parts thereof together}		Groups <a href="#">H01F 27/36</a> and <a href="#">H01F 27/361</a> should be considered in order to perform a complete search.
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}	27/363	. . . {made of electrically conductive material}
27/322	. . . {the insulation forming channels for circulation of the fluid}		<b>WARNING</b>
27/323	. . . {Insulation between winding turns, between winding layers}		Group <a href="#">H01F 27/363</a> is incomplete pending reclassification of documents from group <a href="#">H01F 27/36</a> .
27/324	. . . {Insulation between coil and core, between different winding sections, around the coil; Other insulation structures}		Groups <a href="#">H01F 27/36</a> and <a href="#">H01F 27/363</a> should be considered in order to perform a complete search.
27/325	. . . . {Coil bobbins (formers for coils in general <a href="#">H01F 5/02</a> )}		
27/326	. . . . {specifically adapted for discharge lamp ballasts}	27/366	. . . {made of ferromagnetic material}
27/327	. . . {Encapsulating or impregnating (encapsulating coil and core <a href="#">H01F 27/022</a> )}		<b>WARNING</b>
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}		Group <a href="#">H01F 27/366</a> is incomplete pending reclassification of documents from group <a href="#">H01F 27/36</a> .
2027/329	. . . {Insulation with semiconducting layer, e.g. to reduce corona effect}		Groups <a href="#">H01F 27/36</a> and <a href="#">H01F 27/366</a> should be considered in order to perform a complete search.
27/33	. Arrangements for noise damping	27/38	. . Auxiliary core members; Auxiliary coils or windings
27/34	. Special means for preventing or reducing unwanted electric or magnetic effects, e.g. no-load losses, reactive currents, harmonics, oscillations, leakage fields	27/385	. . . {for reducing harmonics}
		27/40	. Structural association with built-in electric component, e.g. fuse
27/341	. . {Preventing or reducing no-load losses or reactive currents}	27/402	. . {Association of measuring or protective means}
27/343	. . {Preventing or reducing surge voltages; oscillations}	2027/404	. . . {Protective devices specially adapted for fluid filled transformers}
27/345	. . . {using auxiliary conductors}	2027/406	. . . {Temperature sensor or protection}
27/346	. . {Preventing or reducing leakage fields (using magnetic shields <a href="#">H01F 27/36</a> ; using auxiliary windings <a href="#">H01F 27/38</a> )}	2027/408	. . {Association with diode or rectifier}
2027/348	. . {Preventing eddy currents}	27/42	. Circuits specially adapted for the purpose of modifying, or compensating for, electric characteristics of transformers, reactors, or choke coils (circuits for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output <a href="#">H02P 13/00</a> ; impedance networks <a href="#">H03H</a> )
		27/422	. . {for instrument transformers}
		27/425	. . . {for voltage transformers}
		27/427	. . . {for current transformers}
		29/00	<b>Variable transformers or inductances not covered by group <a href="#">H01F 21/00</a> {(tap change devices <a href="#">H01H 9/0005</a>)}</b>



29/02	• with tapplings on coil or winding; with provision for rearrangement or interconnection of windings	2038/122	• • {with rod-shaped core}
29/025	• • {Constructional details of transformers or reactors with tapping on coil or windings}	2038/125	• • {with oil insulation}
29/04	• • having provision for tap-changing without interrupting the load current	2038/127	• • {with magnetic circuit including permanent magnet}
29/06	• with current collector gliding or rolling on or along winding	38/14	• Inductive couplings {(for wireless supply or distribution of electric power using inductive coupling <a href="#">H02J 50/10</a> )}
29/08	• with core, coil, winding, or shield movable to offset variation of voltage or phase shift, e.g. induction regulators	2038/143	• • {for signals}
29/10	• • having movable part of magnetic circuit {(high leakage transformers <a href="#">H01F 38/08</a> ; dynamo-electric machines with movable part of magnetic circuit <a href="#">H02K 23/44</a> , <a href="#">H02K 23/48</a> )}	2038/146	• • {in combination with capacitive coupling}
29/12	• • having movable coil, winding, or part thereof; having movable shield	38/16	• Cascade transformers, e.g. for use with extra high tension
29/14	• with variable magnetic bias {(amplitude modulation by means of variable impedance element <a href="#">H03C 1/08</a> ) ; magnetic amplifiers <a href="#">H03F</a> ; {circuits for automatic telephonic communication <a href="#">H04M 3/00</a> )}	38/18	• Rotary transformers
2029/143	• • {with control winding for generating magnetic bias}	38/20	• Instruments transformers
29/146	• • {Constructional details}	38/22	• • for single phase ac
<b>30/00</b>	<b>Fixed transformers not covered by group <a href="#">H01F 19/00</a></b>	38/24	• • • Voltage transformers
30/02	• Auto-transformers	38/26	• • • • Constructions
30/04	• having two or more secondary windings, each supplying a separate load, e.g. for radio set power supplies	38/28	• • • Current transformers
30/06	• characterised by the structure	38/30	• • • • Constructions
30/08	• • without magnetic core	2038/305	• • • • • {with toroidal magnetic core}
30/10	• • Single-phase transformers ( <a href="#">H01F 30/16</a> takes precedence)	38/32	• • • • • Circuit arrangements
30/12	• • Two-phase, three-phase or polyphase transformers	38/34	• • • • Combined voltage and current transformers
30/14	• • • for changing the number of phases	38/36	• • • • Constructions
30/16	• • Toroidal transformers	38/38	• • for polyphase ac
<b>36/00</b>	<b>Transformers with superconductive windings or with windings operating at cryogenic temperature (superconducting magnets or superconducting coils <a href="#">H01F 6/00</a>)</b>	38/40	• • for dc
<b>37/00</b>	<b>Fixed inductances not covered by group <a href="#">H01F 17/00</a></b>	38/42	• Flyback transformers
37/005	• {without magnetic core}	2038/423	• • {with adjusting potentiometers}
<b>38/00</b>	<b>Adaptations of transformers or inductances for specific applications or functions</b>	2038/426	• • {with gap in transformer core}
2038/003	• {High frequency transformer for microwave oven}	<b>41/00</b>	<b>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</b>
2038/006	• {matrix transformer consisting of several interconnected individual transformers working as a whole}	41/005	• {Impregnating or encapsulating (insulating of windings <a href="#">H01F 41/12</a> )}
38/02	• for non-linear operation	41/02	• for manufacturing cores, coils, or magnets ( <a href="#">H01F 41/14</a> takes precedence; for dynamo-electric machines <a href="#">H02K 15/00</a> )
38/023	• • {of inductances}	41/0206	• • {Manufacturing of magnetic cores by mechanical means (magnetic cores <i>per se</i> <a href="#">H01F 27/24</a> )}
2038/026	• • • {non-linear inductive arrangements for converters, e.g. with additional windings}	41/0213	• • • {Manufacturing of magnetic circuits made from strip(s) or ribbon(s) (magnetic cores made by winding a ribbon <a href="#">H01F 27/25</a> )}
38/04	• • for frequency changing	41/022	• • • • {by winding the strips or ribbons around a coil}
38/06	• • for changing the wave shape	41/0226	• • • • {from amorphous ribbons}
38/08	• High-leakage transformers or inductances	41/0233	• • • {Manufacturing of magnetic circuits made from sheets (magnetic cores made from sheets <a href="#">H01F 27/245</a> ; soft magnetic alloys in the form of sheets <a href="#">H01F 1/16</a> )}
38/085	• • {Welding transformers}	41/024	• • • • {Manufacturing of magnetic circuits made from deformed sheets (magnetic cores made from deformed sheets <a href="#">H01F 27/2455</a> )}
38/10	• • Ballasts, e.g. for discharge lamps	41/0246	• • • • {Manufacturing of magnetic circuits by moulding or by pressing powder (magnetic cores made by moulding or by pressing powder <a href="#">H01F 27/255</a> ; soft magnetic particles <a href="#">H01F 1/20</a> , <a href="#">H01F 1/36</a> )}
38/12	• Ignition, e.g. for IC engines	41/0253	• • {for manufacturing permanent magnets}

41/026	. . . {protecting methods against environmental influences, e.g. oxygen, by surface treatment (magnetic particles with skin <a href="#">H01F 1/061</a> , <a href="#">H01F 1/09</a> , <a href="#">H01F 1/24</a> , <a href="#">H01F 1/33</a> and <a href="#">G11B 5/706</a> )}	41/092	. . . . . Turrets; Turntables
41/0266	. . . {Moulding; Pressing ( <a href="#">H01F 41/0273</a> takes precedence; hard magnetic particles <a href="#">H01F 1/06</a> , <a href="#">H01F 1/11</a> )}	41/094	. . . . . Tensioning or braking devices
41/0273	. . . {Imparting anisotropy (methods and devices for magnetising permanent magnets <a href="#">H01F 13/003</a> )}	41/096	. . . . . Dispensing or feeding devices
41/028	. . . . {Radial anisotropy (for rotor or stator bodies <a href="#">H02K 15/02</a> )}	41/098	. . . . . Mandrels; Formers
41/0286	. . . {Trimming}	41/10	. . . Connecting leads to windings (making electric connections in general <a href="#">H01R 43/00</a> )
41/0293	. . . {diffusion of rare earth elements, e.g. Tb, Dy or Ho, into permanent magnets}	41/12	. . . Insulating of windings ({impregnating or encapsulating of transformers <a href="#">H01F 41/005</a> ; of conductors in general <a href="#">H01B 13/06</a> )}
41/04	. . for manufacturing coils {(coils for transformer or inductances <a href="#">H01F 27/28</a> )}	41/122	. . . . {Insulating between turns or between winding layers}
41/041	. . . {Printed circuit coils (apparatus or processes for manufacturing printed circuits in general <a href="#">H05K 3/00</a> )}	41/125	. . . . {Other insulating structures; Insulating between coil and core, between different winding sections, around the coil}
41/042	. . . . {by thin film techniques}	41/127	. . . . {Encapsulating or impregnating (encapsulating coil and core <a href="#">H01F 41/005</a> )}
41/043	. . . . {by thick film techniques}	41/14	. for applying magnetic films to substrates
41/045	. . . . {Trimming}	<b>NOTE</b>	
41/046	. . . . {structurally combined with ferromagnetic material}	In groups <a href="#">H01F 41/16</a> - <a href="#">H01F 41/24</a> , and <a href="#">H01F 41/32</a> , the group <a href="#">H01F 41/30</a> takes precedence	
41/047	. . . . {structurally combined with superconductive material}	41/16	. . the magnetic material being applied in the form of particles, e.g. by serigraphy {, to form thick magnetic films or precursors thereof} ( <a href="#">H01F 41/18</a> {- <a href="#">H01F 41/24</a> } take precedence)
41/048	. . . {Superconductive coils}	41/18	. . by cathode sputtering
41/06	. . . Coil winding	41/183	. . . {Sputtering targets therefor}
41/061	. . . . Winding flat conductive wires or sheets	41/186	. . . {for applying a magnetic garnet film (magnetic garnet materials <a href="#">H01F 1/346</a> ; magnetic garnet films <a href="#">H01F 10/24</a> )}
41/063	. . . . . with insulation	41/20	. . by evaporation
41/064	. . . . Winding non-flat conductive wires, e.g. rods, cables or cords	41/205	. . . {by laser ablation, e.g. pulsed laser deposition [PLD]}
41/066	. . . . . with insulation	41/22	. . Heat treatment; Thermal decomposition; Chemical vapour deposition
41/068	. . . . . in the form of strip material	41/24	. . from liquids
41/069	. . . . . Winding two or more wires, e.g. bifilar winding	41/26	. . . using electric currents {, e.g. electroplating}
41/07	. . . . . Twisting	41/28	. . . by liquid phase epitaxy
41/071	. . . . Winding coils of special form ( <a href="#">winding conductors onto closed formers or cores</a> <a href="#">H01F 41/08</a> )	41/30	. . for applying nanostructures, e.g. by molecular beam epitaxy [MBE]
2041/0711	. . . . . {Winding saddle or deflection coils}	41/301	. . . {for applying ultrathin or granular layers (ultrathin or granular layers <a href="#">H01F 10/007</a> )}
41/073	. . . . . Winding onto elongate formers	41/302	. . . {for applying spin-exchange-coupled multilayers, e.g. nanostructured superlattices (spin-exchange-coupled multilayers <a href="#">H01F 10/32</a> )}
41/074	. . . . . Winding flat coils	41/303	. . . . {with exchange coupling adjustment of magnetic film pairs, e.g. interface modifications by reduction, oxidation}
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	41/304	. . . . . {using temporary decoupling, e.g. involving blocking, Néel or Curie temperature transitions by heat treatment in presence/absence of a magnetic field}
41/077	. . . . Deforming the cross section or shape of the winding material while winding	41/305	. . . . {applying the spacer or adjusting its interface, e.g. in order to enable particular effect different from exchange coupling}
41/079	. . . . Measuring electrical characteristics while winding	41/306	. . . . . {conductive spacer}
41/08	. . . . Winding conductors onto closed formers or cores, e.g. threading conductors through toroidal cores	41/307	. . . . . {insulating or semiconductive spacer}
41/082	. . . . Devices for guiding or positioning the winding material on the former	41/308	. . . . {lift-off processes, e.g. ion milling, for trimming or patterning}
41/084	. . . . . for forming pancake coils	41/309	. . . . {electroless or electrodeposition processes from plating solution}
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		

## H01F

- 41/32 . for applying conductive, insulating or magnetic material on a magnetic film {, specially adapted for a thin magnetic film}
- 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